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ANALYSIS OF DIFFERENCES IN INCOME FROM PALM PALM FARMING AND RUBBER FARMING IN BENUA BARU VILLAGE, MUARA BENGAL SUBDISTRICT EAST KUTAI DISTRICT

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Abstract

The fertile soil of East Kutai Regency is very suitable for the development of various plantation commodities, including oil palm and rubber. The development of oil palm and rubber farming is one of East Kutai's leading programs. Oil palm plantations are developing along with the growth of cooperatives as an economic movement, while the number of palm oil factories has reached 19 units, which is the largest in East Kalimantan. This research aims to determine the level of income from palm oil and rubber farming, the financial feasibility of developing businesses, and optimizing the production results of oil palm and rubber farming areas in Benua Baru Village, Muara Bengkal District. The analytical method used in this research is the analytical criteria to determine statistically whether there is a real difference in income between oil palm and rubber farming, analysis of the difference test between two independent samples (Independent sample T Test). Village. The research results show that: (1) the average income from oil palm farming is IDR 312.193.729 respondent⁻¹ year⁻¹ on a scale of 3 ha or IDR 13.815.489ha⁻¹ year⁻¹, with an average production cost of IDR 3.276.816 respondent⁻¹ year⁻¹ or IDR 1.281.234ha⁻¹ year⁻¹ and an average selling price of palm oil IDR 819,000 kg fresh fruit cobs⁻¹; (2)the average rubber farming income is IDR 19.814.210 respondent⁻¹ year⁻¹ on a scale of 2.04 ha or IDR 11.693.114 ha⁻¹ year⁻¹, with an average production cost of IDR 14.146.795 respondent⁻¹ year⁻¹ or IDR 7.936.166 ha⁻¹ year⁻¹ and an average selling price of rubber IDR 9,978 kg; and (3) statistically there is a difference in income between oil palm farming and rubber farming in Benua Baru Village.

Keywords

Income, oil palm farming, rubber farming.



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1. INTRODUCTION

The Plantation subsector is one of the mainstay subsectors in East Kalimantan, the Plantation subsector has a strategic role in the economy of East Kalimantan because it makes a significant contribution to Gross Regional Domestic Product (GRDP), the development of isolated areas. After all, they are in remote locations, employment and improvement of the community's economy. In 2022, oil palm production in East Kalimantan will be 16.94 million tons with a planting area of 1.41 million hectares. Of this amount, 79.26% is from large private plantations, 19.61% is from people's plantations and 1.13% is from large government plantations. East Kutai Regency is the region with the largest palm oil production in East Kalimantan. Apart from palm oil, another leading commodity is rubber. In 2022 rubber production in East Kalimantan will be 71.48 thousand tons (1).

The area of oil palm and rubber plantations in East Kutai in 2023 will be 508,639.29 ha and 19,305.26 ha respectively, with palm oil production of 6,545,465.12 tons and rubber of 1,808.58 tons. One of the oil palm development areas in East Kutai is Muara Bengkal District. In 2023 Muara Bengkal District will contribute to the area of oil palm and rubber plantations amounting to 20,176.02 ha (3.97%) and 344.78 ha (1.81%) respectively of the total area of oil palm and rubber plantations in Kutai East (2).

Benua Baru Village is one of the centers for oil palm development in Muara Bengkal District. 65% of the workforce in this region earns their living as farmers/planters. The plantation commodities that are widely cultivated by the community are palm oil and rubber. Based on observations in the field, there is a tendency for people to switch from rubber commodities to palm oil. This phenomenon is very visible, especially in the Muara Bengkal sub-district area where oil palm plantation companies such as PT Telada Sawit and Telen have built palm oil mills so that people have access to sell. open palm. Another phenomenon is that the development trend of palm oil prices has increased in recent years, while rubber prices have had a downward trend. Based on this phenomenon, it is necessary to study the comparative analysis of income from oil palm and rubber farming in Benua Baru Village, Muara Bengkal District.

The research aims to determine the income from oil palm and rubber farming, as well as to determine the difference between oil palm and rubber farming income in Benua Baru Village.

2. MATERIALS AND METHODS

2.1. Time and place

This research was carried out for 3 months starting from May to August 2023 in Benua Baru Village, Muara Bengkal SubDistrict, East Kutai District, East Kalimantan, Indonesia.

2.2. Method of collecting data

The type of data used in this research consists of primary data and secondary data. Primary data was obtained from survey results in the field by conducting interviews with respondents using questionnaires that had been prepared and compiled according to the objectives of this research. Secondary data was obtained from Central Statistics Agency (BPS) East Kutai Regency, Benua Baru Village Profile, scientific research journals, and other parties.

2.3. Sampling method

The sampling method was carried out using a census/saturated sample, the number of oil palm and rubber farmers in Benua Baru Village was 51 respondents, consisting of 27 oil palm farmer

respondents and 24 rubber farmer respondents. The age range for oil palm plants is around 7 to 17 years and rubber plants are around 11 to 14 years.

2.4. Data analysis method

2.4.1. Analysis of Palm Oil and Rubber Farming Income

2.4.1.1. Total cost

Total costs are all costs incurred in the production process which are the sum of fixed costs and variable costs which can be written in the equation [3] :

$$TC = TFC + TVC$$

Information:

TC = Total Cost (IDR year⁻¹); TFC = Total Fixed Cost (IDR year⁻¹); and TVC = Total Variabel Cost (IDR year⁻¹)

2.4.1.2 Revenue

Revenue is the total production amount multiplied by the price. Revenue is written in the following equation [4]:

$$TR = P \times Q$$

Information:

TR = Total Revenue (IDR year⁻¹); P = Price (IDR kg⁻¹); and Q = Amount of Production or Quantity (year⁻¹)

2.4.1.3 Income

The income received from a production result is the total income minus the total costs incurred in the production process, so it can be formulated as follows [4]:

$$I = TR - TC$$

Information :

I = Income (IDR year⁻¹); TR= Total Revenue (IDR year⁻¹); and TC= Total Cost (IDR year⁻¹)

2.4.2. Analysis of Differences in Palm Oil and Rubber Farming Income

To determine the difference between oil palm and rubber farming income, use the independent sample T-test with the following formula [5] and [6]:

$$t_{hitung} = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2} \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

Information :

\bar{x}_1 = Average value of rubber farming income

x_2 = Average value of oil palm farming income

n_1 = Number of rubber farming respondents

n_2 = Number of oil palm farming respondents

s_1^2 = Value of rubber variants

s_2^2 = Value of palm oil variants

Decision rule: If $t_{count} < t_{table}$ ($\alpha = 0.05$) then H_0 is accepted and if $t_{count} > t_{table}$ ($\alpha = 0.05$) then H_0 is rejected.

3. RESULTS AND DISCUSSION

3.1. The land area and age of the Respondent's oil palm and rubber plantations

Based on the results of interviews and observations conducted on 51 oil palm and rubber farmer respondents in Benua Baru village, Muara Bengkal District, an overview of the land area (Table 1) and the condition of plant age (Tables 2 and 3) was obtained, namely as follows:

Table 1. Condition of Respondents Based on Land Area in Benua Baru Village

No	Land Area (ha)	Palm Oil Farming		Rubber Farming	
		Amount	Percentage (%)	Amount	Percentage (%)
1	< 2	16	59,26	20	81,82%
2	> 2-4	4	14,81	2	9,09%
3	> 4-9	7	25,93	2	9,09%
Total		27	100.00	24	100.00

Source: Primary data (processed), 2021

The range of land area used by farmers is between 1.00-9.00 hectares, based on research data obtained from oil palm farmers from land areas <2 hectares as many as 16 people (59,26%), land areas > 2-4 hectares as many as 4 people (14,81%), and land area >4-9 hectares as many as 7 people (25,93%). For rubber farmers with a land area of <2 hectares there are 20 people (81,82%), farmers with a land area of >2-4 hectares are 2 people (9,09%), and farmers with a land area of >4-9 hectares are 2 people. (9,09%).

The age grouping of oil palm plants cultivated by farmers, namely mature plants (TM), is presented in Table 2.

Table 2. Age classification of oil palm plants per respondent in Benua Baru Village

No.	Age Group (Years)	Number (Souls)	Percentage (%)
1.	7-10	15	57,69%
2	>10-15	10	34,62%
3	>15 - 17	2	7,69%
Amount		27	100,00

Source: Primary Data (processed), 2021

Based on Table 2, it is known that the ages of the respondents' oil palm plants are all still productive, aged 7 - 17 years. Most of the plant ages were in the range of 7-10 years old as many as 15 people (57.69%), aged >10-15 years as many as 10 people (34.62%) and aged >15-17 years as many as 2 people (7.59 %).

The age grouping of rubber plants cultivated by farmers, namely mature plants, is presented in Table 3.

Table 3. Age classification of rubber plants per respondent in Benua Baru Village

No.	Age Group (Years)	Number (Souls)	Percentage (%)
1.	7-11	11	46,15%
2.	>11-13	3	15,38%
3.	>13-14	10	38,46%
Amount		24	100,00

Source: Primary Data (processed), 2021

Based on Table 3, it is known that all of the respondents' rubber plants are still productive, aged 7 - 14 years. The highest number of rubber plants was in the age range 7-11 years as many as 11 people (46.15%), aged >11-13 years as many as 3 people (15.38%), and aged >13-14 years as many as 10 people (38, 46%).

3.2. Production Costs, Revenue, and Income from Palm Oil Farming

The average area of oil palm farming ownership is 3 ha at a planting age range of 7-17 years. Cost components consist of fixed costs and variable costs. Production costs (total costs) are costs obtained from the sum of fixed and variable costs, these costs include the purchase of fertilizers and pesticides, labor, other costs, and depreciation of equipment. Total costs are obtained from sales of fixed and variable costs. The average cost incurred by oil palm farmers is IDR 3.276.816 respondent⁻¹ year⁻¹ on an area of 3 ha or IDR 1.281.234 ha⁻¹ year⁻¹.

Revenue is the product of the quantity of production times the selling price of that production. The average amount of palm oil production is 58,488 kg Fresh fruit cobsrespondent⁻¹ year⁻¹ or 19,469 kg fresh fruit cobsha⁻¹ year⁻¹, with a selling price range at the farmer level ranging from IDR 700 to IDR 1,040 kg Fresh fruit cobs. The average income obtained by farmers is IDR 50.623.703 respondent⁻¹ year⁻¹ or IDR 15.075.242 ha⁻¹ year⁻¹.

Palm oil farming income is obtained from total revenues minus total production costs. Income is influenced by the amount of production and the prevailing price of palm oil, the average amount of income earned is IDR 47,378,739 respondent⁻¹ year⁻¹ or IDR 13,815,489 ha⁻¹ year⁻¹. If converted, the average income is IDR 3,935,283 respondent⁻¹ month⁻¹ or IDR 1,311,761 ha⁻¹ respondent⁻¹ month⁻¹.

Details of total costs, revenues, and income from oil palm farming are presented in Table 4.

Table 4. Total Costs, revenues, and Income from Palm Oil Farming on a 3-Hectare Scale

No	Cost Description	Total Production Costs (IDR respondent ⁻¹ year ⁻¹)	Average Cost (IDR ha ⁻¹ year ⁻¹)
1. Variable Cost			
a	Fertilizer	1.325.000	487.947
b	Herbicide	792.731	262.189
c	Labor	901.481	392.909
2. Fixed Cost			
1	Tool Depreciation	286.694	138.188
Total Costs		3.276.816	1.281.234
Revenues		50.623.703	15.075.242
Income		47.378.739	13.815.489

Source: Primary Data (processed), 2023

The average income from oil palm farming in Benua Baru Village is IDR 47.378.739 year⁻¹ on an area of 3 ha or IDR 13.815.459 ha⁻¹year⁻¹. When compared with the research results of [7] Yosia Afia Daniel (2018) that coconut farming income oil palm in West Labangka Village is IDR 32.180.384 ha⁻¹ year⁻¹, so the income of oil palm farmers in the research location is relatively low. The average productivity of oil palm plants is 58,489 kg on a 3 ha business scale with the age of oil palm plants ranging from 7 to 17 years.

3.3. Production Costs, Receipts, and Income from Rubber Farming

The average area of rubber farming ownership is 2.04 ha at a planting age range of 11-14 years. The components of rubber land business costs consist of fixed costs and non-fixed costs or variable costs. The total costs incurred by 24 respondents for fertilizer, pesticides, labor, other costs, and depreciation were IDR 339.523.100 year⁻¹ with an average production cost of IDR 14.146.795 respondent⁻¹ year⁻¹ or IDR 190.468.005 ha⁻¹ year⁻¹ with an average of IDR 1.128.354 ha⁻¹ year⁻¹.

Production is the result obtained in one planting season. Each respondent has a different production amount. In general, all respondents have a kinship relationship with one another so the respondents' behavior in farming processing is not much different. The amount of production per year obtained from respondent farmers on average is that tapping is carried out by farmers every 2 days. Revenue is obtained by multiplying production by the selling price. The average amount of income per respondent is IDR 33,961,006 respondent⁻¹ year⁻¹ or an average of IDR 19,629,281 respondent⁻¹ ha⁻¹ year⁻¹.

Rubber farmers' income is obtained by calculating the difference between revenue and the total production costs that have been incurred to produce production. The average amount of income earned was IDR 19,814,210 respondent⁻¹ year⁻¹ or IDR 11,693,114 ha⁻¹ year⁻¹.

Details of total costs, revenues, and income from rubber farming are presented in Table 5.

Table 5. Total Costs, revenues, and Income from Rubber Farming on a 2,04 Hectare Scale

No	Cost Description	Total Production Costs (IDR respondent ⁻¹ year ⁻¹)	Average Cost (IDR ha ⁻¹ year ⁻¹)
1. Variable Cost			
a	Fertilizer	3.514.500	3.084.028
b	Herbicide	181.458	98.681
C	Labor	6.568.750	3.589.049
d	Other Costs	1.960.312	1.128.354
2. Fixed Cost			
1	Tool Depreciation	57.275	36.054
Total Costs		14.146.795	7.936.166
Revenues		33.961.006	19.629.281
Income		19.814.210	11.693.114

Source: Primary Data (processed), 2023

Based on Table 5, shows that the average income from rubber farming in Benua Baru Village is IDR 19.814.210 year⁻¹ on an area of 2.04 ha or IDR 11.693.114 ha⁻¹year⁻¹. When compared with the research results of [8], regarding rubber development in East Kutai IDR 740.707.629.420 on 6000 hectares of natural rubber plantations, the income of rubber farmers in the research location is also relatively low. The average productivity of rubber plants is 283 kg month⁻¹ on a business scale of 1.6 ha with the age of rubber plants ranging from 11 to 14 years.

3.4. Differences in Income from Palm Oil Farming and Rubber Farming

In oil palm farming, the average total revenue was IDR15.075.242 ha⁻¹ year⁻¹ and an average total production cost of IDR 1.281.234 ha⁻¹ year⁻¹ with an average income of IDR 13.815.489 ha⁻¹ year⁻¹. Meanwhile, total revenue from rubber farming was IDR 19.629.281 ha⁻¹ year⁻¹ and average total production costs of IDR 7.936.166 ha⁻¹ year⁻¹ obtained income of IDR 19,814,210 year⁻¹ or IDR 693.114 ha⁻¹ year⁻¹. This proves that each farmer's income is greater than the total costs they incur. The income from oil palm farming is higher than rubber farming, this occurs because there are differences in income which are influenced by the production costs incurred by oil palm and rubber farmers. Several factors can influence differences in income, such as the use of production facilities and maintenance methods carried out by oil palm and rubber farmers. Each respondent has a different amount of available produce and the selling price is a factor in the difference between oil palm and rubber which increases and decreases. In line with research results reported by [9] Harimurti (2018) that the average level of income for rubber farming in Muara Bulian District is IDR 6.215.742 ha⁻¹ year⁻¹, while the income for oil palm farming is IDR 19.051.460 ha⁻¹ year⁻¹. The income level of rubber farming is smaller than that of oil palm farming with an R/C ratio, with rubber farming at 2.20 and oil palm farming at 4.73. Another research result reported by [10] was that the income of smallholder oil palm farmers was IDR 12.846.356 ha⁻¹ year⁻¹ is lower than the income of people's rubber farming which was IDR 14.042.356 ha⁻¹ year⁻¹.

The results of statistical tests to compare income from oil palm farming and rubber farming are presented in Table 7

Table 7. Difference Test of Two Independent Samples (Independent Sample T Test)

t-Test: Two-Sample Assuming Unequal Variances		
	Variable 1	Variable 2
Mean	46859742	24718260,92
Variance	2,04E+15	1,11267E+14
Observations	26	12
Hypothesized Mean Difference	0	
df	30	
t Stat	2,36606	
P(T<=t) one-tail	0,012318	
t Critical one-tail	1,697261	
P(T<=t) two-tail	0,024635	
t Critical two-tail	2,042272	

Source: Primary Data (processed), 2023

Based on the results of the t-test, the value obtained for t calculated was 2.366 and t table 1.697, which means that there is a real difference between the income of mustard oil farming and rubber farming. From these results, it can be concluded that hypothesis Ho: oil palm farming income = rubber farming income is rejected, while hypothesis H1 shows a difference in oil palm and rubber farming income.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusion

Based on the results of data analysis and discussion, the following conclusions can be drawn:

1. The average income from oil palm farming is IDR 312.193.729 respondent⁻¹ year⁻¹ on a scale of 3ha or IDR 13.815.489ha⁻¹ year⁻¹, with an average production cost of IDR 3.276.816 respondent⁻¹ year⁻¹ or IDR 1.281.234ha⁻¹ year⁻¹ and an average selling price of palm oil IDR 819.000 kg fresh fruit cobs⁻¹.
2. The average rubber farming income is IDR 19.814.210 respondent⁻¹ year⁻¹ on a scale of 2.04 ha or IDR 11.693.114 ha⁻¹ year⁻¹, with an average production cost of IDR 14.146.795 respondent⁻¹ year⁻¹ or IDR 7.936.166 ha⁻¹ year⁻¹ and an average selling price of rubber IDR 9,978 kg.
3. Statistically there is a difference in income between oil palm farming and rubber farming in BenuaBaru Village, with the result t-count>t-table (2,366>1,697).

4.2 Suggestions

1. It is hoped that farmers will be able to optimize the use of fertilizer so that production amounts are maximized and can further reduce production costs.
2. To increase income, rubber farmers are advised to emphasize land care and tapping to increase production yields to the maximum.
3. Differences in the income of each farmer can be seen in production costs and revenues. To save production costs and increase revenues, it is recommended that farmers pay more attention to high production costs and emphasize maintenance so that harvest results can be optimal.

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