



PALM OIL FARMERS' PERCEPTIONS OF PRICE FLUCTUATIONS IN FRESH FRUIT BUNCHES (FFB) IN TURANGI VILLAGE, SALAPIAN SUBDISTRICT, LANGKAT REGENCY

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ABSTRACT

Small-scale oil palm farmers are highly vulnerable financially because the price of fresh fruit bunches (FFB) can fluctuate within a matter of weeks. The objective of this study is to examine how the income of oil palm farmers in Turangi Village is affected by changes in FFB prices. This quantitative study involved 100 respondents, determined using the Slovin formula. A Likert-scale questionnaire was used to collect data, while analysis was conducted using simple linear regression and Spearman's rank correlation test. The results of the Spearman's correlation test indicate a fairly strong and significant positive relationship, with an r_s value of 0.472 and a significance level of $0.002 < 0.05$. Price changes have a significant impact on income, based on the results of simple linear regression, which showed a t -value of $3.263 >$ the critical t -value of 1.996 with a significance level of $0.002 < 0.05$. Price changes explain only 9.8% of the variation in income, while other factors outside the model account for 90.2%, based on an R value of 0.313 and an R^2 of 0.098. These findings confirm that price fluctuations have a significant relationship with and influence on farmers' income. To improve the model's ability to explain changes in farmers' income, it is recommended to conduct further research by incorporating additional factors such as land area, production costs, and productivity.

Keywords: Price Fluctuation, Farmers' Income, Fresh Fruit Bunches, Perceptions

INTRODUCTION

Oil palm (*Elaeis guineensis* Jacq) is one of Indonesia's strategic plantation commodities that plays a vital role in the national economy, approximately 40% of the total area planted with oil palm nationwide consists of smallholder plantations. North Sumatra Province is one of the largest oil palm production centers in Indonesia, with 240,000 farming households relying on income from the sale of fresh fruit bunches (FFB) of oil palm (Directorate General of Plantations, 2023).

Although the potential for oil palm production in North Sumatra is very high, the sector continues to face major challenges, particularly regarding price volatility for Fresh Fruit Bunches (FFB). FFB prices at the farmer level are heavily influenced by Crude Palm Oil (CPO) prices on the international market, the exchange rate of the rupiah against the U.S. dollar, and the pricing policies of palm oil mills (PKS). As a result, the FFB price received by farmers can change within a matter of weeks and is very difficult to predict (Sartika et al., 2025).

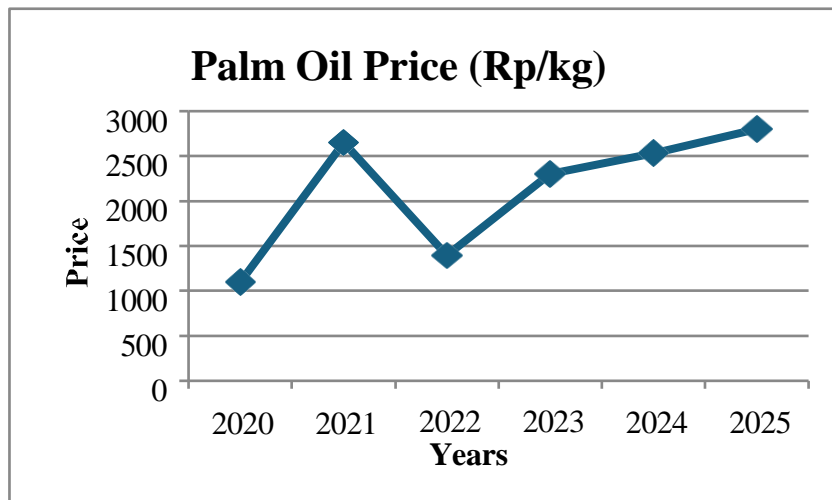


Chart of Palm Oil Price Trends in Langkat Regency

These price fluctuations can be clearly seen in the data on palm oil price movements in Langkat regency over the past six years; it is evident that palm oil prices have changed every year. Prices rose sharply from just Rp 1,100 in 2020, in 2021, they rose to Rp 2,652, then fell in 2022 to Rp 1,400, before rising again in 2023 to Rp 2,300, and in 2024, the price rose to Rp 2,530. The highest price was recorded in 2025 at around Rp 2,800 (Langkat Regency Central Statistics Agency, 2025).

This situation puts small-scale oil palm farmers in a very vulnerable position. When the price of fresh fruit bunches (FFB) drops sharply, as it did in 2022, farmers' incomes plummet, while they still have to meet their obligations for plantation maintenance, fertilizer costs, and household needs. Price volatility for fresh fruit bunches (FFB) not only affects farmers financially, but also shapes their perceptions and attitudes toward the farming operations they run. Farmers who repeatedly experience price declines tend to worry about the stability of their income, reduce the maintenance of their plantations, and even question the sustainability of oil palm farming as their long-term source of livelihood. The gap between the selling price of fresh fruit bunches (FFB) and high production costs directly squeezes farmers' profit margins.

As a result, long-term financial planning for farmers becomes difficult due to income uncertainty (Agustina et al., 2025). This situation is a problem that requires serious attention, given that most smallholder oil palm farmers do not have alternative sources of income other than the proceeds from their oil palm plantations. To that end, the researchers sought to examine in greater depth how oil palm farmers perceive changes in oil palm prices in relation to their income, and to determine whether there is a relationship or influence between price changes and the income of oil palm farmers in that village.

RESEARCH METHODOLOGY

Research Location and Time

Turangi Village, Salapian Subdistrict, Langkat Regency, was selected through purposive sampling as the research site because Salapian Subdistrict is the leading producer of oil palm in Langkat Regency, and 90% of the local population works primarily as oil palm farmers. This study began in February 2026.

Population and Sample

The village of Turangi has a population of 477 people, 100 of whom were selected as the research sample. The Slovin formula, with a 10% margin of error, was used to determine this sample size:

$$n = \frac{N}{1 + N(e)^2}$$

Description

:

n = Sample size

N = Population Size

e = Error tolerance limit of 10%

Data Collection Techniques

The primary data for this study were collected via a questionnaire. The questionnaire used a 5-point symmetric Likert scale with an equal number of response options on both sides and a neutral midpoint (e.g., 1–5).

Data Analysis Techniques

Descriptive Analysis

Descriptive analysis was used to analyze the characteristics of the respondents and farmers' attitudes toward price fluctuations. Microsoft Excel was used to process the questionnaire data. The results of the analysis are presented in the form of frequency distribution tables, percentages, and mean values.

Spearman's Rank Correlation

Data analysis techniques used to examine the relationship between fluctuations in the price of fresh fruit bunches (FFB) and farmers' income.

$$r_s = \frac{6\sum d^2}{n(n^2 - 1)}$$

Description:

r_s = Spearman's rank correlation

coefficient d^2 = Difference between each rank

n = Number of respondents

Simple Linear Regression

This approach is used to predict the magnitude of the change in the dependent variable Y farmers' income when the independent variable X fluctuations in the price of fresh fruit bunches (FFB) changes.

The regression equation model used is:

$$Y = a + BX$$

Description:

Y = Farmers' income

a = Constant numbers

B = Regression

coefficient X = Price

Fluctuations

RESULTS AND DISCUSSION

Farmers' Perceptions of Price Fluctuations

No	Fluctuations in Fresh Fruit Bunch (FFB) Prices	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
		n	n	n	n	n
1	In your opinion, changes in the price of fresh fruit bunches (FFB) are influenced by the price of crude palm oil.	40	52	6	2	0
2	In your opinion, the price of palm oil often fluctuates from week to week	19	71	9	1	0
3	You are concerned when palm oil prices fall because it will have a direct impact on your income	41	47	5	7	0
4	Palm oil farmers must always be prepared and vigilant in the face of fluctuating fresh fruit bunch (FFB) prices	14	49	15	20	2
5	The unstable price of palm oil makes it difficult for you to manage your expenses for maintaining your palm oil plantation	30	44	17	9	0
6	Changes in palm oil prices have led you to reduce the capital allocated for palm oil maintenance	38	38	4	16	4
7	Fluctuations in the price of palm oil make it difficult for you to meet your family's needs	25	38	12	25	0

8	In your opinion, is a stable price for palm oil better than a high but volatile price	20	41	19	20	0
9	Each mill has different purchase prices for palm oil	35	50	9	6	0
10	The quality of oil palm fruit is a key factor in determining the selling price at the mill	44	44	7	5	0
11	You feel that the price of palm oil offered by middlemen is sometimes unfair to farmers	3	21	31	39	6

12	When palm oil prices rise, you feel happy and motivated to take better care of your plantation	29	40	12	19	0
13	In your opinion, could a drop in palm oil prices cause farmers to suffer losses	41	29	22	8	0
14	In your opinion, the government should maintain the stability of palm oil prices to protect palm oil farmers	65	30	4	1	0
15	You obtain information about palm oil prices from fellow farmers or middlemen	26	54	16	4	0

Based on the table above, oil palm farmers in Turangi Village are well aware that the price of fresh fruit bunches (FFB) is unstable and often fluctuates. A total of 92% of farmers believe that FFB prices are influenced by CPO prices, and 90% of farmers realize that these prices change every week. Price changes are a concern for oil palm farmers, as 88% of farmers believe that a drop in prices directly reduces their income. As a result, 74% of farmers struggle to cover the costs of maintaining their farms, and 76% are forced to reduce the funds allocated for farm maintenance. This situation is exacerbated by high production costs such as fertilizers and pesticides which erode profit margins. 63% of farmers believe that price uncertainty makes it difficult to meet their families' needs. Farmers prefer stable prices to high but volatile prices, as price certainty is more beneficial for long term planning. 85% of farmers are aware of price differences among processing plants, and 88% believe that fruit quality affects the selling price. However, attitudes toward middlemen are relatively balanced, indicating that some farmers still consider the prices offered by middlemen to be reasonable. 95% of farmers strongly hope that the government will maintain the stability of fresh fruit bunch (FFB) prices. Cooperatives and farmer groups are considered important for reducing production costs through collective purchasing of inputs, but Turangi Village does not yet have a cooperative. As a result, some farmers are forced to borrow from middlemen at high interest rates even when market prices are high.

Farmers' Perceptions of Income

No	Farmers' Income	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
		n	n	n	n	n
1	Your income depends on the price of palm oil	32	35	16	14	3
2	The revenue generated is in line with your expectations	9	31	19	38	3

3	The proceeds from palm oil sales are enough to cover daily expenses	19	70	8	3	0
4	Your income from the sale of palm oil is very unstable because prices are constantly changing	38	52	4	4	2
5	The income you receive is commensurate with the capital invested in the oil palm plantation	10	75	10	2	3
6	Your income depends on the amount of oil palm harvested	35	55	3	6	1
7	You can save money from the proceeds of your oil palm sales	12	61	19	8	0
8	High quality oil palm fruit can increase your income	46	32	12	10	0
9	Your income increases every year	9	47	40	4	0
10	The amount of land you own has a direct impact on your income	50	41	7	2	0
11	Revenue from palm oil sales is often not enough to buy high quality fertilizer	30	41	7	2	0
12	High production costs can reduce your income	34	37	16	12	1
13	Pest and disease infestations on crops can reduce yields and affect your income.	51	43	4	2	0
14	Increasing the workforce can boost production and affect your income	14	20	30	32	4
15	You need government support in the form of fertilizer and seeds to reduce operating costs, which affect your income	80	19	1	0	0

A total of 67% of farmers agree that their income depends on the price of fresh fruit bunches (FFB), and 90% of farmers state that their income is unstable due to price fluctuations. In addition, 90% of farmers also recognize that crop yield is the main factor determining their income. A total of 89% of farmers believe that their income from selling fresh fruit bunches (FFB) is sufficient to meet their daily needs, 85% of farmers state that their income is commensurate with their capital, and 73% of farmers say they are still able to save money.

This indicates that, despite the uncertainty of income, being a palm oil farmer is still considered profitable. 71% of farmers believe that their sales revenue is often insufficient to purchase high-quality fertilizer, and 71% of farmers state that high production costs reduce their income. The threat of pests and diseases is also significant with 94% of farmers acknowledging that this reduces crop yields, 91% of farmers believe that the size of their farmland directly affects their income, while 78% of farmers state that fruit quality increases their income. Conversely, the effectiveness of increasing the labor force is considered uncertain. Government support is most eagerly anticipated, with 99% of farmers strongly agreeing that they need assistance with fertilizer and seeds. Subsidy programs, price stabilization, and cooperatives were cited as the government's primary methods for helping farmers cope with market price fluctuations.

The Relationship Between Price Fluctuations and Farmers' Income

Independent Variable (X)	Dependent Variable (Y)	rs	Sign	t-table	
Price Fluctuations	Income	0,472	0,013	$\alpha = 0,05$ 0,1966	$\alpha = 0,01$ 0,2565

The Spearman rank correlation coefficient (rs) between price fluctuations and oil palm farmers' income was found to be 0.472. This value was compared with the t-table values at $\alpha = 0.05$ (0.1966) and $\alpha = 0.01$ (0.2565). Since $rs = 0.472$ is greater than both of these t-table values, there is a relationship between price fluctuations and income even at a 99% confidence level.

The relationship between price fluctuations and oil palm farmers' income was statistically significant, with a p-value of $0.013 < \alpha = 0.05$. H1 states that there is a significant relationship between price fluctuations and farmers' income. Therefore, it is accepted.

The correlation coefficient of 0.472 falls between 0.26 and 0.50, indicating a moderate strength of relationship. The positive coefficient indicates a positive relationship, meaning that an increase in the price of fresh fruit bunches (FFB) is followed by an increase in farmers' income.

Results of Simple Linear Regression Analysis

To determine the extent to which price fluctuations affect farmers' income, a simple linear regression analysis was conducted. The results are as follows:

The resulting regression

equation: $Y = 39.819 + 0.318X$

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	39.819	5.755		6.919	.000
	X	.318	.098	.313	3.263	.002

The table above shows a constant value of 39.819 with a calculated t-value of 6.919 and a p-value of 0.000. Since the p-value is less than 0.05, the constant is statistically significant. This constant value indicates that if the price fluctuation variable (X) is assumed to be constant or equal to zero, then palm oil farmers' income remains at 39.819 units.

The regression coefficient for the price fluctuation variable (X) is 0.318, with a calculated t-value of 3.263 and a significance level of 0.002 < 0.05. This means that price fluctuations have a significant effect on oil palm farmers' income. A positive coefficient indicates that a one-unit increase in price fluctuations will increase income by 0.318 units.

Determination Coefisien (R² dan Adjusted R²)

Model Summary ^b						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson	
1	.313 ^a	.098	.089	4.57979	1.541	

Based on the analysis of the coefficient of determination, R = 0.313 was obtained, indicating a positive relationship between price fluctuations (X) and farmers' income (Y). The R² value of 0.098 means that price fluctuations account for only 9.8% of farmers' income in Turangi Village, while 90.2% is explained by other factors. This coefficient of determination, as indicated by the t-test, does not diminish the significance of the effect of price fluctuations on farmers' income, even though the magnitude of that effect is relatively small. This suggests that many factors other than price fluctuations influence the income of oil palm farmers. Some of these factors include land area, fruit quality, production costs, and weather conditions and pest infestations.

CONCLUSION

Based on the analysis results, it was concluded that price fluctuations have a significant relationship with farmers' income, with the strength of the relationship classified as moderate. The correlation coefficient was 0.47, and the significance level (p-value) was $0.013 < 0.05$. A positive coefficient indicates a positive relationship, meaning that an increase in the price of fresh fruit bunches (FFB) is followed by an increase in farmers' income.

The hypothesis that the income of oil palm farmers in Turangi Village is influenced by fluctuations in the price of fresh fruit bunches (FFB) is clear and acceptable. The regression model $Y = 39.819 + 0.318X$ is statistically valid. The impact of price fluctuations on farmers' income is 9.8%, while other factors outside the research model account for 90.2%.

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