MIKAILALSYS
Journal of Multidisciplinary Sciences

e-ISSN : 2987-2286
p-ISSN : 2987-3924

Index: Harvard, Boston, Sydney, Copernicus, Sinta 4, Scilit, Semantic, Google, etc

https://doi.org/10.58578/mikailalsys.v4i2.10776

The Effect of Areca Nut Commodity Prices and Land Area on Farmers' Income in Sungai Undan Village, Inhil, Riau

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Article Info:

Submitted:	Revised:	Accepted:	Published:
May 8, 2026	Jun 5, 2026	Jun 17, 2026	Jun 22, 2026

Abstract

Although previous studies have examined areca nut farming, production, and marketing in several regions, research specifically analyzing the effect of areca nut commodity prices and land area on farmers' income in Sungai Undan Village, Indragiri Hilir Regency, Riau, remains limited. This study aimed to analyze the influence of areca nut commodity prices and land area on farmers' income. A quantitative approach with a descriptive-correlational survey design was employed, involving 50 areca nut farmers selected from a population of 100 farmers using the Slovin formula with a 10% margin of error. Data were collected through questionnaires, face-to-face interviews, and village documents, and were analyzed using descriptive statistics and multiple linear regression with SPSS. The findings indicate that areca nut commodity prices have a positive and significant effect on farmers' income, whereas land area has a positive but non-significant effect. Simultaneously, both variables significantly influence farmers' income, with an Adjusted R Square value of 0.552. These findings suggest that commodity price dynamics play a more decisive role than land ownership size in shaping farmers' income in the study context. The study contributes to the literature on agricultural income, rural commodity trading, and Islamic economic

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justice by highlighting the importance of fair and transparent market mechanisms for smallholder farmers. The conclusion emphasizes the need to strengthen fairer pricing mechanisms, improve farmers' bargaining power, and develop more transparent marketing systems to support income sustainability in rural agricultural communities.

Keywords: Areca Nut Prices; Land Area; Farmers' Income; Rural Commodity Trading; Islamic Economic Justice

INTRODUCTION

Agriculture remains one of the most important sectors in supporting rural livelihoods, especially in countries where many communities depend on land-based economic activities (Jin et al., 2024; Sahoo et al., 2022). For farmers, agriculture is not only a source of income but also a way of sustaining family life, education, social obligations, and long-term household needs. In Indonesia, the agricultural sector continues to play a strategic role in national development because it absorbs a large number of workers and supports the economic life of rural communities (Birowo & Hansen, 2019; Ngadi et al., 2023). However, farmers often face unstable income due to fluctuating commodity prices, limited market access, unequal bargaining positions, and differences in land ownership. The Ministry of Agriculture of the Republic of Indonesia (2023) emphasizes that farmers' welfare is closely related to their ability to obtain fair and sufficient income from agricultural activities.

One of the plantation commodities that has economic value for rural communities is areca nut (*Areca catechu* L.) (Bhat et al., 2024; Kaur & Singh, 2023). Areca nut is widely cultivated in tropical regions and has long been used for various social, cultural, economic, and medicinal purposes. In several areas of Indonesia, this commodity has become an important source of household income. Munandar & Ridwan (2023) explain that areca nut cultivation requires proper seedling techniques and plant management to support good productivity. This indicates that areca nut should not only be seen as a traditional crop, but also as a plantation commodity that can be developed to improve farmers' economic welfare.

In the context of international and national trade, agricultural commodities are strongly influenced by market demand, product quality, distribution channels, and trade policies. International trade can create wider market opportunities for agricultural products, but it can also bring uncertainty when prices change rapidly. Agil (2020) notes that

international trade systems need to be viewed critically because market mechanisms may not always benefit small producers fairly. For areca nut farmers, price fluctuation is a serious issue because their income is highly dependent on the selling price they receive at harvest time. When the price increases, farmers may earn better income; however, when the price declines, their household economy can be directly affected (Belinska et al., 2023; Zhang & Zhao, 2024).

Sungai Undan Village, located in Indragiri Hilir Regency, Riau, is one of the areas where many people depend on areca nut farming. For local farmers, areca nut is more than a plantation crop; it is a daily source of livelihood. The income earned from areca nut is used to meet basic needs, maintain plantations, support children's education, and fulfill other household responsibilities. However, the condition of farmers in this village shows that their income is not always stable. Although areca nut production has strong potential, farmers' earnings are influenced by the commodity price and the size of land they manage.

Commodity price is one of the main factors affecting farmers' income. A higher selling price gives farmers a greater opportunity to increase their earnings, while a lower price can reduce income even when production remains high. Sujai (2011)argues that the stability of agricultural commodity prices is important because agricultural products are directly related to people's basic needs and the welfare of producers. In areca nut farming, price instability makes it difficult for farmers to plan their family finances, savings, and farm maintenance. This condition becomes more challenging for small farmers who rely almost entirely on income from harvest sales.

In addition to commodity price, land area also has an important role in determining farmers' income. In general, farmers with larger landholdings have greater potential to produce more areca nut than those with smaller land areas. Nevertheless, land size alone does not automatically guarantee higher income. Productivity, plant condition, crop quality, production costs, and selling price also influence the final income received by farmers. Indayani et al. (2022) found that areca nut production is affected by several factors, including land condition and farming management. Similarly, Evita et al. (2021) show that the income of dried areca nut farmers is closely related to production volume, farming costs, and selling price.

The income problem of areca nut farmers is also connected to the marketing system. Many farmers sell their harvest to collectors or middlemen because they have limited access

to transportation, market information, and direct buyers. This situation often places farmers in a weak bargaining position. As a result, the selling price is more frequently determined by traders than by farmers themselves. Nahak & Nubatonis (2019) explain that marketing channels influence the price received by areca nut producers. Wahyuanto (2024) also highlights that the role of areca nut brokers can affect farmers' income, particularly when the pricing mechanism is not transparent or does not fully reflect the value of farmers' production.

From the perspective of Islamic economics, buying and selling activities should be based on justice, balance, honesty, and transparency. Nasyiah (2014) states that the determination of price must reflect fairness so that no party is harmed in the transaction. Munandar & Ridwan (2023) also emphasize that justice is a fundamental principle in Islamic economics, including in cooperation and profit-sharing practices. In the case of areca nut farmers, this principle is highly relevant because farmers often stand in a weaker economic position than traders or buyers. Therefore, a fairer and more transparent trading system is needed to protect farmers and support more sustainable rural welfare.

Several previous studies have discussed areca nut farming, income, production, cultivation, and marketing. Evita et al. (2021) examined the income of dried areca nut farmers in Aceh Tamiang, while Nesneri et al. (2020) analyzed areca nut farming income in East Aceh. Gea and Gea (2023) focused on areca nut seedling techniques, and Arifullah et al. (2017) studied the factors affecting areca nut production. Meanwhile, Nahak and Nubatonis (2019) discussed the marketing of raw areca nut, and Putro & Kramadibrata (2024) examined the role of brokers in determining prices and farmers' income from an Islamic business ethics perspective. Although these studies are relevant, research that specifically examines the effect of areca nut commodity prices and land area on farmers' income in Sungai Undan Village, Indragiri Hilir Regency, Riau, is still limited.

Based on these issues, this study focuses on the effect of areca nut commodity prices and land area on farmers' income in Sungai Undan Village, Indragiri Hilir Regency, Riau. This research is important because it provides an empirical understanding of how price changes and land ownership contribute to farmers' income. The findings are expected to offer useful insights for farmers, village government, traders, and related stakeholders in formulating strategies to improve areca nut farmers' income in a fair, productive, and sustainable manner.

METHODS

This study employed a quantitative research approach because the main purpose of the research was to measure the effect of areca nut commodity prices and land area on farmers' income in Sungai Undan Village, Indragiri Hilir Regency, Riau. A quantitative approach was considered appropriate because the variables in this study were expressed in numerical data and analyzed statistically to examine the relationship between the independent variables and the dependent variable. As explained by Creswell and Creswell (2018), quantitative research is useful for testing objective theories by examining the relationship among measurable variables. The research design used in this study was a descriptive-correlational survey design. This design enabled the researcher to describe the actual economic condition of areca nut farmers and, at the same time, analyze whether commodity price and land area significantly influenced farmers' income. Compared with previous studies that mostly discussed areca nut income, production, or marketing descriptively, this study provides a more focused statistical analysis by examining two key factors price and land area as predictors of farmers' income.

The population of this study consisted of 100 areca nut farmers in Sungai Undan Village. The sample was determined using the Slovin formula with a 10% margin of error, resulting in 50 farmers as research respondents. This sampling technique was used to obtain representative data within the available time and field conditions, in line with Sugiyono (2017) explanation that sampling is needed when the population is relatively large and cannot be fully studied. The data consisted of primary and secondary data. Primary data were collected directly from areca nut farmers through questionnaires and face-to-face interviews, while secondary data were obtained from village documents related to land area, production, and farmers' income. The research instrument was tested through validity and reliability tests to ensure that the questionnaire items were appropriate and consistent in measuring the research variables. The data were analyzed using descriptive statistics and multiple linear regression with the help of SPSS. Before regression analysis, classical assumption tests were conducted, including normality, multicollinearity, and heteroscedasticity tests. Hypothesis testing was carried out using the t-test to examine the partial effect of each independent variable, the F-test to examine the simultaneous effect of all independent variables, and the coefficient of determination (R^2) to measure how far commodity price and land area explained variations in farmers' income.

RESULTS

The results of this study are presented based on respondent characteristics, instrument testing, classical assumption tests, multiple linear regression analysis, and hypothesis testing. The data were obtained from 50 areca nut farmers in Sungai Undan Village, Indragiri Hilir Regency, Riau. The analysis was conducted using SPSS to examine the effect of areca nut commodity prices and land area on farmers' income.

1. Respondent Characteristics

The characteristics of respondents in this study were grouped based on gender and age. Based on gender, most respondents were male, with 27 farmers or 54% of the total respondents. Meanwhile, female respondents consisted of 23 farmers or 46%. This condition shows that areca nut farming in Sungai Undan Village is carried out by both men and women, although male farmers remain slightly dominant.

Table 1. Respondent Characteristics Based on Gender

No.	Gender	Frequency	Percentage
1	Male	27	54%
2	Female	23	46%
Total		50	100%

Based on age, most respondents were in the 41–50 age group, with 23 farmers or 46%. The second largest group was the 51–60 age group, with 14 farmers or 28%. Furthermore, 8 respondents or 16% were aged 61–70 years, while 5 respondents or 10% were aged 30–40 years. These findings indicate that most areca nut farmers in Sungai Undan Village are in the middle to older age categories, which reflects that areca nut farming is mostly managed by farmers with long farming experience.

Table 2. Respondent Characteristics Based on Age

No.	Age Group	Frequency	Percentage
1	30–40 years	5	10%
2	41–50 years	23	46%
3	51–60 years	14	28%
4	61–70 years	8	16%
Total		50	100%

2. Instrument Validity Test

The validity test was conducted to determine whether each questionnaire item was appropriate for measuring the research variables. The criterion used was that an item is

considered valid if the calculated r-value is greater than the r-table value. With a total sample of 50 respondents, the r-table value was 0.273. The results of the validity test for the areca nut commodity price variable are presented in Table 3.

Table 3. Validity Test of Areca Nut Commodity Price Variable

Item	r-count	r-table	Description
X1.1	0.802	0.273	Valid
X1.2	0.651	0.273	Valid
X1.3	0.848	0.273	Valid
X1.4	0.862	0.273	Valid
X1.5	0.777	0.273	Valid

Table 3 shows that all items in the areca nut commodity price variable have r-count values greater than 0.273. Therefore, all items used to measure the commodity price variable were declared valid.

Table 4. Validity Test of Land Area Variable

Item	r-count	r-table	Description
X2.1	0.808	0.273	Valid
X2.2	0.675	0.273	Valid
X2.3	0.695	0.273	Valid
X2.4	0.813	0.273	Valid
X2.5	0.831	0.273	Valid

As shown in Table 4, all items in the land area variable were valid because their r-count values were higher than the r-table value of 0.273. This means that the questionnaire items were suitable for measuring the land area variable.

Table 5. Validity Test of Farmers' Income Variable

Item	r-count	r-table	Description
Y.1	0.784	0.273	Valid
Y.2	0.879	0.273	Valid
Y.3	0.883	0.273	Valid
Y.4	0.846	0.273	Valid
Y.5	0.820	0.273	Valid

Table 5 indicates that all items in the farmers' income variable were also valid. Each item had an r-count value greater than 0.273. Thus, the instrument used to measure farmers' income was appropriate for further analysis.

3. Instrument Reliability Test

The reliability test was conducted using Cronbach's Alpha. A variable is considered reliable if the Cronbach's Alpha value is greater than 0.60. The reliability test results are shown in Table 6.

Table 6. Reliability Test Results

Variable	Cronbach's Alpha	Number of Items	Reliability Standard	Description
Areca nut commodity price	0.845	5	0.60	Reliable
Land area	0.800	5	0.60	Reliable
Farmers' income	0.897	5	0.60	Reliable

Based on Table 6, all variables had Cronbach's Alpha values greater than 0.60. The areca nut commodity price variable obtained a value of 0.845, the land area variable obtained 0.800, and the farmers' income variable obtained 0.897. These results indicate that all research instruments were reliable and could be used for further statistical analysis.

4. Classical Assumption Tests

The classical assumption tests consisted of normality, multicollinearity, and heteroscedasticity tests. These tests were conducted to ensure that the regression model met the basic assumptions required for multiple linear regression analysis.

Table 7. Normality Test Results

One-Sample Kolmogorov-Smirnov Test	Unstandardized Residual
N	50
Mean	0.0000000
Std. Deviation	2.07223333
Absolute	0.122
Positive	0.071
Negative	-0.122
Test Statistic	0.122
Asymp. Sig. (2-tailed)	0.063

The normality test in Table 7 shows that the Asymp. Sig. value was 0.063. Since this value is greater than 0.05, the residual data were normally distributed. Therefore, the regression model met the normality assumption.

Table 8. Multicollinearity Test Results

Variable	Tolerance	VIF
Areca nut commodity price	0.925	1.081
Land area	0.925	1.081

Table 8 shows that the tolerance values for both independent variables were 0.925, which is greater than 0.10. The VIF values were 1.081, which is lower than 10. These results indicate that there was no multicollinearity problem between the independent variables in the regression model.

Table 9. Heteroscedasticity Test Results

Model	B	Std. Error	Beta	t	Sig.
Constant	2.227	2.193		1.015	0.315
Areca nut commodity price	-0.033	0.066	-0.077	-0.507	0.615
Land area	0.000	0.071	0.000	-0.003	0.998

Based on Table 9, the significance value of the areca nut commodity price variable was 0.615, while the significance value of the land area variable was 0.998. Both values were greater than 0.05. Therefore, it can be concluded that there was no heteroscedasticity problem in the regression model.

5. Multiple Linear Regression Analysis

Multiple linear regression analysis was used to determine the effect of areca nut commodity prices and land area on farmers' income. The results of the regression analysis are presented in Table 10.

Table 10. Multiple Linear Regression Results

Model	B	Std. Error	Beta	t	Sig.
Constant	6.222	3.347		1.859	0.069
Areca nut commodity price	0.748	0.100	0.743	7.479	0.000
Land area	0.043	0.108	0.040	0.402	0.689

The multiple linear regression model used in this study is presented as follows:

$$Y = \alpha + \beta 1X1 + \beta 2X2 + e \quad (1)$$

Based on the regression results, the equation can be written as follows:

$$Y = 6.222 + 0.748X1 + 0.043X2 + e \quad (2)$$

The regression equation shows that the constant value was 6.222. This means that if the areca nut commodity price and land area are assumed to be constant or equal to zero,

farmers' income would be 6.222. The regression coefficient of the areca nut commodity price variable was 0.748, which indicates a positive relationship between commodity price and farmers' income. This means that an increase in areca nut price tends to increase farmers' income. Meanwhile, the regression coefficient of the land area variable was 0.043, which also indicates a positive relationship. However, the effect of land area was much smaller than the effect of commodity price.

6. Hypothesis Testing

Hypothesis testing was conducted using the t-test and F-test. The t-test was used to examine the partial effect of each independent variable on farmers' income, while the F-test was used to examine the simultaneous effect of areca nut commodity prices and land area on farmers' income.

Table 11. t-Test Results

Variable	B	t-count	Sig.	Decision
Areca nut commodity price	0.748	7.479	0.000	Significant
Land area	0.043	0.402	0.689	Not significant

Based on Table 11, the areca nut commodity price variable had a significance value of 0.000, which is lower than 0.05. This means that areca nut commodity price has a positive and significant effect on farmers' income. In other words, changes in areca nut prices directly affect the income received by farmers in Sungai Undan Village.

Meanwhile, the land area variable had a significance value of 0.689, which is greater than 0.05. This result shows that land area has a positive but not significant effect on farmers' income. Although larger land may provide greater production potential, the result indicates that land area alone does not significantly determine farmers' income without being supported by other factors such as productivity, crop quality, production costs, and selling price.

Table 12. F-Test Results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	279.587	2	139.793	31.226	0.000
Residual	210.413	47	4.477		
Total	490.000	49			

Table 12 shows that the F-count value was 31.226 with a significance value of 0.000. Since the significance value is lower than 0.05, it can be concluded that areca nut commodity

prices and land area simultaneously have a significant effect on farmers' income. This result confirms that the regression model is appropriate for explaining the relationship between the independent variables and farmers' income.

7. Coefficient of Determination

The coefficient of determination was used to measure how far the independent variables could explain variations in the dependent variable. The result is shown in Table 13.

Table 13. Coefficient of Determination Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.755	0.571	0.552	2.11586

Based on Table 13, the Adjusted R Square value was 0.552. This means that 55.2% of the variation in farmers' income can be explained by areca nut commodity prices and land area. Meanwhile, the remaining 44.8% is influenced by other factors outside this research model, such as production costs, crop quality, labor, transportation access, market distribution, and farmers' bargaining position.

Overall, the results of this study show that areca nut commodity price is the most dominant factor affecting farmers' income in Sungai Undan Village. Although land area has a positive coefficient, its effect was not statistically significant. Therefore, improving farmers' income cannot rely only on land ownership, but also requires fairer price mechanisms, better market access, and more transparent trading practices.

DISCUSSION

1. The Effect of Areca Nut Commodity Prices on Farmers' Income in Sungai Undan Village, Inhil, Riau

Based on the results of the t-test, the significance value of the areca nut commodity price variable was 0.000, which is lower than 0.05. This finding indicates that the first hypothesis was accepted, meaning that areca nut commodity prices have a positive and significant effect on farmers' income in Sungai Undan Village, Indragiri Hilir Regency, Riau. In practical terms, this result shows that changes in the selling price of areca nut directly influence the amount of income received by farmers. When the price of areca nut increases, farmers have a greater opportunity to earn higher income even if the production volume remains the same. Conversely, when the price decreases, farmers' income may decline and affect their household economic stability.

This finding is in line with the theory of agricultural income, which explains that farmers' income is determined by the interaction between production quantity, selling price, and production costs. In this study, price becomes an important factor because areca nut farmers depend heavily on the market value of their harvest. The result is also supported by Mawardati (2015), who found that commodity price had a significant effect on areca nut farming income in Sawang District, North Aceh Regency. Mawardati's study showed that higher commodity prices tend to increase farmers' income, while lower prices may reduce the economic benefits received by farmers. Therefore, the findings of this study strengthen the view that price stability is highly important for improving the welfare of areca nut farmers (Bhat et al., 2024; Kaur & Singh, 2023).

The implication of this finding is that efforts to improve farmers' income should not only focus on production, but also on creating a fairer and more transparent pricing mechanism. Farmers need better access to market information so they are not fully dependent on middlemen or local buyers. The village government and related stakeholders can also support farmers by facilitating farmer groups or cooperatives that help strengthen farmers' bargaining position in selling areca nut. In this way, farmers can obtain a more reasonable selling price and improve their economic resilience.

2. The Effect of Land Area on Farmers' Income in Sungai Undan Village, Inhil, Riau

The results of the t-test showed that the significance value of the land area variable was 0.689, which is greater than 0.05. This means that the second hypothesis was rejected, and land area does not have a significant effect on farmers' income in Sungai Undan Village. Although the regression coefficient of land area was positive, the effect was not statistically significant. This result indicates that larger land ownership does not automatically guarantee higher income for areca nut farmers.

This finding can be understood through the perspective of labor productivity theory, which emphasizes that income is not only determined by the size of production factors such as land, but also by productivity, technology, skills, crop quality, and farm management. In other words, a farmer with a smaller land area may still earn higher income if the land is managed efficiently, the plants are productive, and the selling price is favorable. On the other hand, a larger land area may not generate optimal income if the plants are less productive, damaged, poorly maintained, or if the selling price is low .

The result of this study is supported by Vidya Mandarani & Fika Megawati (2022), who found that land area did not always have a significant effect on farmers' income. Their study showed that the contribution of land area to income depends on other supporting factors, such as capital, labor, selling price, technology, fertilization, and farm management. Therefore, the finding of this study suggests that increasing farmers' income cannot rely only on expanding land ownership. Farmers also need support in terms of cultivation techniques, plant maintenance, access to fertilizer, market information, and post-harvest management.

The implication of this finding is that agricultural development programs in Sungai Undan Village should pay attention to land productivity rather than only land size. Training on better cultivation practices, proper harvesting techniques, and efficient farm management may help farmers increase income even with limited land. This is important because not all farmers have the ability to expand their land, but they may still improve their income through better productivity and quality improvement.

3. The Effect of Areca Nut Commodity Prices and Land Area on Farmers' Income in Sungai Undan Village, Inhil, Riau

Based on the F-test results, the significance value was 0.000, which is lower than 0.05. This indicates that areca nut commodity prices and land area simultaneously have a significant effect on farmers' income in Sungai Undan Village. In other words, although land area did not have a significant partial effect, when it was analyzed together with commodity price, both variables contributed significantly to explaining changes in farmers' income.

The coefficient of determination showed an Adjusted R Square value of 0.552. This means that 55.2% of the variation in farmers' income can be explained by areca nut commodity prices and land area, while the remaining 44.8% is influenced by other factors outside this research model. These other factors may include production costs, plant productivity, crop quality, labor availability, access to transportation, market distribution, farmers' bargaining power, and the role of middlemen in determining prices.

This finding shows that farmers' income is influenced by a combination of economic and production factors (Diaz et al., 2022; Purnama et al., 2023). Commodity price appears to be the more dominant factor because it has a significant partial effect, while land area functions as a supporting factor that may influence income when combined with other variables. Therefore, improving farmers' income requires an integrated approach. Price

stability, fair market access, better land management, and stronger farmer institutions need to be considered together.

From a practical perspective, the results of this study provide useful input for farmers, village government, traders, and agricultural policymakers. Farmers need support not only in increasing production but also in improving their bargaining position in the market. The village government may encourage the establishment of farmer groups or cooperatives to help farmers access better prices and reduce dependence on middlemen. At the same time, agricultural extension programs are needed to help farmers manage their land more productively and sustainably.

However, this study also has several limitations. First, the research was conducted only in Sungai Undan Village, so the findings may not fully represent areca nut farmers in other regions. Second, the sample size was limited to 50 farmers, which may affect the generalizability of the findings. Third, this study only examined two independent variables, namely commodity price and land area, while farmers' income may also be influenced by production costs, quality of harvest, labor, access to market information, and marketing channels. Therefore, future studies are encouraged to include additional variables and wider research locations to obtain a more comprehensive understanding of areca nut farmers' income.

CONCLUSION

This study concludes that areca nut commodity prices have a positive and significant effect on farmers' income in Sungai Undan Village, Indragiri Hilir Regency, Riau. The increase in areca nut prices directly improves farmers' income because most farmers depend on the selling value of this commodity as their main source of livelihood. Conversely, when the price decreases, farmers' income also declines and affects their household economic stability. Meanwhile, land area does not have a significant partial effect on farmers' income. This finding indicates that wider land ownership does not automatically guarantee higher income, because farmers' earnings are also influenced by productivity, crop quality, production costs, plant conditions, market access, and the bargaining position of farmers in the trading process.

Simultaneously, areca nut commodity prices and land area have a significant effect on farmers' income, with an Adjusted R Square value of 0.552. This means that 55.2% of the

variation in farmers' income can be explained by commodity prices and land area, while the remaining 44.8% is influenced by other factors outside this research model. These findings show that improving the income of areca nut farmers requires not only larger or more productive land, but also fair price mechanisms, better market access, stronger farmer bargaining power, and a more transparent trading system. From an Islamic economic perspective, the areca nut trading system in Sungai Undan Village still needs to be strengthened so that it reflects the principles of justice, balance, transparency, and mutual willingness between sellers and buyers. Future research is recommended to include other variables such as production costs, marketing channels, crop quality, transportation access, and the role of middlemen to obtain a more comprehensive understanding of farmers' income.

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