

Analysis of Factors Influencing Palm Oil Farmers' Income and Strategies for Increasing Income

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ABSTRACT

This study aims to analyse the influence of production factors, including land area, capital, labour, market price, and farming duration, on the income of oil palm farmers in the region. In addition, this study aims to analyse strategies to increase oil palm production to raise the income of oil palm farmers in Batin XXIV Subdistrict, Batang Hari Regency. The analytical tools used are multiple linear regression, SWOT analysis and Analytical Hierarchy Process (AHP). The results of the multiple linear regression analysis show that simultaneously, the variables of land area, capital, labour, market price, and farming duration have a significant effect on farmers' income, with a coefficient of determination (R^2) of 82.9%, indicating that income variation can be explained by these variables. Partially, the variables that have a positive and significant effect on income are capital, labour, and farming duration, whereas land area and market price have no significant effect. In addition, the strategy to increase palm oil production, based on the SWOT analysis, is in quadrant I (progressive strategy), with priority on the SO strategy, namely utilising internal strengths to seize external opportunities. The AHP analysis results indicate that priority strategies include utilising high farming experience (0.3290), utilising relatively stable market prices (0.2525), optimising family labour in government programs (0.2109), and developing farmers' capital capacity (0.2076), which are expected to increase oil palm plantation productivity as well as farmer income and welfare.

Keywords: land area, capital, labour, market price, length of farming, income, SWOT, analytical hierarchy process.

How to Cite

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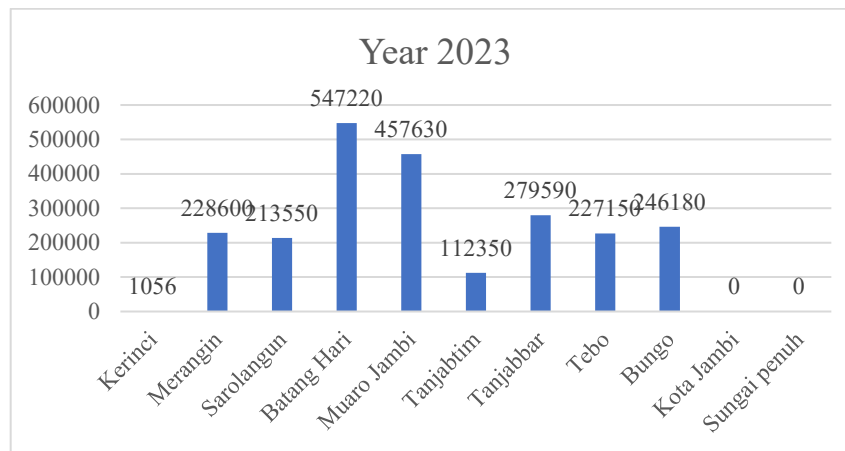
1 INTRODUCTION

Oil palm farmers play a very important role in supporting both regional and national economic development. Based on data on palm oil production in the Indonesian archipelago for 2023–2025, national palm oil production has increased year over year. In 2023, Indonesia's total palm oil production reached 47,084,299 tons, which then increased to 47,474,604 tons in 2024, and rose again to 48,125,004 tons in 2025. This indicates relatively stable growth in the national palm oil plantation sector over the past three years.

By island, Sumatra is the region with the largest contribution to national palm oil production, reaching 25,688,752 tons in 2023 and increasing to 26,236,993 tons in 2025. Sumatra's dominance is due to the vast area of oil palm plantations, as well as the development of palm oil processing infrastructure in provinces such as Riau, North Sumatra, and Jambi.

However, palm oil productivity in Jambi Province has shown a less favourable trend. In 2023, productivity was 3,162 kg/ha, rising slightly to 3,197 kg/ha in 2024, then declining to 3,097 kg/ha in 2025. Furthermore, to observe palm oil production in the regencies/cities of Jambi Province, it can be seen in the following figure:

Figure 1: Palm Oil Production in Regencies/Cities of Jambi Province in 2023



Sumber: Badan Pusat Statistik Kabupaten Batang Hari (2025).

Palm oil production across districts/cities in Jambi Province in 2023 shows it is fairly evenly distributed among several districts, though with varying levels. Batanghari Regency recorded the highest palm oil production at 547,220 tons, followed by Muaro Jambi Regency with 457,630 tons, and Tanjung Jabung Barat Regency with production of 279,590 tons.

Batanghari Regency has the second-largest oil palm plantation area and production after Muaro Jambi Regency, which has the largest plantation area and production among regions in Jambi Province. However, in terms of productivity, Batanghari Regency ranks third with a productivity level of 3.461 tons/ha. This figure is higher than the productivity of Muaro Jambi Regency, which, despite having the largest plantation area and production in Jambi Province, is 2.292 tons/ha.

The development of oil palm productivity in Batanghari Regency during 2022–2023 shows that productivity in most sub-districts increased significantly. However, unlike other regions, Batin XXIV Sub-district showed a productivity decline of -2.45. This condition is considered an anomaly because most sub-districts in Batanghari Regency experienced increased productivity. The decline in productivity will affect farmers' income in Batin XXIV Sub-district. The number of oil palm farmers in Batin XXIV Sub-district is 5,573, spread across 17 villages.

Land area is a primary indicator in determining the production capacity of palm oil that can be generated by a farmer (Ramadhan et al., 2023). The larger the land area, the greater the potential for production and income. Business capital is an important element that cannot be ignored in oil palm plantation activities. The availability of capital determines farmers' ability to purchase fertilisers, superior seedlings, harvesting equipment, and cover plantation maintenance costs (Alpazri, 2020).

Labour in oil palm agricultural activities plays a major role in determining production efficiency. Activities such as fertilising, pruning fronds, harvesting, and transporting fresh fruit bunches require sufficient and skilled labour involvement (Mangipau & Halim, 2022). Market price factors significantly influence the income of oil palm farmers. The price of oil palm fresh fruit bunches (FFB), which is determined by the market, often fluctuates drastically. A decline in prices can cause substantial losses, especially for small farmers whose production costs are relatively high. This condition is worsened by farmers' dependence on middlemen or certain companies for the sale of their harvest (Hardyaningtyas & Hernawati, 2023).

Based on research conducted by Widiani & Bendesa (2023), Pambudi & Bendesa (2020), and Alpazri (2020), land area, capital, and labour have a significant influence on farmers' income. Furthermore, Mangipau & Halim (2022) and Alpazri (2020) state that land

area has a significant effect on farmers' income. In addition, Muhammad Zidni Mubarak et al. (2023) show that capital and labour variables have a positive and significant effect on farmers' income.

Moreover, research by Hardyaningtyas & Hernawati (2023) and Alpazri (2020) indicates that palm oil prices significantly affect the income of oil palm farmers. Meanwhile, the results of studies by Koesriwulandari et al. (2023) and Pinem (2021) state that farming experience (length of farming) has a positive and significant effect on oil palm farmers' income.

Overall, these research findings indicate that factors such as land area, capital, labour, market prices, and farming experience are the main variables influencing farmers' income, both in oil palm commodities and other agricultural sectors.

Based on the explanation above, the researcher is interested in obtaining empirical evidence that land area, capital, labour, market prices, and farming experience influence the income of oil palm farmers. Therefore, this study is titled “Analysis of factors influencing palm oil farmers' income and strategies for increasing”.

Research Objectives

This study aims to analyse the factors influencing oil palm farmers' income and to determine priority strategies for increasing oil palm production and farmers' income in Batin XXIV Subdistrict, Batang Hari Regency. Specifically, the study seeks:

RO1: To analyse the influence of land area, capital, labour, market price, and farming duration on the income of oil palm farmers in Batin XXIV Subdistrict, Batang Hari Regency.

RO2: To analyse and determine priority strategies for increasing oil palm production and farmers' income in Batin XXIV Subdistrict, Batang Hari Regency.

2 LITERATURE REVIEW

Dependent Variable

Income

Income is an important indicator of the economic sustainability of farming because it reflects the returns farmers receive from their production. In oil palm farming, farmers' income is influenced by production factors and farm management conditions, including land area, capital, labor, market price, and farming experience (Alpazri, 2020; Pangidoan & Andriyani, 2021).

Independent Variable

land area

Land area is an important production factor in agriculture because it determines the scale of farming and the potential output. In general, a larger cultivated area provides greater production capacity and may contribute to higher farm income when the land is managed effectively (Ramadhan et al., 2023; Widiani & Bendesa, 2023).

Capital

Capital is an important production factor because it enables the acquisition of inputs and assets required for farming. Dunia & Abdullah (2012) define capital as the funds used to acquire assets and support operational activities. In agricultural production, adequate capital enables farmers to finance inputs and farm operations, thereby influencing production and income (Alpazri, 2020; Pambudi & Bendesa, 2020).

Labor

Labour is an important production factor in farming because plantation activities require sufficient human resources to carry out cultivation, maintenance, harvesting, and related operations. The availability and effective use of labour can influence production performance and farmers' income (Mangipau & Halim, 2022; Muhammad Zidni Mubarak et al., 2023).

Market Price

High market prices for Palm Oil will directly increase farmers' income. When the selling price of Palm Oil rises, farmers can sell their harvests for greater profit. Conversely, if prices are low, farmers' incomes will be under pressure, and this could even result in losses if production costs exceed income. Overall, the market price of palm oil significantly affects farmers' incomes, with the impact determined by production costs, market access, and supply-and-demand dynamics. Improving the stability and transparency of market prices can help sustainably increase the income of palm oil farmers. Based on research by Hardyaningtyas & Hernawati (2023), market prices have a significant effect on farmers' income.

Length of Farming

The length of time a business practitioner engages in their field will affect their professional abilities. The longer they pursue their field of business, the more their knowledge of that field will grow. Their trading skills will grow, and they will also gain more business connections and customers (Pangidoan & Andriyani, 2021). The duration of a person's business can be an advantage when choosing strategies and methods to carry out their work, and they can generate ideas for every task they undertake. Workers with longer work experience will have more mature and accurate ideas in their work. Additionally, the length of time a worker engages in their field will influence their professional capabilities.

3 METHODOLOGY

This research is a field research study or primary data analysis. In this study, the researcher collected data by distributing questionnaires. In addition, the researcher also used library research. The research was conducted using a survey technique. The survey was conducted using a questionnaire consisting of a structured set of questions administered to oil palm farmers in Batin XXIV Sub-district, Batang Hari Regency, regarding labour, capital, land area, and income.

The primary data sources in this study are oil palm farmers in Batin XXIV Sub-district, Batang Hari Regency; the Head of the Plantation Office of Batang Hari Regency; the Head of the Plantation Division/UPTD Plantation of Batin XXIV Sub-district; the Head of the Industry and Trade Office (or the Head of the Trade Division); the Head of the Regional Development Planning Agency (Bappeda) of Batang Hari Regency (or the Head of the Planning Division); Field Agricultural Extension Officers (PPL) for oil palm plantations in Batin XXIV; and representatives of financial institutions or oil palm farmer cooperatives. Meanwhile, secondary data sources in this research are obtained from the Central Bureau of Statistics (BPS) and the Batang Hari Regency Statistical Book.

The population in this study consists of oil palm farmers in Batin XXIV Sub-district, Batang Hari Regency, totalling 5,573 farmers. Based on a population of 5,573 farmers across 17 villages, the researcher selected 8 villages with the largest numbers of farmers, namely Hajran Village with 860 farmers and Jelutih Village with 729 farmers. Next are Olak Besar Village with 654 farmers, Matagual Village with 650 farmers, Durian Luncuk Village with 637 farmers, Karneo Village with 526 farmers, Jangga Village with 316 farmers, and finally Simpang Aur Gading Village with 240 farmers, for a total of 4,612 farmers.

Based on calculations using the Slovin method, the sample for this study comprises 98 farmers, and the sampling technique used is random sampling. The researcher collected the names of all farmers in each village of Batin XXIV Sub-district and then randomly selected them to meet the required sample size.

The analytical methods used in this research are descriptive and quantitative. The analytical tools used are multiple linear regression, SWOT analysis and Analytical Hierarchy Process (AHP).

4 FINDINGS AND DISCUSSION

The F-test is used to assess the overall effect of the independent variables on the dependent variable, often referred to as the linearity test of the regression equation. The results of the overall test can be seen in the following table:

Table 1 Simultaneous Test

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4891,608	5	978,322	88,990	,000 ^b
	Residual	1011,416	92	10,994		
	Total	5903,024	97			

a. Dependent Variable: Farmers' Income

b. Predictors: (Constant), Farming Duration, Land Area, Market Price, Labour, Capital

Source: Processed Data, 2026

Based on the ANOVA table, the p-value is 0.000, which is less than 0.05. This indicates that the independent variables Land Area, Capital, Labor, Market Price, and Farming Experience simultaneously have a significant effect on the dependent variable, namely the income of oil palm farmers.

The t-test is conducted to determine whether each independent variable individually (partially) has a significant effect on the dependent variable. If the significance level is below 5%, then partially Land Area, Capital, Labour, Market Price, and Farming Experience have a significant influence on the dependent variable, namely, oil palm farmers' income. Based on Table 2, the results of the t-test are as follows:

Table 2 Results of Multiple Linear Regression Analysis

Coefficients ^a							
Model	Unstandardized Coefficients		Standardized Coefficient		Sig.	Collinearity Statistics	
	B	Std. Error	Beta	t		Tolerance	VIF
1 (Constant)	9807196,858	8024076,193		1,222	,225		
Land Area	-3661,380	18623,077	-,007	-,197	,845	,997	1,003
Capital	2,588	,179	,785	14,420	,000	,446	2,242
Labor	807119,383	230349,196	,193	3,504	,001	,436	2,296
Market Price	-4115,932	2854,984	-,054	-1,442	,153	,940	1,064
Farming Duration	137341,633	49488,357	,116	2,775	,007	,759	1,317

a. Dependent Variable: Farmers' Income

Source: Processed Data, 2026

Based on the t-test (partial test) results, all variables are shown to have a significant effect on the income of oil palm farmers. The land area variable has a p-value of $0.000 < 0.05$, indicating a significant effect on farmers' income. The capital variable also has a probability value of 0.000, which is < 0.05 , indicating a significant effect on farmers' income. Similarly, the labour variable has a probability value of $0.000 < 0.05$, indicating a significant effect on farmers' income. Meanwhile, the market price variable has a probability value of $0.025 < 0.05$, indicating a significant effect on farmers' income, and the farming experience variable has a probability value of $0.000 < 0.05$, also indicating a significant effect on farmers' income.

The coefficient of determination (R^2) is used to assess the proportion of variance in the dependent variable explained by the independent variables, expressed as a percentage. As shown in the following table:

Table 3 R² Square Test Result

Model Summary				
Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate
1	.910 ^a	.829	.819	3,31567

a. Predictors: (Constant), Farming Duration, Land Area, Market Price, Labour, Capital

b. Dependent Variable: Farmers' Income

Source: Processed Data, 2026

Based on Table 3 (Model Summary), the R-squared value is 0.829. This means that 82.9% of the variation in the income of oil palm farmers can be explained by the variables land area, capital, labour, market price, and farming experience included in this study, while the remaining 17.1% is explained by other variables outside the scope of this research.

Strategy to Increase Oil Palm Production and Its Impact on Farmers' Income in Batin XXIV Subdistrict, Batang Hari Regency

The strategy to increase oil palm production and impact farmers' income in Batin XXIV Subdistrict, Batang Hari Regency, is guided by a SWOT analysis. SWOT analysis consists of four strategic alternatives: S–O (Strengths–Opportunities), S–T (Strengths–Threats), W–O (Weaknesses–Opportunities), and W–T (Weaknesses–Threats). This method is used to analyze and describe the strengths, weaknesses, opportunities, and threats, as well as the constraints that must be faced during the planning process.

After conducting internal and external analyses, the next step is to calculate the weights of internal and external factors. These weights are calculated by assigning scores or compiling them into IFAS (Internal Factor Analysis Summary) and EFAS (External Factor Analysis Summary) tables. The following table presents the calculated weights of internal and external factors used in this analysis.

Table 4 Internal Strategic Factor Analysis (IFAS)

No	Internal Factors	Weight	Rating	Weight × Rating
Strengths				
1	High Farming Experience	0.13	3	0.39
2	Market Prices Relatively Stable at a High Range	0.13	3	0.39
3	Availability of Family Labor	0.13	3	0.38
4	The majority of Farmers Are Still in a productive age	0.12	3	0.37
Total Strength Score		0.51		1.54
Weaknesses				
1	Relatively Small Land Scale	0.13	3	0.38
2	Limited Business Capital	0.12	3	0.37
3	Dependence on Limited Labor	0.12	3	0.37
4	The majority of Farmers' Income Is Still Relatively Low	0.11	3	0.34
Total Weakness Score		0.49		1.46
Total Strength – Total Weakness		1.00		0.07

Source: Processed Data, 2026

Based on the Internal Strategic Factor Analysis (IFAS) results in Table 5.13, the internal conditions of oil palm farmers in Batin XXIV Subdistrict, Batang Hari Regency show a balance between strength and weakness factors, although they are slightly dominated by strength factors. This is indicated by the total strength score of 1.54, which is higher than the total weakness score of 1.46, resulting in a difference of 0.07.

Table 5 External Strategic Factor Analysis (EFAS)

No	External Factors	Weight	Rating	Weight × Rating
Opportunities				
1	Productivity Increase through Intensification	0.14	3	0.41
2	Access to Government Programs and Business Credit	0.13	3	0.39
3	Stable Market Demand for Palm Oil	0.13	3	0.38
4	Partnership with Companies or Cooperatives	0.13	3	0.39
Total Opportunity		0.52		1.57
Threats				
1	Market Price Fluctuation	0.12	3	0.36
2	Increase in Production Input Prices	0.12	3	0.36
3	Risk of Declining Productivity of Old Plants	0.12	3	0.35
4	Dependence on Small-Scale Farming	0.12	3	0.36
Total Threat		0.48		1.43
Opportunity – Threat		1.00		0.14

Source: Processed Data, 2026

Based on the External Strategic Factor Analysis (EFAS) results in Table 5, the external environment of oil palm plantation businesses in Batin XXIV Subdistrict, Batang Hari Regency generally presents more opportunities than threats for farmers. This is indicated by the total opportunity score of 1.57, which is higher than the total threat score of 1.43, resulting in a difference of 0.14.

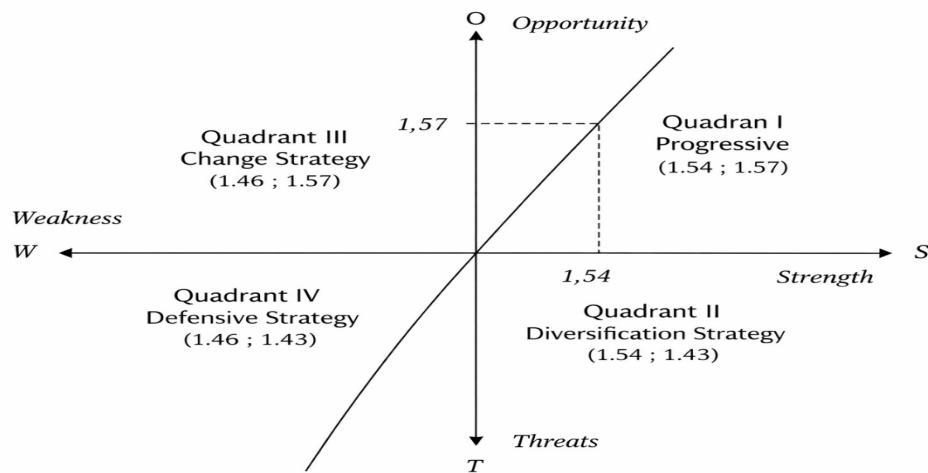
The SWOT matrix formulation based on the results of internal and external factor evaluations is as follows:

Table 6 SWOT Matrix Formulation

EFAS \ IFAS	Strength (S)	Weakness (W)
Opportunity (O)	SO Strategy $SO = 1,54 + 1,57$ $SO = 3,11$	WO Strategy $WO = 1,46 + 1,57$ $WO = 3,03$
Threats (T)	ST Strategy $ST = 1,54 + 1,43$ $ST = 2,97$	WT Strategy $WT = 1,46 + 1,43$ $WT = 2,89$

Source: Processed Data, 2026

Based on Table 6 of the SWOT Matrix Formulation, the strategy for increasing oil palm production that impacts farmers' income in Batin XXIV Subdistrict, Batang Hari Regency, is analysed through the combination of internal factors (IFAS) and external factors (EFAS). The calculation results show that the SO strategy value is 3.11, WO is 3.03, ST is 2.97, and WT is 2.89. These differences in values illustrate the priority level of strategies that can be implemented in the development of smallholder oil palm plantation businesses. The highest value is found in the SO (Strength–Opportunity) strategy with a score of 3.11. This indicates that the condition of oil palm farming is relatively strong and offers significant external opportunities for development. In the quadrant-based SWOT analysis model, it can be illustrated as follows:

Figure 2 SWOT Matrix Quadrant Analysis Model

Based on Figure 2: SWOT Matrix Quadrant Analysis Model, the position of the strategy to increase oil palm production that impacts farmers' income in Batin XXIV Subdistrict, Batang Hari Regency, is located in Quadrant I (Progressive) with coordinates (1.54; 1.57). These values are obtained from the differences between internal factors (Strength – Weakness) of 1.54 and external factors (Opportunity – Threat) of 1.57, which are positive on both axes. This position indicates that the condition of oil palm farming has strong internal strengths and significant external opportunities, thereby supporting an aggressive, growth-oriented strategy. The results of the SWOT matrix analysis are shown in Table 7.

Table 7 SWOT Matrix

INTERNAL / EXTERNAL	Identification of Factors	Opportunities (O)	Threats (T)
Strengths (S)	1. High farming experience 2. Market prices relatively stable at a high range 3. Availability of family labour 4. The majority of farmers are still in their productive age	1. Increase in productivity through intensification 2. Access to government programs and business credit 3. Stable demand for palm oil in the market 4. Partnerships with companies or cooperatives	1. Fluctuation of market prices 2. Increase in production input prices 3. Risk of declining productivity of old plants 4. Dependence on small-scale farming
		S–O Strategy 1. Utilising high farming experience to increase productivity. 2. Optimising family labour in implementing government programs. 3. Taking advantage of relatively stable market prices. 4. Developing farmers' capital capacity.	S–T Strategy 1. Using farming experience to improve efficiency. 2. Optimising family labour to reduce operational costs. 3. Improving the skills of productive farmers in plantation management. 4. Strengthening farmer groups as a collective institution.
Weaknesses (W)	1. Relatively small land scale 2. Limited business capital 3. Dependence on limited labour 4. The majority of farmers' income is still relatively low	W–O Strategy 1. Utilising access to government programs and business credit. 2. Participating in intensification programs and technical training. 3. Encouraging the establishment of cooperatives or partnerships. 4. Optimising government assistance in providing production facilities.	W–T Strategy 1. Improving production cost efficiency. 2. Diversifying farmers' household income sources. 3. Gradually replanting ageing oil palm trees. 4. Increasing cooperation among farmers in the use of labour and production facilities.

Source: Processed Data, 2026

Furthermore, the priority strategy for increasing oil palm production that impacts farmers' income in Batin XXIV Subdistrict, Batang Hari Regency, is determined using the Analytical Hierarchy Process (AHP) method.

Figure 3 SWOT–AHP Hierarchy for Increasing Oil Palm Production



Source: Results of data processing (Super Decisions Software 2.10)

The data analysis on increasing oil palm production in Batin XXIV Subdistrict shows that the priority weights of the strategies for increasing oil palm production can be seen in the following figure.

Name	Graphic	Ideals	Normals	Raw
Strategy 1		1.000000	0.328979	0.109660
Strategy 2		0.641163	0.210929	0.070310
Strategy 3		0.767621	0.252531	0.084177
Strategy 4		0.630922	0.207560	0.069187

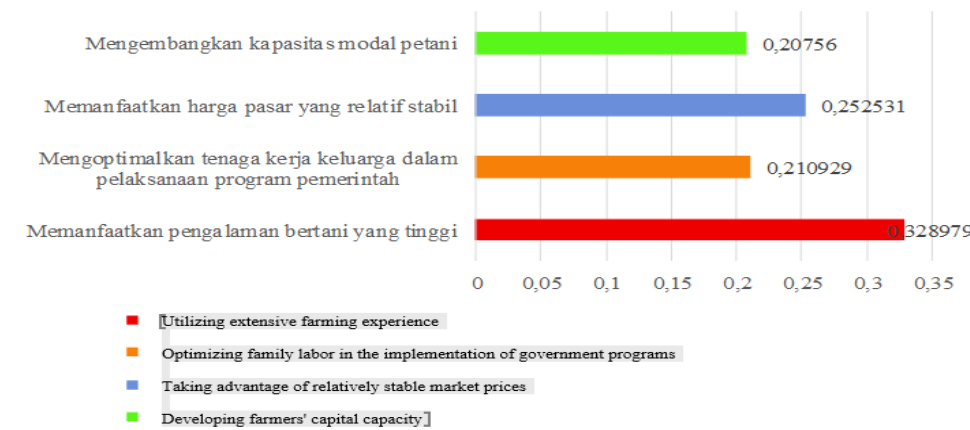
Source: Results of data processing (Super Decisions Software 2.10)

Figure 4 Alternative Priority

Based on the results of data processing using Super Decisions (ANP) in the study on strategies to increase oil palm production that impact farmers' income in Batin XXIV Subdistrict, Batang Hari Regency, the priority values of the strategies are obtained in the Normals column. These values indicate the level of importance or priority of each strategy in efforts to increase oil palm production.

The analysis results show that Strategy 1, namely utilizing high farming experience, has the highest priority value of 0.328979. This indicates that the farming experience possessed by farmers in Batin XXIV Subdistrict is a very important factor in increasing oil palm production.

Figure 5 Bar Chart of Alternative Priorities



Source: Research findings (Super Decisions Software 2.4.0)

As illustrated in Figure 5, utilizing high farming experience is the primary paradigm for increasing oil palm production. This strategy is related to farmers' ability to manage their farming activities more effectively and efficiently based on the knowledge and skills gained from years of farming experience. Such experience enables farmers to understand various important aspects of oil palm cultivation, such as plant maintenance techniques, proper fertilization, pest and disease control, and determining the optimal harvesting time.

Figure 6 Ranking of Alternatives

Graphic	Alternatives	Total	Normal	Ideal	Ranking
	Strategy 1	0.1097	0.3290	1.0000	1
	Strategy 2	0.0703	0.2109	0.6412	3
	Strategy 3	0.0842	0.2525	0.7676	2
	Strategy 4	0.0692	0.2076	0.6309	4

Source: Research findings (Super Decisions Software 2.10)

Based on Figure 6, which presents the ranking of alternative strategies obtained from data processing using Super Decisions Software 2.10, the priority order of strategies to increase oil palm production that impacts farmers' income in Batin XXIV Subdistrict, Batang Hari Regency can be identified. The analysis results show that Strategy 1, namely utilising high farming experience, ranks first with a normalised value of 0.3290 and an ideal value of 1.0000. This indicates that farmers' experience in managing oil palm farming is the most dominant factor in increasing production. Farmers' experience enables them to better understand cultivation techniques, land management, fertilisation practices, and pest and disease control, thereby improving the productivity of oil palm plantations.

The Effect of Land Area on the Income of Oil Palm Farmers

Based on the research results, the probability value for the land area variable is 0.000 with a confidence level of ($\alpha = 5\%$). It can be seen that the probability value is less than 0.05 ($0.000 < 0.05$), meaning that H_0 is rejected and H_a is accepted, indicating that land area has a positive and significant effect on the income of oil palm farmers. Thus, the hypothesis that capital influences the income of oil palm farmers is valid and has been proven. The results of this study are consistent with the findings of Mangipau & Halim (2022), Widiani & Bendesa (2023), Doti (2017), Suryati (2017), Pambudi & Bendesa (2020), and Alpazri (2020), which state that land area has a positive and significant effect on the income of oil palm farmers. The influence of land area on farmers' income arises because larger cultivated land areas increase the potential for production. This allows farmers to plant more oil palm trees, conduct crop rotation or diversification, and increase harvest yields. With optimal land management, an increase in land area will directly improve productivity and ultimately increase oil palm farmers' income.

The Effect of Capital on the Income of Oil Palm Farmers

Based on the research results, the probability value for the capital variable is 0.000 with a confidence level of ($\alpha = 5\%$). It can be seen that the probability value is less than 0.05 ($0.000 < 0.05$), meaning that H_0 is rejected and H_a is accepted, indicating that capital has a positive and significant effect on the income of oil palm farmers. Thus, the hypothesis that capital influences the income of oil palm farmers is valid and has been proven. The results of this study are consistent with the research conducted by Ramadhan et al. (2023), Pambudi & Bendesa (2020), Muhammad Zidni Mubarak et al. (2023), and Suryati (2017), who stated that capital has a positive and significant effect on oil palm farmers' income. Capital influences oil palm farmers' income because it is one of the most important production factors in farming activities. Capital is used to meet various operational needs, such as purchasing fertilisers, pesticides, plant maintenance costs, and labour costs in the harvesting and plantation management processes. The greater the capital owned by farmers, the greater their ability to maintain plants optimally, thereby increasing oil palm productivity. Increased productivity will ultimately increase harvest yields and farmers' income.

The Effect of Labour on the Income of Oil Palm Farmers

Based on the research results, the probability value for the labour variable is 0.000 with a confidence level of ($\alpha = 5\%$). It can be seen that the probability value is less than 0.05 ($0.000 < 0.05$), meaning that H_0 is rejected and H_a is accepted, indicating that labour has a positive and significant effect on the income of oil palm farmers. Thus, the hypothesis that labour influences the income of oil palm farmers is valid and has been proven. The results of this study are consistent with research conducted by Pambudi & Bendesa (2020), Muhammad Zidni Mubarak et al. (2023), Widiani & Bendesa (2023), and Suryati (2017), who stated that labour has a positive and significant effect on oil palm farmers' income. Labour is one of the most important factors of production in oil palm farming. Labour plays a role in various plantation management activities such as plant maintenance, fertilisation, pest and disease control, land clearing, harvesting, and transportation of production results. The more optimal the use of labour in managing oil palm plantations, the better and more regularly plant maintenance can be carried out, thereby increasing crop productivity. Increased productivity will ultimately increase oil palm production and farmers' income.

The Effect of Market Price on the Income of Oil Palm Farmers

Based on the research results, the probability value for the market price variable is 0.025 with a confidence level of ($\alpha = 5\%$). It can be seen that the probability value is less than 0.05 ($0.025 < 0.05$), meaning that H_0 is rejected and H_a is accepted, indicating that market price has a significant effect on the income of oil palm farmers. Thus, the hypothesis that market price affects the income of oil palm farmers is valid and has been proven. The results of this study are consistent with research by Hardyaningtyas & Hernawati (2023) and Alpazri (2020), which found that market price has a significant effect on farmers' income. The influence of market price on farmers' income is that the higher the selling price of fresh fruit bunches (FFB), the greater the sales value farmers receive from their harvests. With stable or increasing market prices, farmers' income will be more secure, especially if plantation productivity is adequate. This indicates that market price is an important factor in determining the income of oil palm farmers.

The Effect of Farming Experience on the Income of Oil Palm Farmers

Based on the research results, the probability value for the farming experience variable is 0.000 with a confidence level of ($\alpha = 5\%$). It can be seen that the probability value is less than 0.05 ($0.000 < 0.05$), meaning that H_0 is rejected and H_a is accepted, indicating that farming experience has a positive and significant effect on the income of oil palm farmers. Thus, the hypothesis that farming experience influences the income of oil palm farmers is valid and supported by evidence. The results of this study are consistent with research conducted by Pinem (2021), who stated that farming experience has a positive and significant effect on oil palm farmers' income. The influence of farming experience arises from farmers' knowledge and ability to manage oil palm farming activities. The longer farmers have been engaged in farming, the more knowledge they gain about cultivation techniques, plant maintenance, fertilisation, pest and disease control, and determining the right time to harvest. This experience enables farmers to make more appropriate decisions in managing plantations so that production activities can run more effectively and efficiently. With proper management, oil palm productivity can increase, ultimately leading to higher farmers' incomes.

5 CONCLUSION

The results of multiple linear regression analysis show that simultaneously the variables of land area, capital, labour, market price, and length of farming have a significant effect on farmer income with a significance value of 0.000 (< 0.05) and a coefficient of determination (R^2) of 0.829, which means that 82.9% of the variation in income can be explained by these variables. Partially, the variables that have a positive and significant effect on income are capital, labour, and farming length, while land area and market price have no significant effect.

In addition, the strategy to increase palm oil production, based on the SWOT analysis, is in quadrant I (progressive strategy), with priority on the SO strategy, namely utilising internal strengths to seize external opportunities.

The AHP analysis results indicate that priority strategies include utilising high farming experience (0.3290), utilising relatively stable market prices (0.2525), optimising family labour in government programs (0.2109), and developing farmers' capital capacity (0.2076), which are expected to increase oil palm plantation productivity as well as farmer income and welfare.

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7 Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in the paper.

8 Author contribution statement

Author Nurmaidah Sitanggang 1- contributed to the conceptualisation, research design, and writing of the original draft.

Author Junaidi2 was responsible for data collection, analysis, and validation of the results.

Author's Etik Umiyati³- provided supervision, critical review, and editing of the final manuscript.

All authors have read and approved the final version of the manuscript.

9 Ethics statement

This research was conducted in accordance with the ethical standards of **Jambi University** and the principles outlined in the Declaration of Helsinki. All participants were informed about the purpose of the study and provided written informed consent prior to participation. Participants' privacy and confidentiality were strictly maintained, and the data collected were used solely for academic purposes.

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