

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

Nurmaidah Sitanggang^{*1}, Junaidi², Etik Umiyati³

¹²³ Faculty of Economics and Business, Universitas Jambi, Mendalo Indah, Jambi 36361, Indonesia

Corresponding Author: Nurmaidah Sitanggang

Email: nurmaidahjambi@gmail.com

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ABSTRACT

This study aims to analyze the influence of production factors, including land area, capital, labor, market price, and farming duration, on the income of oil palm farmers in the region. In addition, this study aims to analyze strategies for increasing oil palm production that can increase 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, labor, 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, labor, 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 the priority of the SO strategy, namely utilizing internal strengths to seize external opportunities. The AHP analysis results indicate that priority strategies include utilizing high farming experience (0.3290), utilizing relatively stable market prices (0.2525), optimizing family labor 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, labor, market price, length of farming, income, SWOT, analytical hierarchy process.

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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 shown an increasing trend from year to 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 continuing to increase 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 favorable trend. In 2023, productivity was recorded at 3,162 kg/ha, slightly increasing to 3,197 kg/ha in 2024, but then declining again 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:

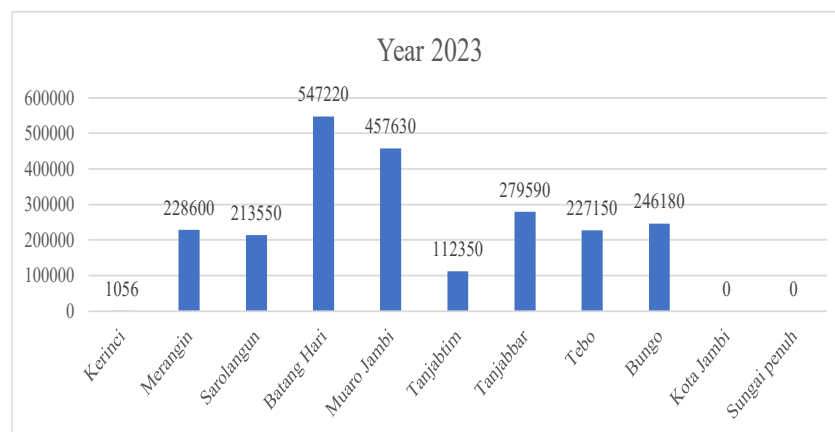


Figure 1 Palm Oil Production in Regencies/Cities of Jambi Province in 2023

Source: Central Bureau of Statistics (Badan Pusat Statistik), 2025.

Palm oil production across districts/cities in Jambi Province in 2023 shows that palm oil production is fairly evenly distributed across several districts, although with varying production 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 compared to other 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, has a productivity level of 2.292 tons/ha.

The development of oil palm productivity in Batanghari Regency during 2022–2023 shows that productivity in most sub-districts experienced a fairly significant increase. However, unlike other regions, Batin XXIV Sub-district actually showed a decline in productivity of -2.45. This condition is considered an anomaly because most sub-districts in Batanghari Regency experienced an increase in productivity. The decline in productivity will have an impact on the income of farmers in Batin XXIV Sub-district. The number of oil palm farmers in Batin XXIV Sub-district is 5,573 people, spread across 17 villages within the sub-district.

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 production and income that can be obtained. Business capital is an important element that cannot be ignored in oil palm plantation activities. The availability of capital determines farmers' ability to purchase fertilizers, superior seedlings, harvesting equipment, and cover plantation maintenance costs (Alpazri, 2020).

Labor in oil palm agricultural activities plays a major role in determining production efficiency. Activities such as fertilizing, pruning fronds, harvesting, and transporting fresh fruit bunches require sufficient and skilled labor involvement (Mangipau & Halim, 2022). Market price factors have a significant influence on the income of oil palm farmers. The price of oil palm fresh fruit bunches (FFB), which is determined by the market, often experiences drastic fluctuations. 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 in selling their harvest (Hardyaningtyas & Hernawati, 2023).

Based on research conducted by Widiani & Bendesa (2023), Pambudi & Bendesa, (2020), and Alpazri (2020), land area, capital, and labor 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, Muhammd Zidni Mubarak et al., (2023) show that the variables of capital and labor have a positive and significant effect on farmers' income.

Moreover, research by Hardyaningtyas & Hernawati (2023) and Alpazri (2020) indicates that palm oil prices have a significant effect on 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, labor, 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, labor, 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”.

2 LITERATURE REVIEW

2.1 Dependent Variable

2.2.1 Income

Income is the most important factor for every human in this world; income greatly affects the survival of a business. A business's ability to finance all activities that support the sustainability of the business is greatly influenced by the amount of income the business earns. Income is money received by a business from buyers as a result of the process of selling goods or services (Mahardika, 2018).

2.2 Independent Variable

2.2.1 land area

According to Irawan in (Nugroho, 2010), agricultural areas, particularly farmland, broadly provide two types of benefits: first, benefits from existing use (use values), which are generated from the exploitation or farming activities on

agricultural land. Use values consist of two types: direct benefits and indirect benefits. Direct benefits are characterized by products that can be measured in reality and can be transacted in the form of prices (marketable output) and serve as a source of income for the community, and benefits that cannot be measured in money (unpriced benefit) but can be directly felt by the community, such as food security functions. The second type of benefit is intrinsic benefits, which arise naturally along with farming activities; these benefits may only be felt in the future rather than at present, such as biodiversity.

2.2.2 Capital

According to Karyanto (2008), capital is a factor that determines the level of production. A lack of capital in farming will result in very limited use of production facilities, which in turn will affect income. According to Firdaus & Wasilah (2012), capital is defined as money used to purchase assets such as machinery, equipment, trade receivables, labor, and raw materials. According to Syamsuddin (Rachmawati, 2015), working capital is the capital from all current assets, including cash, receivables, and inventory, minus current liabilities, which is used to finance the company's operational activities in the short term.

2.2.3 Labor

Labor is a very important factor in income and is considered in the production process in sufficient quantities, not only in terms of availability but also in terms of quality and variety. Every production process must provide adequately sufficient labor, and the number of workers used must be adjusted to the needs to a certain level to be optimal (Siswanto, 2011).

2.2.4 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' income will be pressured, and it could even result in losses if production costs are higher than the income received. Overall, the market price of palm oil greatly affects farmers' income, 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 conducted by Hardyaningtyas & Hernawati (2023), they stated that market prices have a significant effect on farmers' income.

2.2.5 Length of Farming

The length of time a business practitioner engages in their field will affect their professional abilities. The longer they pursue their business field, the more their knowledge about that business will increase. Their trading skills will grow, and they will also gain more business connections and customers (Naf'an Pangidoan & Devi Andriyani, 2021). The duration of a person's business can be an advantage in choosing strategies and methods to carry out their work, and they can generate thoughts or ideas in 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 carried out using a questionnaire consisting of a structured list of questions addressed to oil palm farmers in Batin XXIV Sub-district, Batang Hari Regency, regarding labor, 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, totaling 5,573 farmers. Based on the population of 5,573 farmers spread across 17 villages, the researcher selected 8 villages with the largest number of farmers, namely Hajran Village with 860 farmers, followed by 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, resulting in a total population of 4,612 farmers.

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

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

4 FINDINGS AND DISCUSSION

The F-test is conducted to determine the overall effect of the independent variables on the dependent variable, which is 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, Labor, Capital

Source: Processed Data, 2026

Based on the ANOVA table, the significance value obtained is 0.000, which is smaller 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, Labor, 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 Coefficients		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 probability value of $0.000 < 0.05$, indicating that it has a significant effect on farmers' income. The capital variable also has a probability value of $0.000 < 0.05$, showing a significant effect on farmers' income. Similarly, the labor 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 $0.025 < 0.05$, showing a significant effect on farmers' income, and the farming experience variable has a probability value of $0.000 < 0.05$, which also indicates a significant effect on farmers' income.

The coefficient of determination (R^2) analysis is used to examine the extent to which the independent variables affect the dependent variable, expressed as a percentage. As shown in the following table:

Table 3
R² Square test Result

Model Summary ^b				
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, Labor, Capital

b. Dependent Variable: Farmers' Income

Source: Processed Data, 2026

Based on Table 3 (Model Summary), the R-square 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, labor, 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 that impacts farmers' income in Batin XXIV Subdistrict, Batang Hari Regency is directed through a SWOT analysis. SWOT analysis consists of four strategic alternatives, namely S–O (Strengths–Opportunities) strategy, S–T (Strengths–Threats) strategy, W–O (Weaknesses–Opportunities) strategy, and W–T (Weaknesses–Threats) strategy. 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 calculation of the 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	Majority of Farmers Are Still in 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

No	Internal Factors	Weight	Rating	Weight × Rating
4	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, it is known that 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, it can be seen that the external environment of oil palm plantation businesses in Batin XXIV Subdistrict, Batang Hari Regency generally provides greater opportunities than threats faced by 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 analyzed 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 in a relatively strong position and has significant external opportunities for development. In the quadrant-based SWOT analysis model, it can be illustrated as follows:

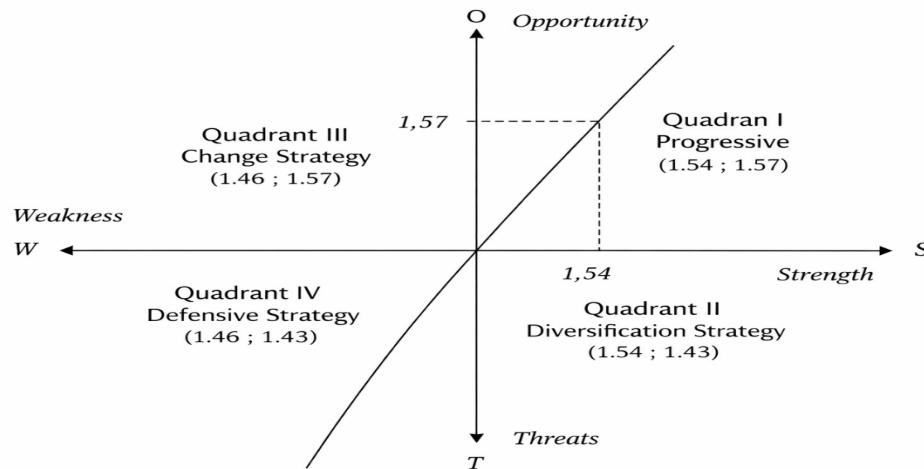


Figure 2

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 difference between internal factors (Strength – Weakness) of 1.54 and external factors (Opportunity – Threat) of 1.57, which show positive values 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 development or growth-oriented strategy. The results of the SWOT matrix analysis can be seen in Table 7.

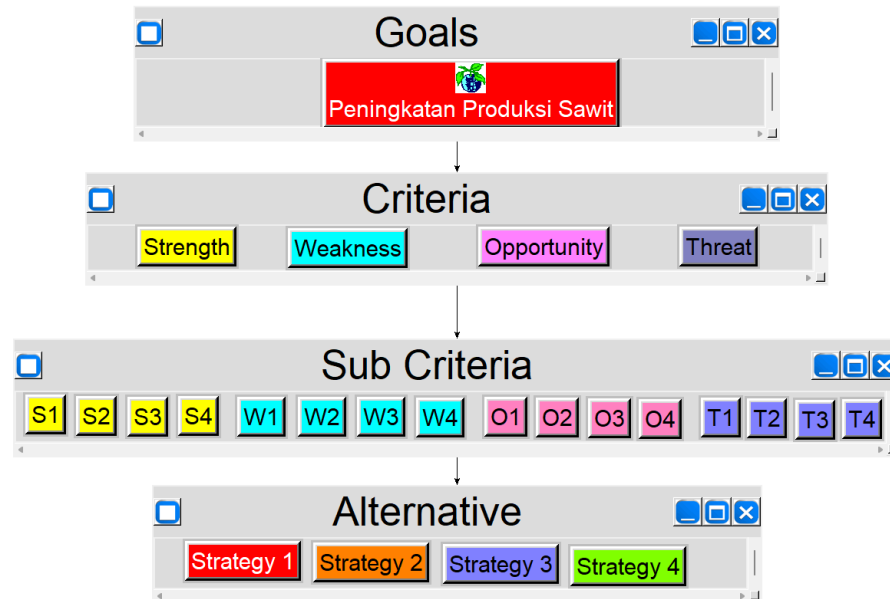
Table 7
SWOT Matrix

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 labor 4. Majority of farmers still in 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
	1. Utilizing high farming experience to increase productivity. 2. Optimizing family labor in implementing government programs. 3. Taking advantage of relatively stable market prices. 4. Developing farmers' capital capacity.	S–O Strategy 1. Using farming experience to improve efficiency. 2. Optimizing family labor to reduce operational costs. 3. Improving the skills of productive farmers in plantation management. 4. Strengthening farmer groups as a collective institution.	S–T Strategy 1. Using farming experience to improve efficiency. 2. Optimizing family labor to reduce operational costs. 3. Improving the skills of productive farmers in plantation management. 4. Strengthening farmer groups as a collective institution.

INTERNAL / EXTERNAL	Identification of Factors	Opportunities (O)	Threats (T)
Weaknesses (W)	1. Relatively small land scale 2. Limited business credit 3. Dependence on programs and capital 4. Majority of farmers' income still relatively low	W-O Strategy 1. Utilizing government programs and technical training. 2. Participating in intensification of replanting aging oil palm trees. 3. Encouraging the establishment of cooperatives or partnerships. 4. Optimizing government assistance in providing production facilities.	W-T Strategy 1. Improving production cost efficiency. 2. Diversifying household income sources of farmers. 3. Gradually increasing cooperation among farmers in the use of labor 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.



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

Figure 3 SWOT-AHP Hierarchy for Increasing Oil Palm Production

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

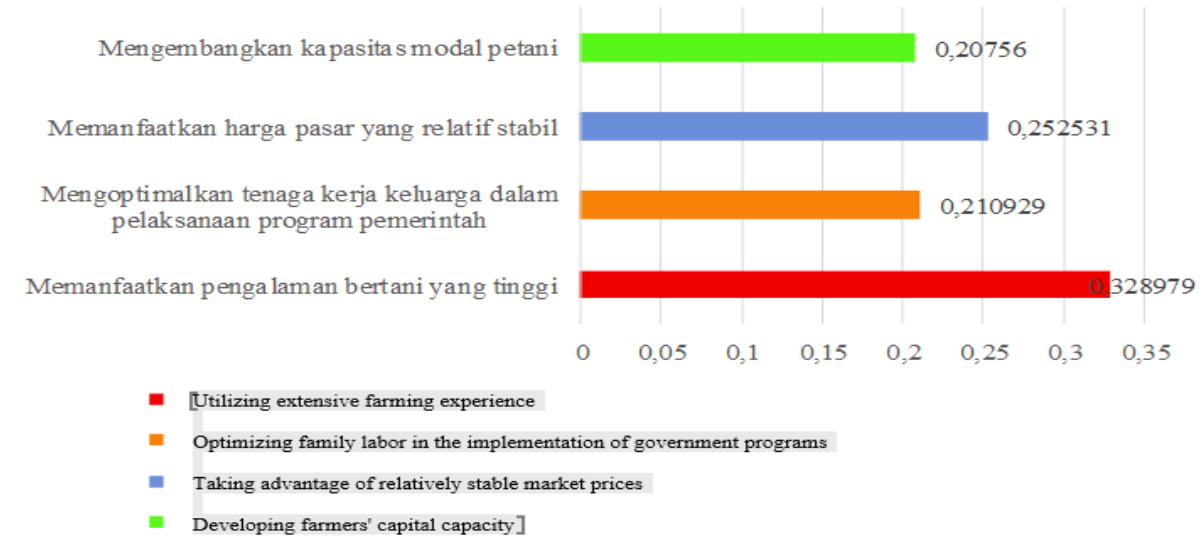
Source: Results of data processing (Super Decisions Software 2.10)

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.



Source: Research findings (Super Decisions Software 2.4.0)

Figure 5 Bar Chart of Alternative Priorities

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.

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)

Figure 6 Ranking of Alternatives

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 utilizing high farming experience, ranks first with a normalized 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, fertilization 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 stating that capital influences the income of oil palm farmers is valid and 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 occurs because the larger the cultivated land, the greater the potential production that can be achieved. 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 impact productivity and ultimately increase the income of oil palm farmers.

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 stating that capital influences the income of oil palm farmers is valid and 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. The influence of capital on oil palm farmers' income occurs because capital is one of the most important production factors in farming activities. Capital is used to meet various operational needs such as purchasing fertilizers, pesticides, plant maintenance costs, and labor 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 Labor on the Income of Oil Palm Farmers

Based on the research results, the probability value for the labor 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 labor has a positive and significant effect on the income of oil palm farmers. Thus, the hypothesis stating that labor influences the income of oil palm farmers is valid and 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 labor has a positive and significant effect on oil palm farmers' income. Labor is one of the most important production factors in oil palm farming activities. Labor plays a role in various plantation management activities such as plant maintenance, fertilization, pest and disease control, land clearing, harvesting, and transportation of production results. The more optimal the use of labor 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 stating that market price affects the income of oil palm farmers is valid and proven. The results of this study are consistent with the research conducted by Hardyaningtyas & Hernawati (2023) and Alpazri (2020), which stated that market price has a significant effect on farmers' income. The influence of market price on farmers' income occurs because the higher the selling price of fresh fruit bunches (FFB), the greater the sales value received by farmers 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 stating that farming experience influences the income of oil palm farmers is valid and proven. The results of this study are consistent with research conducted by Kurnia Asri et al. (2025) and Pinem (2021) who stated that farming experience has a positive and significant effect on oil palm farmers' income. The influence of farming experience occurs because it reflects farmers' knowledge and ability in managing oil palm farming activities. The longer farmers have been engaged in farming, the more knowledge they gain regarding cultivation techniques, plant maintenance, fertilization, pest and disease control, and determining the right harvesting time. 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 and ultimately lead to higher farmers' income.

5 CONCLUSION

The results of multiple linear regression analysis show that simultaneously the variables of land area, capital, labor, 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, labor, 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 the priority of the SO strategy, namely utilizing internal strengths to seize external opportunities.

The AHP analysis results indicate that priority strategies include utilizing high farming experience (0.3290), utilizing relatively stable market prices (0.2525), optimizing family labor 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's Nurmaidah Sitanggang¹- contributed to the conceptualization, research design, and writing of the original draft.

Author's 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 adhered to the principles outlined in the Declaration of Helsinki. Ethical approval was obtained from the [Institutional Ethics Committee/Review Board] under reference number [Approval Number, if applicable]. 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 data collected were used solely for academic purposes.

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