

Prospects for the Development of Coconut and Oil Palm Commodities in Community Plantations in North Aceh Regency

Mawardati^{1,*}, Jullimursyida², Suryadi¹, Emmia Tambarta Kembaren¹, Irada Sinta¹

¹Faculty of Agriculture, Universitas Malikussaleh, Indonesia

²Faculty of Economics and Business, Universitas Malikussaleh, Indonesia

Received July 28, 2022; Revised November 4, 2022; Accepted November 24, 2022

Cite This Paper in the Following Citation Styles

(a): [1] Mawardati, Jullimursyida, Suryadi, Emmia Tambarta Kembaren, Irada Sinta, "Prospects for the Development of Coconut and Oil Palm Commodities in Community Plantations in North Aceh Regency," *Universal Journal of Agricultural Research*, Vol. 10, No. 6, pp. 722 - 730, 2022. DOI: 10.13189/ujar.2022.100612.

(b): Mawardati, Jullimursyida, Suryadi, Emmia Tambarta Kembaren, Irada Sinta (2022). *Prospects for the Development of Coconut and Oil Palm Commodities in Community Plantations in North Aceh Regency*. *Universal Journal of Agricultural Research*, 10(6), 722 - 730. DOI: 10.13189/ujar.2022.100612.

Copyright©2022 by authors, all rights reserved. Authors agree that this article remains permanently open access under the terms of the Creative Commons Attribution License 4.0 International License

Abstract This study discusses commodities of oil palm and coconut plantation in North Aceh Regency. This study aims to analyze the prospect for the development of oil palm and coconut commodities using cost and profit analysis methods and financial feasibility analysis. The results of the analysis show that the production cost of oil palm plantations is higher than that of coconut commodities. This is due to differences in garden maintenance costs. Coconut farmers almost never maintain the plantation, while oil palm farmers maintain their plantation even though it is not recommended. The results of the profit analysis show that both businesses provide profits to farmers. Furthermore, the results of the feasibility analysis show that both businesses are feasible, as indicated by the value of $NPV > 0$, $Net\ B/C > 1$ and $IRR >$ of the prevailing interest rate and the BEP is still in the economic life of the plant. However, overall oil palm plantations are more profitable than coconut plantations. In addition to having considerable potential, oil palm and coconut plantations contribute to regional economic development by increasing farmers' incomes and providing employment and business opportunities for the majority of the local community. Therefore, oil palm and coconut plantations have great prospects to be developed in North Aceh Regency.

Keywords Prospect, Community Plantation, Oil Palm,

Coconut

1. Introduction

Oil palm sector provides the largest contribution (around 90.92%) to the Indonesian commodities compared to rubber, cocoa, coconut, and coffee. Oil palm and coconut are the main vegetable oil producers in Indonesia. This commodity is spread throughout Indonesia, including North Aceh Regency. In 2019, the area of oil palm and coconut land in this Regency reached 50.201 Ha (15.83%).

Most people in North Aceh Regency work as coconut farmers and processors in the coconut cooking oil industry. The need for cooking oil in North Aceh is quite fulfilled. Most of the coconut commodities such as copra in North Aceh Regency are used to produce cooking oil which will be sold to North Sumatra. While the dried coconut is used to produce food in the home industry. This commodity is proven to be able to increase regional income. However, the high world demand for palm oil in the form of crude palm oil (CPO) has caused some coconut plantation farmers to switch to oil palm plantation farmers. Government policies are more focused on oil palm plantations ranging from regional expansion

(extensification), provision of superior seeds, infrastructure, to the existence of processing industries ranging from medium to large scale, and replanting policies.

Oil palm is the crop that generates the most productive foreign exchange and is able to meet enormous world demand. Currently, palm oil has grown to lead to vegetable oil which is estimated to reach 240 million tons by 2050. Palm oil has made a major contribution to economic improvements, as reported by producers in various countries [18].

The government's policy on the development of oil palm plantations is expected to increase the production and productivity of FFB. However, the average FFB production in North Aceh Regency is still below 10 tons/ha/year. Productivity is much lower than it should be. Under optimal conditions, oil palm production can reach 20-25 tons of FFB/ha/year or about 5-6 tons of oil palm/ha/year [1]. Furthermore, [3] said that oil palm production with seeds from tissue culture reaches 7-9 tons/ha/year or 32-40 tons FFB/ha/year. Meanwhile, coconut plantations are also declining due to the conversion of coconut plantations to oil palm plantations. The medium-scale coconut cooking oil processing industry has drastically reduced. Although all sub-districts in the regency still have coconut plantations, the average age is above 25 years (above the economic age of annual crops) and there is no policy for replanting. The consumption of cooking oil that used to be from coconut oil has also turned to palm oil. It is not surprising that recently there has been a surge in world CPO prices, the impact of which is not only an increase in prices but also the scarcity of cooking oil in the country, including in North Aceh Regency, causing panic from the government to ordinary people. In fact, this does not need to happen if coconut cooking oil is still being produced so that it becomes a temporary substitute.

Policies that support the development of oil palm plantations can be realized by the government by establishing a special unit called the Integrated Plant Nutrition Management Unit (IPNM) aimed at optimizing soil conditions and taking into account physical, chemical, biological and hydrological properties aimed at improving agricultural productivity and minimizing land degradation. A lot of things can be improved if we have an Integrated Plant Nutrition Management Unit (IPNM), to both providing tangible profits in terms of higher yields and unknowingly trying to conserve natural resources of the land itself [2].

Therefore, it is necessary to study the prospects for the development of coconut commodities through business feasibility, considering that currently the average productivity of people's coconuts in North Aceh Regency is around 822 kg or 0.822 tons/ha/year. Although this figure is still below the national average productivity of about 1 ton/ha/year, the difference is not that big, and the

average coconut productivity is a maximum of 2 - 3 tons/ha/year. While a study on oil palm plantations is also needed because of negative issues regarding the development of this commodity on the environment, the current policy of the North Aceh Regency government remains to focus on plantation development but is advised to expand the plantation area (extensification) in order to choose commodities other than oil palm [4].

2. Literature Review

2.1. The Contribution of Community Plantation to the Economy

The plantation sub-sector plays an important role in economic development. It increases farmers' income, absorbs labor, provides domestic raw materials, and generates foreign exchange. This contribution is shown by both large plantations and community plantations. Therefore, community plantations must be considered by the regional and central governments for their significant contribution in improving the quality and income of garden farmers, macroeconomic stability, and sources of raw materials for the downstream industry of agricultural products; thus, they can become a support or problem solver for the Indonesian state [14]. In addition, community plantations are the backbone of the country's foreign exchange generator, and the absorption of labor in this sector is increasingly evident [15].

Data retrieved from the Statistics Indonesia show that agricultural exports from January to November 2020 were worth 399.5 trillion rupiah, an increase of 12.63% compared to the same period in 2019 of 349.1 trillion rupiah. From the export value, the contribution of plantations reached 90.9% or 363.2 trillion rupiah, and this is an important contributor in achieving the target of the triple export movement (Gratiex). The contribution is generated by both large plantations and community plantations.

In addition to contributing to the national economy, community plantations make a significant contribution to the regional economy [19]. The strategic plantation commodities that have so far contributed to the national economy include oil palm, coconut, and some other commodities. Oil palm plantations contribute to regional income by 7.29% per year and contribution to labor by 5.11% per year [10]. Oil palm plantations are also categorized as quite contributing to improving the welfare of farmers' households. To achieve the decent living category, farmers must have a land area of 2.08 hectares or a minimum selling price of Rp1,553.40 per kg [9].

Another commodity that contributes significantly both to the regional economy and to farmers' income is coconut. The development of coconut-based products continues to show significant opportunities. On the other hand, changes

in the global environment have brought changes to consumer behavior and competitive conditions. Coconut commodity plays a big role in the national economy [6].

2.2. Prospects for the Development of Community Plantation

Oil palm and coconut are two plantation commodities grown in almost all regions of Indonesia, either by large or community plantations. This is very reasonable because in addition to providing economic profits, it is also suitable for agro-climatic conditions. The high world demand for palm oil provides an opportunity for Indonesia as one of the world's largest palm oil producing countries to develop this commodity, especially increasing the intensification of community plantation businesses.

From 2017-2021, the oil palm plantations in Indonesia showed an increasing trend. In 2022, the Indonesian Ministry of Agriculture noted that the area would reach 15.08 million hectares (ha) in 2021. The plantation area increased 1.5% compared to the previous year which was 1.48 million hectares. Of the 15.08 million ha, 6.08 million ha (40.34%) are people's plantations. The addition of smallholder oil palm areas will encourage additional job opportunities for the surrounding community and the business will also provide profits for farmers [12]. In addition, smallholder oil palm farming is also economically feasible with an R/C ratio of >1 [20]. In addition, oil palm plantations also make a significant contribution to regional development [21].

In addition to oil palm, coconut is one of the commodities that has an important selling value for the Indonesian farmers. In 2019, coconut area in Indonesia reached 3,500,726 (ha) and produced 2,992,190 (tons). Currently, the coconut plantations reach 3.5 million hectares, of which 97% is dominated by community plantations. The government rejuvenates coconut plantation in stages. In addition, rejuvenation is also carried out through the Plantation Superior Seed (BUN) 500 program. Through this program, the supply of high-yielding coconut seeds reaches 132,000 hectares, the number of trees being rejuvenated per hectare reaches 120 trees or 120 seeds [17].

As the largest producer in the world, Indonesian coconut has become a giant business. It includes the procurement of production facilities (seeds, fertilizers, pesticides, etc.), production process, processing of coconut products (derivatives of meat, shell, coir, wood, sticks, and sap), and supporting activities (finance, irrigation, transportation, trade, etc.).

The competitiveness of coconut products no longer lies in the primary product but in the downstream industry. The downstream product business is currently growing and has high feasibility for small, medium, and large businesses. It is expected that the downstream industry will become the locomotive of the upstream industry.

Some of the final products that have been well developed are desiccated coconut (DC), coconut milk/cream (CM/CC), coconut charcoal (CCL), activated carbon (AC), and brown sugar (BS). All of them have entered the export market with rapid development. Copra and CCO as semi-finished products are expected to be further processed into oleochemical (OC) products. The export market demand for processed coconut products generally shows an increasing trend (Ministry of Trade, 2020). With an average production of 15.5 billion coconuts per year, the total by-products that can be obtained are 3.75 million tons of water, 0.75 million tons of shell charcoal, 1.8 million tons of coir fiber, and 3.3 million tons coir dust [13]. The coconut fruit component processing industry is generally only a traditional industry with a very small industrial capacity compared to the available potential. However, coconut plantations play a role in driving the regional economy [10]. In addition to playing a role in the regional economy, community coconut plantation is able to provide profits to farmers with an R/C ratio > 1 and is still financially feasible [14].

3. Materials and Methods

This study was focused on the oil palm farmers and coconut farmers in North Aceh Regency using a survey method. The sample locations were determined purposively in 4 (four) sub-districts which have a wider area and there are varying plant ages for the two commodities compared to other sub-districts in North Aceh Regency. The sample selected should include at least 2 families at each age of the plant. The total sample in this study was 100 households, consisting of 50 families of oil palm farmers and 50 families of coconut farmers from 4 selected regencies. The data used in this study are primary data and secondary data.

A qualitative descriptive method is used for data analysis to obtain information related to the potential development of oil palm and coconut commodities. While quantitative descriptive method is used to analyze the policies related to the development of the two commodities. In addition, it is also used to analyze the structure of costs, revenues, and profits for the development of oil palm and coconut commodities.

$$1. \text{ Cost : } TC = FC + VC$$

Where

TC = Total Cost of each commodity (oil palm and coconut)

FC = Fixed Cost of each commodity (oil palm and coconut)

VC = Variable Cost of each commodity (oil palm and coconut)

$$2. \text{ Revenue: } TR_i = P_{yi} \times Q_i$$

Where:

TR_i = Total revenue of each commodity (oil palm and coconut)

P_{yi} = Selling price of each commodity (oil palm and coconut)

Q_i = Total production of each commodity (oil palm and coconut)

3. Profit: $\pi_i = TR_i - TC_i$

Where:

π_i = Profit of each commodity (oil palm and coconut)

TR_i = Total revenue of each commodity (oil palm and coconut)

TC_i = Total Cost of each commodity (oil palm and coconut)

Meanwhile, a feasibility analysis approach is used to analyze the development prospects. Analysis of the financial aspect is calculated using several methods based on investment capital, working capital, and profits obtained [16]. There are 4 financial feasibility criteria used in this study, namely [7]:

1. Net Present Value (NPV)

$$NPV = \sum \frac{B_t - C_t}{(1+i)^t}$$

Where:

B_t = Revenue in year t

C_t = Cost in year t

I = Interest rate

2. Profit Cost Ratio (BCR)

$$Net\ B\ C = \frac{\sum_{t=0}^n (B_t - C_t)/(1+i)^t}{\sum_{t=0}^n (C_t - B_t)/(1+i)^t}$$

Where:

$B_t - C_t$ = Positive net profit

$C_t - B_t$ = Negative net profit

3. Internal Rate of Return (IRR)

$$IRR = i_1 + \left(\frac{NPV_1}{NPV_1 - NPV_2} \right) \cdot (i_2 - i_1)$$

Where:

i_1 = Interest rate generating a positive NPV

i_2 = Interest rate generating a negative NPV

NPV_1 = Positive NPV

NPV_2 = Negative NPV

4. $BEP = T_{p-1} + \frac{\sum_{t=1}^n T_{ci} - \sum B_{tep-1}}{BP}$

Where:

T_{p-1} = Year before achieving BEP

T_{ci} = Total cost after discount

B_{iep-1} = Total profit after discount before BEP year

4. Results and Discussion

North Aceh Regency is located in the northern part of

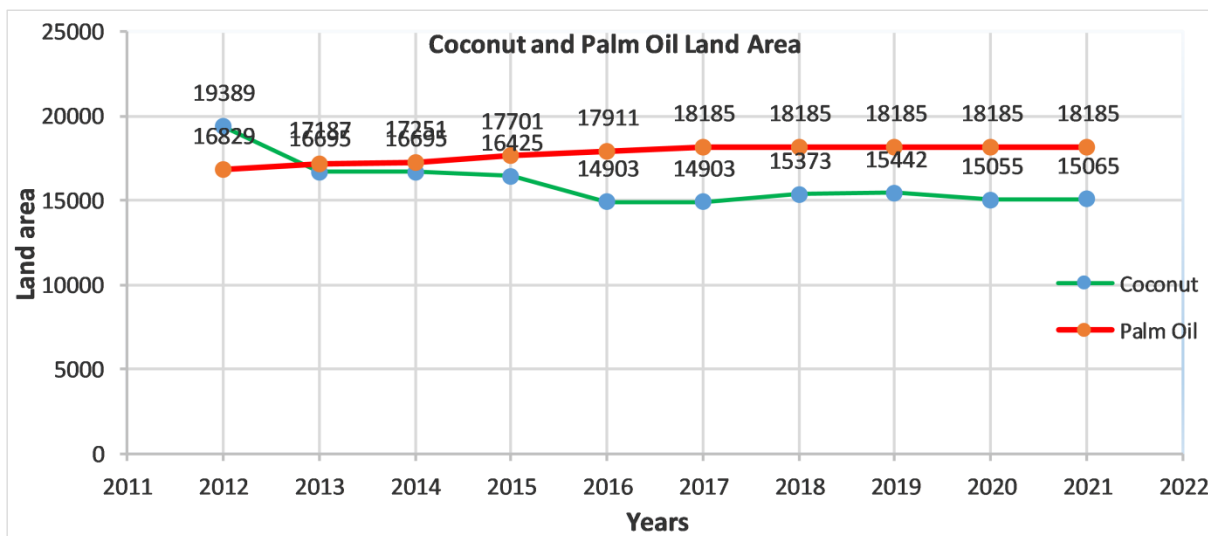
Aceh Province. The North Aceh region has a very varied regional topography, from a wide lowland area in the north extending west to east to mountainous areas in the south. The average height of the North Aceh region is 125 m. The eastern causeway of Sumatra crosses the lowlands, making this low-lying area a more economically developed area than the southern region inland. The low-lying areas are dominated by agricultural land in the form of rice fields and residential areas, on the coast consisting of saltwater fishponds. Meanwhile, in the highland areas, plantations have begun to be cultivated extensively by the community.

4.1. Conditions of Oil Palm and Coconut in Community Plantation in North Aceh Regency

The development of community plantations is one of the main focuses of the regional government of North Aceh Regency in order to support the regional economy. Community plantations are managed by the people independently in a more traditional management. The number of people who depend on plantation crops has resulted in community plantations growing rapidly in this area. Among a number of plantation commodities developed in this area, oil palm, coconut, areca nut, cocoa, and rubber are the leading commodities of the plantation sub-sector that thrive in North Aceh Regency, so they have prospects of being developed to improve the community's economy [22]. The following is the development of the land area for the five leading commodities specifically for community plantations in 2021.

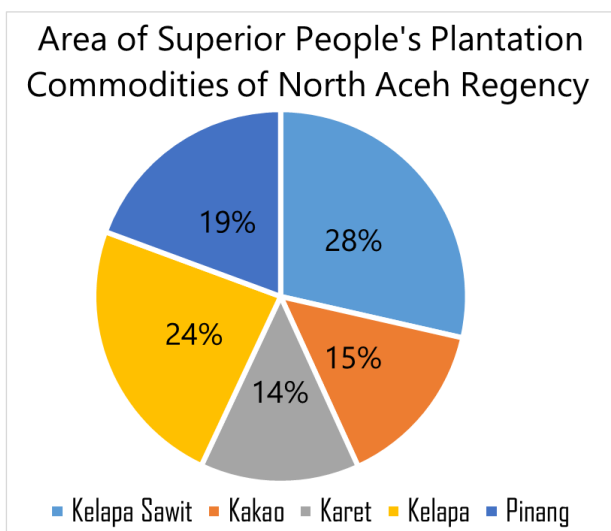
Among the 5 (five) leading plantation commodities in North Aceh Regency, the area of oil palm is 18,185 hectares (28%) and coconut is 15,065 hectares (24%). The development of the area of oil palm and coconut of the community plantations over the last ten years is as shown in Figure 2.

Figure 2 shows that from 2012 to 2017 the area of oil palm community plantation in North Aceh Regency continued to increase even though it was around 0.80 percent. However, from 2017 to 2021, there was no increase in the area of smallholder oil palm plantations, which remained at 18,185 hectares. In addition, an area of 8,682.5 hectares of oil palm plantations in this regency is no longer productive, partly due to plants have been over 25 years old and partly not bearing fruit due to poor quality seeds [22]. Meanwhile, the area of coconut plantations in 2012 was much higher than the area of oil palm plantations. However, there was a significant decrease in 2013, due to the fact that a lot of coconut land was converted into oil palm land. Since 2013, the development of coconut plantation area has fluctuated and tends to decrease.



Source: BPS North Aceh Regency, 2021

Figure 1. Coconut Palm Oil Area



Source: BPS North Aceh Regency (processed)

Figure 2. Area of Superior People's Plantation Commodities

Unfortunately, the community plantations have not been able to provide welfare for farmers. The low level of education of farmers is one of the factors that results in low technology adoption and ultimately low productivity and quality of produce followed by low product selling prices and farmers' income. In fact, community plantations contribute significantly to the economy both at the national and regional levels.

Average production of oil palm and coconut for community plantations in North Aceh Regency for the last 10 years (2012-2021 period).

From 2012-2016, palm oil production almost did not change. However, there was a significant increase in 2017, i.e., 21.87% because all existing land was already in

production. From 2017-2021, there were no significant changes in oil palm production due to the absence of new area expansion. Meanwhile, the production of coconut plantations, although the area decreased by 22.3% from 2012-2021, only decreased by 3.39% in the same period.

In general, the average productivity of oil palm in the community plantations is low, not only in the study area but also in national productivity. National production of palm oil (CPO) from community plantations is estimated at 16.5 tons/ha of FFB (20% yield). The production of independent community plantations is lower than that, a maximum of 15 tons/ha of FFB [5].

4.2. Prospects for the Development of Oil Palm and Coconut Commodities in the Community Plantations in North Aceh Regency

The prospects for plantation development in North Aceh Regency are still wide open for plantation crops. 12,715 ha land has not been used optimally. The potential for rainfed, dry land, and plantations in North Aceh reaches 39,000 hectares, but only about 30% has been utilized. Most of the vacant land is very suitable for the development of plantation commodities, including oil palm and coconut. If oil palm plants require a certain area to be developed, then coconut plants can grow anywhere in the North Aceh Regency. BPS data for North Aceh Regency (2021) shows that coconut plantations are developed in all sub-districts in this regency, while oil palm plantations can be developed in 22 sub-districts out of 27 sub-districts in Aceh Utara regency. In addition, communities who live in rural areas have a relatively large home yard. It is common for them to plant coconut trees in the yards. However, this study found that some people left their yards empty or kept over 25-years-old coconut

trees. If the price of coconut could be better, the community's home yard is one of the most potential lands for coconut plantations.

The results of interviews with farmers show that the interest of farmers in developing these two commodities is quite high. Based on the information obtained, some farmers have planned to change the function of rainfed rice fields for plantation crops, but they do not have knowledge about potential commodities. Farmers have different reasons in choosing plantation commodities to be cultivated, including:

1. Farmers choose commodities that have a high selling price, but they do not take into account the production costs, which are also quite high.
2. Farmers choose commodities because there are seed programs from the government and other parties.
3. Farmers choose certain commodities because they think it is easy to market their produce.
4. Some farmers also choose certain commodities because they are influenced by other farmers.

The low knowledge of farmers on these various aspects also affects their ability to choose the right type of commodity to be cultivated in the right location. Moreover, currently there is still a lot of vacant land that will be used for the development of plantation commodities.

The high demand for plantation products, both to meet the needs of domestic industrial raw materials and for exports, has encouraged the acceleration of growth in the plantation sector, including community plantations. In North Aceh Regency, the area of community plantations by type of plant from 2012-2020 continued to increase. Of a number of plants cultivated, oil palm commodities still occupy the largest area each year, followed by coconut commodities (BPS, 2021).

Unfortunately, local government policies, especially on the development of oil palm plantations, have not been able to increase commodity productivity. The problem is that farmers in the research area have limitations in accepting technology due to the low level of education. The limited ability to seek market information and the capital owned is still very small. The implication is that the assistance provided by the government has not been able to be utilized to develop their oil palm plantations. Thus, the existing opportunities have not been able to be utilized optimally. Whereas for a long time, the enthusiasm of farmers is quite high for the development of this commodity.

Viewed from the aspect of the palm oil processing industry, North Aceh currently has 10 (ten) large and medium-scale agro-industries, both owned by PTPN and private businesses. However, this amount has not been able to accommodate all FFB belonging to community plantations, especially independent farmers. Therefore, government policies are still needed to encourage various parties to build PKS, especially mini PKS in production

centers owned by the community. The distance between the location of community plantations and the CPO industry is one of the causes of their low income [12]. In addition, other policies for the development of oil palm plantations are subsidized fertilizers, seed program, and replanting. Head of Plantation, Livestock and Animal Health Office of North Aceh Regency, Total unproductive oil palm plantations reached 8,682.5 hectares. Currently, his party has proposed rejuvenation of oil palm plantations funded by the central government [10]. Since 2019, replanted oil palm plantations have reached 3,080 hectares. For the 2021 fiscal year, the North Aceh Regency Government has realized the rejuvenation of an area of 400 hectares from the planned 2,500 hectares spread over 10 locations. In addition, palm trees aged over 25 years with an average productivity below 10 tons of FFB per year will also be replanted.

On the other hand, local government policies for the development of coconut plantations, both from the aspect of seed program, fertilizers, and the coconut processing industry, especially replanting have not been as much as oil palm commodities. Apart from being limited in number, the coconut agro-industry is also still on a small and medium scale, the majority of which are home industries. In fact, the area of community coconut plantation is only 5% lower than the area of oil palm plantations. In addition, North Aceh Regency is also a coconut production center in Aceh Province besides Bireuen Regency [1].

4.3. Analysis of the Costs and Profits of Oil Palm and Coconut Business in North Aceh District

Cost analysis is one of the most important things to do in a business. However, it is different in the case of community plantation businesses in the research location. Cost is not a concern for farmers as they focus on profit. This research was conducted on traditional community oil palm and coconut plantations with less intensive management systems. Thus, the use of production costs is also generally not efficient. Farmers only need costs for harvesting, while maintenance costs are not paid much attention because almost all farmers do not carry out proper plant care. However, the amount of costs incurred by farmers varies greatly according to the age of the plant.

Table 1 shows that the average production cost of mature oil palm plantations is Rp2,504,536.9/ha/year with a minimum cost at the age of 25 years, which is Rp1,137,666.6 /ha/year. At that age, the average oil palm plant has reached its economic age and some plants are not harvested due to no longer producing. While the average maximum cost incurred by farmers is Rp6,313,505.0 /ha/year at the age of 17 years of oil palm plantations. Based on information from farmers and some literature, oil palm plants at that age are very productive and almost all plants are productive, thus costs will swell in harvesting.

Table 1. Production Costs of Oil Palm and Coconut in Community Plantations in North Aceh Regency

Description	Oil Palm (Rp/ha/year)	Coconut (Rp/ha/year)
Minimum Cost	1.137.666,6 (25 years)	1,016,861,1 (25)
Maximum Cost	6.313.505,0 (17 years)	3.700.000,0 (6 years)
Average Cost	2.504.536,9	1.991.224,9

Table 2. Profits from Oil Palm and Coconut Commodities in the Community Plantations in North Aceh Regency

Description	Oil Palm (Rp/ha/year)	Coconut (Rp/ha/year)
Minimum Profit	1192371,0 (4 years)	976576,0 (4 years)
Maximum Profit	17370652,6 (13 years)	9991666,6 (14 years)
Average Profit	7.869.619,9	5.650.075,7

Meanwhile, in coconut plantations, the average production cost of mature coconut plantations is Rp1,991,224.9/ha/year with a minimum cost at the age of 25 years, namely Rp1,137,666.6/ha/year. Similar to oil palm plantations, coconut plants are no longer producing because they have reached their economic age. The average maximum cost incurred by coconut farmers is Rp3,700,000/ha/year at the age of 6 years of coconut plantations. Based on information from farmers and some literature, coconut plants have just entered their productive age. In addition to harvest costs, farmers need additional equipment, especially for harvesting needs.

Overall, Table 1 also shows that the average production cost of oil palm plantations is higher than that of coconut plantations. This is due to the difference in the cost of maintaining plantation and plants. Most of the oil palm farmers carry out plant care by applying fertilizer and eradicating pests and diseases even though it is not in accordance with the recommendations. In addition, oil palm farmers clean their plantation at least once a year. In contrast to coconut farmers who almost never take care of both plant maintenance and plantation cleaning. At the research site, it was found that farmers only plant coconut trees, then wait for harvest until the plants no longer produce. This condition does not only occur in coconut community plantations, but also in other agricultural businesses. [6] revealed that generally patchouli farmers in Aceh Province also do not fertilize their plants. In line with these findings, [20] stated that coconut plantation business in Indonesia is rather difficult to develop because it competes with oil palm.

Table 2 shows that the minimum profit for oil palm plantations is Rp1,192,371.0/ha/year and based on data in the field obtained on plants, i.e., 4-years-old. The quality of Fresh Fruit Bunches (FFB) of oil palm plants aged 3-7 years is still low (Mangoensoekarjo S. and Semangun H. 2003), and the average productivity is still low. While the average maximum profit obtained is Rp17,370,652,6 /ha/yr on 13-year-old plants. The high and low profits of farmers are closely related to the amount of production

produced. The 7-13-year-old oil palm plants produce an average maximum productivity [21].

Coconut plantations get a minimum profit on 4-year-old plants, i.e., Rp976576,0/ha/yr. Information obtained from farmers, coconut plants generally start producing at the age of 5-6 years, but there are several varieties that produce at the age of 4 years but in small quantities. The maximum profit from coconut plantations is Rp9.991,666,6/ha/year, because that age is the productive age of coconut plants.

The results of the analysis show that the profits of community plantations for coconut are lower than for oil palm. Currently, coconut community plantations face various obstacles from upstream to downstream. Monoculture coconut farming with narrow land and low productivity has not been able to meet the needs of farmers for a decent life (Mahmud Z, 2008). Even though various cultivation technologies and product processing are available, they have not been absorbed properly due to various factors ranging from production, institution, and marketing aspects. If these problems can be overcome, coconut plantations are still very potential to be developed. If coconut plantations are managed properly, such as being able to minimize harvest costs, it will be able to increase the net income of farmers [8]. Furthermore, the results of another study [12] concluded that coconut in smallholder plantations was feasible with R/C ratio = 2 or >1.

4.4. Feasibility Analysis of Oil Palm and Coconut Commodities in the Community Plantations in North Aceh Regency

The financial feasibility analysis on oil palm and coconut commodities in the community plantations in North Aceh Regency is intended to compare the feasibility of oil palm and coconut commodities in the community plantations using several investment criteria, namely: Net Present Value (NPV), Internal Rate of Return (IRR), Net Profit Cost Ratio (Net B/C), and Break Event

Point (BEP). Oil palm and coconut are plantation crops that have an economic life of more than 25 years. Thus, the feasibility analysis is carried out based on investment costs, namely all costs needed before production and operational costs, namely all costs incurred when the plant is in production by taking into account the Social Opportunity Cost of Capital (SOCC) which is approximated by the applicable loan interest rate (discount factor).

The data obtained show that the average total investment cost of oil palm plantations is Rp16,996,469,- per hectare, while coconut plantations is Rp.10,618,727,- per hectare. The average investment cost of a coconut plantation is lower than that of an oil palm plantation, as well as its operational costs. However, the results of the financial feasibility analysis show that the two plantation businesses were feasible because they obtained NPV values > 0, Net B/C > 1 and IRR > from the prevailing interest rates and BEP occurred within the economic life of the plants. The value of the investment criteria is presented in Table 3.

Table 3. Recapitulation of Values for Investment Criteria for Palm Oil and Coconut Commodities in the Community Plantation in North Aceh Regency

Criteria of Investment	Commodity	
	Oil Palm	Coconut
1. NPV	37.313.468,24	23.641.655,24
2. Net B/C	3,486198425	3,396899555
3. IRR	0,2636 (26,36%)	0,232521197 (23,25%)
4. BEP	8 th year, 12 th month	10 th year, 3 rd month

Table 3 shows that the NPV value of oil palm is greater than that of coconut. This shows that if the business is carried out until the economic age of the plant (25 years), the present value (profit) obtained for oil palm plantations reaches Rp37,313,468.24, while coconut is only Rp23,641,655.24. This means that the most financially appropriate choice for an entrepreneur is oil palm plantations.

In addition, the value of Net B/C also shows that the return on invested capital is greater in oil palm (3.49) compared to coconut (3.40). For every one rupiah invested, the income will be 3.49 rupiah.

The IRR value also shows that oil palm plantations are still feasible when the prevailing loan interest rate is still below 26.36 percent. Meanwhile, for business coconut plantations, it is no longer feasible when the loan interest rate reaches 23.25 percent. The break event point (BEP) for oil palm plantations occurs more quickly than for coconuts. Oil palm shows BEP in the 8th year and twelfth month (9th year), while the return on investment is obtained in the 10th year and the third month.

5. Conclusions and Recommendations

5.1. Conclusions

The results of the analysis show that the investment costs and plantation production costs for oil palm commodities are higher than for coconut commodities. However, the results of the income analysis of the two businesses provide profits to farmers. Both plantations are worth pursuing, as indicated by the value of NPV > 0, Net B/C > 1 and IRR > of the prevailing interest rate, and BEP is still in the economic age of the plant. However, oil palm plantations are more profitable than coconut plantations. In addition to having considerable potential, oil palm and coconut commodities in the community plantations contribute to regional economic development, by increasing farmers' incomes and opening employment and business opportunities for the majority of the local community. World demand for this commodity is also getting higher. Therefore, it can be concluded that the oil palm and coconut community plantations have great prospects to be developed in North Aceh Regency.

5.2. Recommendations

It is suggested that farmers should choose oil palm as a more profitable commodity to cultivate. However, based on the potential of the area and the wishes of the farmers, the local government should facilitate the development of coconut plantations as oil palm plantations because coconut plantations are feasible and profitable for farmers.

REFERENCES

- [1] Haba Aceh. (2017). Haba Ekonomi. Membangun Negri, Mensejahteraan Petani.
- [2] B. M. Rajurkar (2021). Higher Seed Production through IPNM in Cajanas Cajan Linn. (Mill. Sp.). Universal Journal of Agricultural Research, 9(2), 48 - 56. DOI: 10.13189/ujar.2021.090203.
- [3] BPS. Aceh Utara Dalam Angka (2020). Biro Pusat Statistik Kabupaten Aceh Utara.
- [4] BPS, 2020. Luas Areal Tanaman Perkebunan Rakyat Menurut Jenis Tanaman. <https://www.bps.go.id/indicator/54/770/1/luas-areal-tanaman-perkebunan-rakyat-menurut-jenis-tanaman.html>
- [5] BPS Aceh. (2021). PROVINSI ACEH DALAM ANGKA.
- [6] Effendy. E, dkk,2020. Keragaan Kelembagaan Pertanian dan Model Pengembangan Agribisnis Nilam Aceh. Jurnal Ekonomi Pertanian dan Agribisnis (JEPA) Volume 4, Nomor 4, HAL: 728-737. <https://jepa.ub.ac.id/index.php/jepa/article/view/483> (diakses 1 Desember 2020)

- [7] Fitriandi, P., Hardiani, & Mustika, C. (2019). Analisis sub sektor perkebunan Provinsi Jambi. *E-Jurnal Perspektif Ekonomi Dan Pembangunan Daerah*, 8(1), 15–30. <https://doi.org/10.22437/pdpd.v8i1.5006>
- [8] Hari, B., Hendriyana, & Nurdini, L. (2017). Studi Pendahuluan Menentukan Kondisi Proses Pembuatan VCO Skala Laboratorium: Perancangan Alat Pembuat VCO (virgin coconut oil) Kapasitas 5 Liter. *Prosiding Seminar Nasional Ilmu Pengetahuan Dan Teknologi Jendral Achmad Yani*, 49–51.
- [9] Jamilah, Mawardati, & Syamni, G. (2022). Kontribusi Usaha tani Kelapa Sawit Dalam Meningkatkan Kesejahteraan Rumahtangga Petani Di Kabupaten Aceh Utara. *Mimbar Agribisnis: Jurnal Pemikiran Masyarakat Ilmiah Berwawasan Agribisnis*, 8(1), 387. <https://doi.org/10.25157/ma.v8i1.6815>
- [10] Mawardati. (2017). *Agribisnis Perkebunan Kelapa Sawit*. In Unimal Press (1st ed., Vol. 1, Issue 1). Unimal Press.
- [11] <http://www.ncbi.nlm.nih.gov/pubmed/25246403>
<http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC4249520>
- [12] Mawardati. (2018). Selection of Fresh Fruit Bunch Marketing Channel in Smallholder Oil Palm Plantation in Aceh Province. *Jurnal Aplikasi Manajemen*, 16(2), 246–254. <https://doi.org/10.21776/ub.jam.2018.016.02.07>
- [13] Meray, K., Lolowang, T. F., & Mandei, J. R. (2021). Contribution of the Plantation Sub-Sector To the Economy of North. *Agri-Sosio Ekonomi Unsrat*, 17(2), 225–232.
- [14] Murosikhoh, N. (2021). Kontribusi sektor perkebunan terhadap perekonomian daerah. *Research-Gate*, December 2021.
- [15] Mustofa, R., Hapsoh, Syahza, A., & Suwondo. (2021). Food Carrying Capacity as an Indicator of Sustainability of Smallholder Oil Palm Plantations in Riau Province. *Review of International Geographical Education ...*, 11, 111–121. <https://doi.org/10.48047/rigeo.11.08.11>
- [16] Pitriani, Edison, H., & Napitupulu, D. (2019). *Jurnal Agri Sains Vol, 3 No.02, (28 Desember 2019). Jurnal Agri Sains*, 03(02), 1–12.
- [17] Purnomo, H., Okarda, B., Dewayani, A. A., Ali, M., Achdiawan, R., Kartodihardjo, H., Pacheco, P., & Juniwati, K. S. (2018). Reducing forest and land fires through good palm oil value chain governance. *Forest Policy and Economics*, 91(December 2017), 94–106. <https://doi.org/10.1016/j.forpol.2017.12.014>
- [18] Samuel Adu Osei, Daniel Agyei-Dwarko, Johnny Sackitey Ossom, Enoch Sapey, Wonder Nunekpeku, Dickson Osei Darkwah (2022). Agro-Morphological Evaluation of Gamma Irradiated Oil Palm (*Elaeis guineensis*, Jacq.) M2 Population at the Nursery Stage. *Universal Journal of Agricultural Research*, 10(2), 137 - 144. DOI: 10.13189/ujar.2022.100205.
- [19] Siregar, I. N. P. (2018). Analisis Peran Sektor Perkebunan Terhadap Perekonomian Sumatera Utara. *Jurnal Ekonomi Pendidikan*, 6(4), 34–41.
- [20] Sukamto, 2001. *Upaya meningkatkan produksi kelapa*. PT. Penebar Swadaya. Jakarta.
- [21] Mahmud Z, 2008. *Modernisasi Usaha tani Kelapa Rakyat. Pengembangan Inovasi Pertanian*. Vol. 1 No. 4.