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Factors Influencing Coffee Farmers' Income in Kisam Tinggi District, Ogan Komering Ulu (OKU) Selatan Regency: A Case Study of Simpang Empat Village

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Abstract

Coffee farming is a key agricultural activity in Kisam Tinggi District, especially in Simpang Empat Village. This study aims to identify the factors influencing coffee farmers' income in Kisam Tinggi District, Ogan Komering Ulu (OKU) Selatan Regency. The research employs a quantitative approach, with data processed according to the relevant model. Data sources include questionnaires and structured interviews, and the analysis is performed using classical assumption tests, multiple linear regression, and hypothesis testing with Eviews 10 software. The results indicate that, simultaneously, the independent variables have a significant and positive effect on the dependent variable. Additionally, individually, land area, labor, fertilizer costs, and pesticide costs significantly and positively impact farmers' income.

Keywords: Farmers' Income, Land Area, Labor, Fertilizer Costs, Pesticide Costs.

INTRODUCTION

Indonesia is the third-largest coffee producer globally, after Brazil and Vietnam, contributing around 6% of the world's coffee production (Anggraini, 2022). As an agrarian country, the agricultural sector, including coffee plantations, plays a vital role in Indonesia's economy. Internationally, Indonesia is also the fourth-largest coffee exporter with an 11% market share (Harum, 2022). Domestically, coffee consumption is concentrated on major islands like Sumatra, Java, and Kalimantan, with Sumatra being one of the primary coffee-producing regions. Coffee has long been a key commodity, serving not only as a source of income for farmers but also as a vital export product and a contributor to national foreign exchange earnings (Khaeroni, 2018).

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However, despite its importance, the coffee industry in Indonesia faces several challenges, including price fluctuations. These price variations result from imbalances between government policies and global coffee market supply, leading to instability in farmers' incomes (Anggraini, 2022). Additionally, technical challenges such as suboptimal cultivation techniques and land management affect productivity.

Four main types of coffee are cultivated in Indonesia: Arabica, Robusta, Liberica, and Hybrid. Arabica, which was the first type of coffee introduced to Indonesia, thrives at altitudes of 1,100 to 1,200 meters above sea level, which is suitable for many regions in Indonesia (Siwa, 2023). Robusta, which is more resistant to disease and has higher yields, is widely cultivated, especially in Sumatra (Faud Anshor et al., 2014). Meanwhile, Liberica, which grows in lowland areas, and Hybrid coffee, a cross between two superior varieties, are also cultivated in some regions (As'ad, 2020).

Coffee productivity varies across provinces in Indonesia. According to the Indonesian Central Statistics Agency (BPS, 2022), South Sumatra ranks first in terms of coffee production and cultivated land area, with 267,867 hectares producing 206,307 tons of coffee. Other leading coffee-producing provinces include Aceh, North Sumatra, Lampung, and East Java (BPS, 2022). One of the significant contributors to national coffee production in South Sumatra is Ogan Komering Ulu Selatan (OKUS) Regency, where coffee is a key commodity.

OKUS Regency has coffee plantations spread across 19 districts, with Kisam Tinggi District being one of the largest coffee producers. Kisam Tinggi covers 9,051 hectares, producing 6,240 tons annually (Badan Penyuluhan Pertanian, 2022). Although Kisam Tinggi is a significant producer, coffee farmers' income remains below the average income of coffee farmers in South Sumatra. In Simpang Empat village, a coffee-producing village in Kisam Tinggi, the majority of the population are coffee farmers, with a total cultivation area of 884 hectares and a production rate of 663 kg per hectare. Despite its large coffee output, farmers' welfare in Simpang Empat is lower than the provincial average (BPS, 2022).

Despite South Sumatra's higher coffee productivity compared to the national average (0.75 tons per hectare versus 0.55 tons per hectare nationally) (Martins & Matsumoto, 2010), coffee farmers in Simpang Empat village still experience low incomes. Their earnings range from Rp. 10,000,000 to Rp. 20,000,000 per hectare per year, significantly below South Sumatra's average of Rp. 24,303.78 per hectare annually (Badan Penyuluhan Pertanian, 2022). This indicates inefficiencies in land management or distribution of output.

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The factors affecting coffee farmers' income in Kisam Tinggi are thought to include land size, use of technology, intensive land management, and the adoption of proper cultivation practices such as the effective use of fertilizers and pesticides. In addition, variables like plant age and labor force also influence coffee land productivity (Martins & Matsumoto, 2010). Based on these issues, this research aims to analyze the factors affecting coffee farmers' income in Kisam Tinggi District, Ogan Komering Ulu Selatan Regency, with a focus on Simpang Empat village as a case study..

LITERATUR REVIEW

Factors Affecting Coffee Farmers' Income

The income of coffee farmers in Kisam Tinggi District is influenced by several key factors, such as land area, labor, fertilizer costs, and pesticide costs. These factors are directly related to the productivity of coffee farming and the efficiency in utilizing agricultural resources. According to agricultural economics theory, these factors significantly affect the success and income levels of farmers in the region.

Land Area

Land area plays a crucial role in determining coffee farmers' income. As stated by Mubyarto (2007), the larger the land area used, the higher the production output, which ultimately increases farmers' income. Previous studies support this view, showing that larger land areas positively correlate with increased coffee farmers' income.

Labor

Labor is another key factor influencing coffee farmers' income. A study by Nainggolan et al. (2018) found that increasing labor by 1 HOK/hectare can significantly raise coffee farmers' income. However, excessive labor usage may affect farming efficiency and productivity, potentially reducing income.

Fertilizer Costs

Fertilizer plays an essential role in stimulating coffee plant growth and enhancing productivity. According to Izzati (2016), appropriate fertilizer use can boost harvests,

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which in turn positively impacts farmers' income. However, excessive or improper use of fertilizer can have the opposite effect, lowering production and income.

Pesticide Costs

Effective use of pesticides helps protect coffee plants from pests and diseases. Studies have shown a positive relationship between pesticide costs and farmers' income, where the proper use of pesticides can increase harvest yields and farmers' earnings. Excessive pesticide use, however, can be detrimental, making it crucial for farmers to carefully manage dosage and pesticide types.

METHODOLOGY

This research employs a combination of both secondary and primary data collected from field surveys. The study location covers Simpang Empat Village, Kisam Tinggi District, Ogan Komering Ulu (OKU) Selatan Regency, with the research period from February 20, 2024, to March 2, 2024. Secondary data is obtained from publications by the Central Bureau of Statistics (BPS) and the Agricultural Extension Agency (BPP), while primary data is collected through interviews and questionnaires with coffee farmers.

The variables analyzed in this research include farmers' income (Y), land area (X1), labor (X2), fertilizer costs (X3), and pesticide costs (X4). The analysis is conducted using multiple linear regression with a quantitative descriptive approach. Multiple linear regression is employed to evaluate the influence of independent variables on the dependent variable. The regression model used is as follows:

$$Y=\beta0+\beta1X1+\beta2X2+\beta3X3+\beta4X4+\epsilon$$

Where:

Y: Farmers' income (Rp)
X1: Land area (Rp)
X2: Labor (Rp)
X3: Fertilizer costs (Rp)
X4: Pesticide costs (Rp)
β0: Constant
β1, β2, β3, β4: Regression coefficients
ε: Error term

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The analysis process used multiple linear regression, with classical assumption tests conducted to examine normality, multicollinearity, and heteroscedasticity. T-tests and F-tests were used to test the hypotheses.

RESULT

Analisis Regresi Linier Berganda

Multiple linear regression analysis was used to determine the effect of land area (X1), labor (X2), fertilizer costs (X3), and pesticide costs (X4) on farmers' income (Y) in coffee farming in Simpang Empat Village, Kisam Tinggi District, Ogan Komering Ulu (OKU) Selatan Regency. The analytical tool used in this study was EViews 10, and the results are as follows:

Tabel 1. Regression Results Using the Cobb-Douglas Production Function on Coffee Farming in Simpang Empat Village, Using EViews.10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Farmers' Income	6.926366	2203261	3.143688	0.0023
Land Area	0.721010	0.174959	4.121026	0.0001
Labor	0.747602	0.180765	4.135767	0.0001
Fertilizer Costs	3.528262	0.536637	6.574769	0.0000
Pesticide Costs	5.611415	2.033103	2.760025	0.0072

Source: EViews.10 Calculations, 2024

Notes:
*) = significant at α 1%
**) = significant at α 5%
The regression results based on Table 9 can be written as follows:
$Y = \beta0+\beta1X1+\beta2X2+\beta3X3+\beta4X4+et$
$Y = 6.926366+0.721010+0.747602+3.528262+5.611415$
$Y = 6.926366 + 0.721010 + 0.747602 + 3.528262 + 5.611415$
$Y = 6.926366+0.721010+0.747602+3.528262+5.611415$
$R^2 = 0.888344$
F-statistic = 159.1222

Explanation:
Y = Farmers' income

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X_1 = Land area
X_2 = Labor
X_3 = Fertilizer costs
X_4 = Pesticide costs

Based on the estimation results, the following can be explained:

1. The coefficient of land area is 0.721010, meaning a 1% increase in land area will result in a 0.721010 increase in farmers' income in Simpang Empat, assuming ceteris paribus.
2. The labor coefficient is 0.747602, meaning a 1% increase in labor will result in a 0.747602 increase in farmers' income, assuming ceteris paribus.
3. The fertilizer cost coefficient is 3.528262, meaning a 1% increase in fertilizer costs will increase farmers' income by 3.528262, assuming ceteris paribus.
4. The pesticide cost coefficient is 5.611415, meaning a 1% increase in pesticide costs will increase farmers' income by 5.611415, assuming ceteris paribus.

The R-squared (R^2) value of 0.888344 indicates that 88% of the variation in farmers' income in Simpang Empat can be explained by the land area, labor, fertilizer costs, and pesticide costs, while the remaining 12% is explained by other variables not included in the study or model

Uji Asumsi Klasik

Normality Test

The normality test is one of the classical assumption tests used to determine whether the residuals from regression are normally distributed (Widarjono, 2018). The decision rule for the normality test is as follows: if the probability value of the Jarque-Bera t-statistic is greater than alpha (α = 0.05), the residuals are normally distributed. However, if the probability value of the Jarque-Bera t-statistic is less than alpha (α = 0.05), the residuals are not normally distributed. The hypotheses for the normality test are as follows:

Tabel 2. Normality Test Results

Jarque – bera (JB)	1.337580
Prob.	0.512328

Source: Eviews 10 Data Processing, 2024

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The image above shows the results of the normality test, indicating a Jarque-Bera (JB) value of 1.337580 with a probability value of 0.512328. These results conclude that H_0 is accepted, and thus H_a is rejected, meaning the data is normally distributed.

Multicollinearity Test

Multicollinearity detection in this study is conducted using the variance inflation factor (VIF) for each variable. A VIF greater than 10 indicates multicollinearity, while a VIF less than 10 indicates no multicollinearity. The test results are as follows:

Tabel 3. Multicollinearity Test Results

Independent Variable	VIF	Description
Land Rent	2.912276	Tolerable
Labor	2.469051	Tolerable
Fertilizer Costs	2.961654	Tolerable
Pesticide Costs	1.978895	Tolerable

Source: Data Processed with Eviews.10, 2024

Based on these results, the variables of land rent, labor, fertilizer costs, and pesticide costs all show VIF values of less than 10, indicating that there is no multicollinearity issue in this study.

Heteroscedasticity Test

Heteroscedasticity arises when there is an error or the assumption that the disturbance factor has a constant variance is not met. The heteroscedasticity test is used to assess whether there is a variance inequality in the residuals for observations in the regression model. In this study, the heteroscedasticity test was conducted using the White method with Eviews.10. If the obsR-square value is greater than 0.05, it indicates that the data is free from heteroscedasticity problems. Conversely, if the obsR-square value is

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less than 0.05, heteroscedasticity is present in the data. The results of the heteroscedasticity test are as follows:

Tabel 4. Heteroscedasticity Test Results

*Obs*R-square*	*16.21243*
Prob. Chi- square	*0.3006*

Source: Data Processed with Eviews.10, 2024

From the results obtained, the prob. chi-square value in the heteroscedasticity test is 0.3006, where the prob. chi-square value of 0.3006 > 0.05, which means there is no heteroscedasticity.

Hypothesis Test

T-statistic test

The T-statistic test is used to determine how the independent variables (X1, X2, X3, X4) individually (partially) have a significant effect on the dependent variable (Y). The T-statistic test uses a significance level of α = 0.05 with a degree of freedom (df) of n-k-1 = 85-4-1 = 80, with the following hypotheses:

H_0: $\beta_i = 0$; the independent variables do not have a significant effect on coffee farmers' income.

H_a: $\beta_i \neq 0$; the independent variables have a significant effect on coffee farmers' income.

The decision rule is:

If T-statistic > T-table, then H_0 is rejected, and H_a is accepted.

If T-statistic < T-table, then H_0 is accepted, and H_a is rejected.

Table 5. T-statistic Test Results

Variable	T-statistic	T-table	Conclusion
Land rent	4.121026	1.664	H_0 rejected, H_a accepted
Labor	4.135767	1.664	H_0 rejected, H_a accepted
Fertilizer cost	6.574769	1.664	H_0 rejected, H_a accepted
Pesticide cost	2.760025	1.664	H_0 rejected, H_a accepted

Source: Data Processing Results with Eviews 10

The results of the T-test are as follows:

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1. The independent variable of land area has a value of 4.121026, which is greater than the t-table value of 1.664 at a significance level of α = 0.05. This indicates that H_0 is rejected, and H_a is accepted, concluding that land area has a significant positive effect on farmers' income in Kisam Tinggi District.
2. The labor variable has a value of 4.135767, which is greater than the t-table value of 1.664 at a significance level of α = 0.05. This indicates that H_0 is rejected, and H_a is accepted, concluding that labor has a significant positive effect on coffee farmers' income in Kisam Tinggi District.
3. The fertilizer cost variable has a value of 6.574769, which is greater than the t-table value of 1.664 at a significance level of α = 0.05. This indicates that H_0 is rejected, and H_a is accepted, concluding that fertilizer costs have a significant positive effect on coffee farmers' income in Kisam Tinggi District.
4. The pesticide cost variable has a value of 2.760025, which is greater than the t-table value of 1.664 at a significance level of α = 0.05. This indicates that H_0 is rejected, and H_a is accepted, concluding that pesticide costs have a significant positive effect on coffee farmers' income in Kisam Tinggi District.

F-statistic Test

The purpose of this test is to determine whether all independent variables in the model simultaneously affect the dependent variable, with a confidence level of 95% (α = 0.05). If the F-statistic value is greater than 0.05, with the numerator degrees of freedom (df1) = k - 1 = 4 - 1 = 3 and the denominator degrees of freedom (df2) = n - k = 85 - 4 = 81, then the estimated regression model is considered valid; otherwise, it is not.

Table 6. F-statistic Test Results

F-statistik	F-tabel	Probabilitas	Keterangan
159.1222	2,48	0.000000	H_0 ditolak dan H_a diterima

Source: Data Processing Results with Eviews 10

Based on the F-statistic value of 159.1222, which is greater than the F-table value of 2.48 at α = 0.05, the result indicates that H_0 is rejected and H_a is accepted. This concludes that the independent variables of land area, labor, fertilizer costs, and

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pesticide costs significantly affect coffee farmers' income in Simpang Empat Village, Kisam Tinggi District.

DISCUSSION

Impact of Land Area

The land area variable has a coefficient of 0.721010 and a probability value of 0.0001. A 1% increase in land area leads to a 0.721010% increase in income. This result aligns with previous research indicating that larger land areas significantly boost income.

1) Impact of Labor

The labor variable has a coefficient of 0.747602 and a probability value of 0.0001. A 1% increase in labor results in a 0.747602% increase in income. This supports the idea that more labor positively impacts farmers' income.

2) Impact of Fertilizer Costs

Fertilizer costs have a coefficient of 3.528262 and a probability value of 0.0000. A 1% increase in fertilizer costs leads to a 3.528262% increase in income. This finding is consistent with the notion that higher fertilizer costs can enhance income due to increased production.

3) Impact of Pesticide Costs

Pesticide costs have a coefficient of 5.611415 and a probability value of 0.0072. A 1% increase in pesticide costs results in a 5.611415% increase in income. Proper use of pesticides, as recommended, significantly boosts farmers' income by improving coffee yields.

CONCLUSION

Based on the regression estimation results, the land area variable shows a positive and significant impact on the income of coffee farmers in Simpang Empat Village, Kisam Tinggi District. This finding supports the hypotheses and theories that were formulated. Similarly, the labor variable also has a positive and significant effect on the income of coffee farmers in the same village. This result aligns with the hypotheses and theories that have been developed. Moreover, the fertilizer cost variable demonstrates a positive and significant influence on the income of coffee farmers in Simpang Empat Village. This finding is consistent with the hypotheses and theories established. Lastly, the pesticide cost variable has a positive and significant impact on the income of coffee farmers in the same village. This result supports the hypotheses

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and theories that were formulated. Overall, these findings confirm that all tested variables have a significant impact as per the existing theories..

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