

THE INFLUENCE OF SELLING PRICE AND PRODUCTIVITY COCONUT PALM OIL TO WELFARE FARMERS IN RUMAH GALUH VILLAGE , SEI BINGAI DISTRICT , NORTH SUMATRA

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Abstract

This study aims to analyze the effects of palm oil prices and productivity on the welfare of palm oil farmers in Rumah Galuh Village, Sei Bingai District, Langkat Regency, North Sumatra. A quantitative approach was employed with 60 respondents selected using simple random sampling. Data were collected through questionnaires and secondary sources. Data analysis was conducted using IBM SPSS Statistics 25, including validity, reliability, classical assumption, multiple linear regression, t-test, F-test, and coefficient of determination (R^2). The results show that palm oil prices have a positive and significant effect on farmer welfare ($t = 5.989$; $p = 0.000$), while productivity also has a positive and significant effect ($t = 3.403$; $p = 0.001$). Simultaneously, both variables significantly affect farmer welfare ($F = 75.571$; $p = 0.000$). The R^2 value of 0.726 indicates that 72.6% of the variation in farmer welfare is explained by palm oil prices and productivity, while 27.4% is influenced by other factors.

Keywords: Fresh Fruit Bunch Prices, Farmer Welfare, Productivity

INTRODUCTION

Sector agriculture own role strategic in development economy and improvement welfare society , especially Because become source income and employment Work for public rural areas (Saragih , 2010). One of the subsectors that play a role important is plantation coconut palm oil Because give contribution to Indonesia's economy and exports . In 2023, the subsector plantation contributed 41.57% to the GDP of the sector agriculture with value of Rp. 735.91 trillion , while export commodities plantation reaching IDR 622.36 trillion (Directorate General of Plantations, 2025). Coconut palm oil also becomes source income main for community in Rumah Galuh Village , Sei Bingai District , Regency Langkat , North Sumatra. Conditions welfare farmers are closely related with price Fresh Fruit Bunches (FFB) sales and productivity . Sei Bingai District Data show production coconut palm oil increase until 84,074.50 tons in 2024, which shows size potential production area . However , the increase production the need supported price sufficient sales to be able to increase income and welfare farmer .

Another problem is fluctuations Fresh Fruit Bunch (FFB) prices . 2025 data shows the average price of fresh fruit bunches is IDR 2,752/kg, with price The highest price was Rp3,100/kg in February and the lowest was Rp2,500 /kg in June. the can influence income farmer Because cost production , such as fertilizer and energy work , stay must covered . Conditions the show that stability price be one of factor important in guard income and welfare farmer . Besides price , productivity is factor important in increase reception farmers . Increasingly tall productivity , increasingly big potential results and income obtained . Ritonga's research (2021) shows that price and productivity coconut palm oil influential positive and significant to welfare farmers . Similar results discovered by Thalib (2025), which shows that price and productivity in a way positive influence welfare farmer coconut palm oil . Based on condition said , research This aim analyze influence price sales and productivity coconut palm oil to welfare farmers in Rumah Galuh Village , Sei Bingai District , Regency Langkat , North Sumatra.

LITERATURE REVIEW

Welfare Farmer

Welfare is condition when individual capable fulfil need life in a way safe , decent and prosperous . According to Poerwadarminta (2014), welfare is a state of safety , security and prosperity . In context House ladder farmers , welfare can seen through level income , pattern expenditure , education , health , and condition place stay (Prisciawati , 2023). With Thus , the increase income derived from from business farmer coconut palm oil can be one of indicator improvement welfare farmer .

Coconut Selling Price Palm oil

Price is mark something declared goods in form of money. In business farmer coconut palm oil , price Selling Fresh Fruit Bunches (FFB) to factor important Because determine revenue earned farmers . Prices are influenced by demand , supply , costs production , conditions economy and policy government . Therefore that , the increase price potential TBS sales increase income farmers and ultimately increase welfare .

Productivity Coconut Palm oil

Productivity is comparison between the output produced with the input used in something period . Productivity coconut palm oil related with ability farmer produce FFB from source available power . Increase productivity can happen through use of capital , proper fertilization , utilization land and management effective production . The more tall productivity , increasingly big potential production and income earned farmers , so that can support improvement welfare .

METHOD

This research held in March– July 2026 in Rumah Galuh Village , Sei Bingai District , Regency Langkat , North Sumatra. Location selected Because part public eyed livelihood as farmer coconut palm oil . Population study consists of over 150 farmers coconut palm oil people . The sample is determined use Slovin's formula with level 10% error , so 60 respondents were obtained . Retrieval sample done using simple random sampling. Data used consists of on primary and secondary data . Primary data was obtained through interviews , questionnaires , and observations to farmers , including information price selling fresh fruit bunches, productivity and welfare farmers . Secondary data obtained from the Central Statistics Agency, District Plantation Service Langkat , as well as relevant literature . Instruments study use question with choice answer *yes* and *no* , each is given scores 1 and 0.

Variables study consists of on price selling TBS (X1), productivity coconut palm oil (X2), and welfare farmer (Y). Selling price measured based on accepted value farmers per kilogram of fresh fruit bunches with indicator demand , supply , and costs production . Productivity measured based on ability produce FFB per unit wide with capital indicators , fertilization , area land , and production . Welfare farmer measured through level income , pattern consumption , and conditions place stay . Data analysis was performed using SPSS through validity and reliability tests For test quality instrument . Next assumption testing was carried out classics that include normality , multicollinearity , and heteroscedasticity . The influence of price sales and productivity to welfare farmer analyzed use multiple linear regression with equation $Y = a + b_1X_1 + b_2X_2 + e$. Testing hypothesis done through *t* -test For know influence partial , *F test* For know influence simultaneously , as well as coefficient determination (R^2) for measure the model's ability to explain variation welfare farmer .

RESULTS AND DISCUSSION

CLASSICAL ASSUMPTION TEST

NORMALITY TEST

Normality test aim For know whether the residual data in the regression model normally distributed . Testing normality in study This done using the One Sample Kolmogorov-Smirnov Test with IBM SPSS Statistics Version help 25 . In addition , testing is also supported with Histogram and Normal Probability Plot analysis . Regression model it is said fulfil assumptions normality if mark significance (Asymp.Sig .) more big from 0.05 .

Criteria taking decision is as following .

1. If the value Asymp . sign hand . > 0.05 , then the data is normally distributed .
2. If the value Asymp . sign hand . < 0.05 , then the data is not normally distributed .

Table 1. Normality Test Results
One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		60
Normal Parameters ^{a,b}	Mean	0.00
	Standard Deviation	1.05
Most Extreme Differences	Absolute	0.095
	Positive	0.095
	Negative	-0.055
Test Statistics		0.095
Asymp . Sig. (2-tailed)		.200 ^{c,d}

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

Based on Table 1, the value Asymp . Sig. (2-tailed) is $0.200 > 0.05$, so the research residual normally distributed and meets assumptions normality in analysis multiple linear regression . These results are also supported by the Histogram and Normal Probability Plot graphs in Figures 1 and 2.

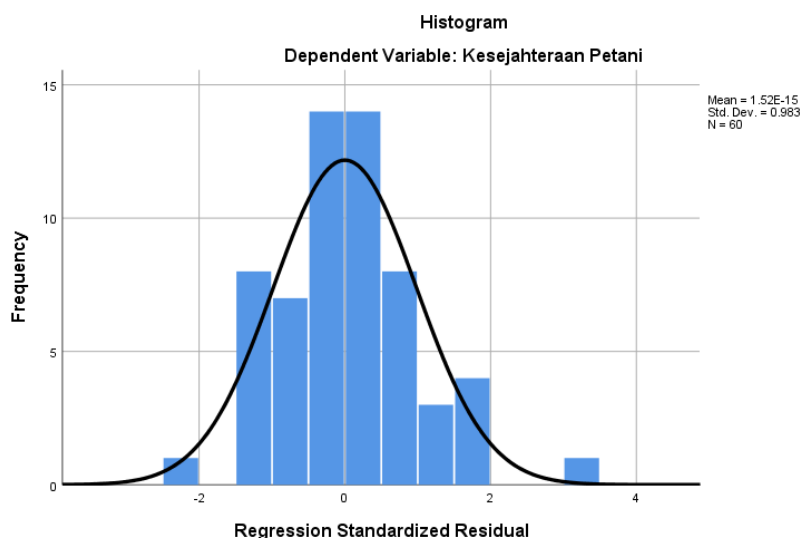


Figure 1. Results of the Histogram Normality Test

Figure 1 shows that pattern data distribution forms curve shaped bells and no crooked to left and to right . This is show that the data has normal distribution .

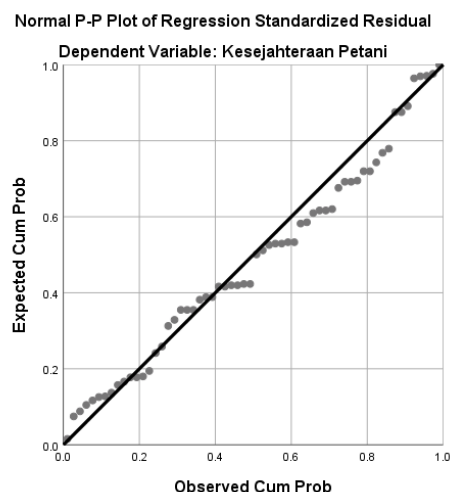


Figure 2. Results of the P-Plot Normality Test

Figure 2 is shown that dot, dot, dot spread around the diagonal line and follow direction of the diagonal line. Condition the show that the remaining data normally distributed so that the regression model fulfil assumptions normality .

MULTICOLLINEARITY TEST

Multicollinearity test aim For know whether there is connection or high correlation intervariable independent in the regression model . A good regression model is a model that is not experience symptom multicollinearity testing done with see Tolerance and Variance Inflation Factor (VIF) values using IBM SPSS Statistics Version 25. Criteria taking decision is as following .

1. If the Tolerance value > 0.10 and $VIF < 10$, so No happen multicollinearity .
2. If the Tolerance value is < 0.10 and $VIF > 10$, so happen multicollinearity .

Table 2. Multicollinearity Test Results

Coefficients ^a			
Model		Collinearity Statistics	
		Tolerance	VIF
(Constant)			
1	Price	0.504	1,985
	Productivity	0.504	1,985

a. Dependent Variable: Welfare Farmer

Table 2 is known that Coconut Price Variable Palm Oil and Productivity own higher tolerance value big than 0.10 and VIF value more small out of 10. With thus can concluded that the regression model No experience symptom multicollinearity so that fulfil assumptions classic .

HETEROSCEDASTICITY TEST

Heteroscedasticity test aim For know whether happen inequality residual variance in the regression model . A good regression model is a model that has constant residual variance or No experience heteroscedasticity . In research this , heteroscedasticity test done using the Glejser Test and supported with Scatterplot analysis using IBM SPSS Statistics Version 25.

Table 3. Heteroscedasticity Test Results Glacier

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-1,573	1,211		-1,298	0.200
1 Price	0.087	0.057	0.274	1,526	0.133
Productivity	0.001	0.045	0.002	0.013	0.990

a. Dependent Variable: Res_2

Based on the table above known that all over variables independent own mark significance more big from 0.05. With thus can concluded that the regression model No experience symptom heteroscedasticity .

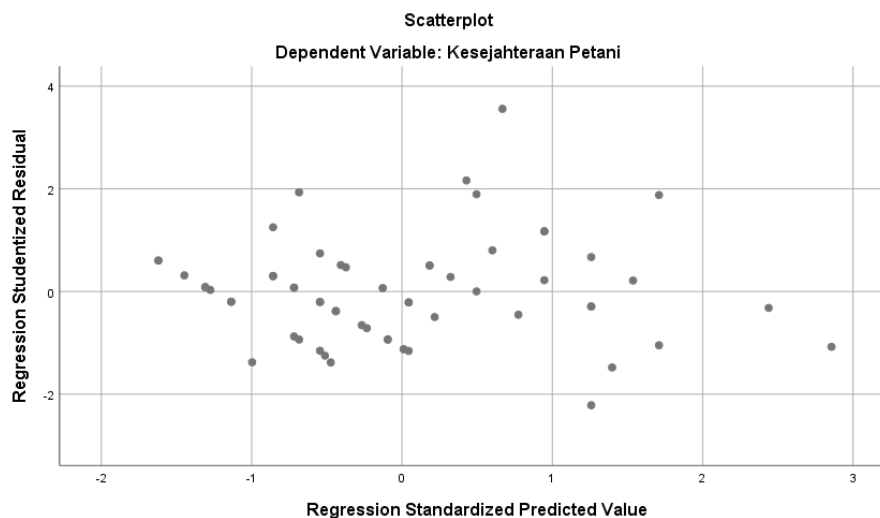


Figure 3. Heteroscedasticity Test Results Scatterplot

Figure 3 is shown that dot, dot, dot spread in a way random , no form pattern certain , as well as spread above and below number zero on the Y axis . With thus can concluded that the regression model No experience symptom heteroscedasticity so that fulfill one of the assumptions in analysis multiple linear regression .

MULTIPLE LINEAR REGRESSION ANALYSIS

Analysis multiple linear regression used For know size influence price coconut palm oil and productivity to welfare farmers in Rumah Galuh Village , Sei Bingai District , Regency Langkat . In addition , the analysis This aim For know direction connection between variables free with variables bound as well as size change welfare farmer if happen changes in prices coconut palm oil and productivity . Analysis done with IBM SPSS Statistics Version 25 assistance . Analysis results multiple linear regression presented in Table 4.

Table 4. Analysis Results Multiple Linear Regression

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	6,254	1,897		3,297	0.002
1 Price	0.533	0.089	0.585	5,989	0.000
Productivity	0.238	0.070	0.332	3,403	0.001

a. Dependent Variable: Welfare Farmer

Based on results analysis multiple linear regression obtained equality regression as following .

$$Y = 6.254 + 0.533X_1 + 0.238X_2$$

Equality the show that price coconut palm oil and productivity own direction positive relationship to welfare farmers . This means that if price coconut palm oil and productivity increases , then welfare farmers also tend to experience improvement , with assumptions variables other still .

Based on equality regression the can explained as following .

1. Constant value of 6.254 shows that if price coconut palm oil and productivity considered still or No experience changes , then mark welfare farmer amounting to 6,254.
2. Coefficient regression price coconut palm oil of 0.533 shows that every improvement One unit price coconut palm oil will increase welfare farmer of 0.533 units , with assumptions productivity still .
3. Coefficient regression productivity of 0.238 indicates that every improvement One productivity will increase welfare farmer of 0.238 units , with assumptions price coconut palm oil still .

HYPOTHESIS TESTING

PARTIAL TEST (t-Test)

Partial test (t test) is used For know the influence of each variable independent to variables dependent individually . Testing done at the level significance of 5% ($\alpha = 0.05$). Hypothesis accepted if calculated t value > t table or mark significance < 0.05. Partial test results can seen in Table 5.

Table 5. Partial Test Results (t-Test)

Coefficients ^a			
	Model	t	Sig.
	(Constant)	3,297	0.002
1	Price	5,989	0.000
	Productivity	3,403	0.001

a. Dependent Variable: Welfare Farmer

For obtain the t- table value obtained from formula $df = n - k - 1$, namely $df = 60 - 2 - 1 = 57$ At the level significance 5% (two side) is obtained t- table value amounting to 2.00247. Based on results testing can explained as following .

1. The Influence of Coconut Prices Palm oil to Welfare Farmer
Variables price coconut palm oil get t - value amounting to 5,989 with level significance of 0.000. This value show that the calculated t (5.989) > t table (2.00247) and the value significance 0.000 < 0.05. With thus can concluded that price coconut palm oil influential positive and significant to welfare farmers . Therefore that is , H_1 is accepted .
2. Influence Productivity to Welfare Farmer
Variables productivity get t - value amounting to 3,403 with level significance of 0.001. This value show that the calculated t (3.403) > t table (2.00247) and the value significance 0.001 < 0.05. With thus can concluded that productivity influential positive and significant to welfare farmers . Therefore that is , H_2 is accepted .

SIMULTANEOUS TEST (F-Test)

Simultaneous test (F test) is used For know whether variables independent in a way 6119together have influence to variables dependent . Testing done at the level significance of 5% ($\alpha = 0.05$). Hypothesis accepted if F count > F table or mark significance < 0.05. Simultaneous test results can seen in Table 6.

Table 6. Simultaneous Test Results (F-Test)

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	172,569	2	86,285	75,571	.000 ^b
Residual	65,081	57	1,142		
Total	237,650	59			

a. Dependent Variable: Welfare Farmer

b. Predictors: (Constant), Productivity , Price

table value obtained based on $df_1 = 2$ and $df_2 = 57$ at level significance of 5%, namely of 3.16. Based on results testing obtained calculated F value amounting to 75,571 with level significance of 0.000. This value show that F count (75.571) > F table (3.16) and the value significance $0.000 < 0.05$. With thus can concluded that price coconut palm oil and productivity in a way simultaneous influential positive and significant to welfare farmers . Therefore that is , H_3 is accepted .

COEFFICIENT OF DETERMINATION (R^2)

Coefficient determination (R^2) is used For know size ability variables independent in explain variation changes in the dependent variable . The more big R Square value , then the more the regression model's capabilities are also great in explain variables dependent . The results of the coefficient test determination can seen in Table 7.

Table 7. Coefficient Test Results Determination (R^2)

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	.852 ^a	0.726	0.717	1.06854
a. Predictors: (Constant), Productivity , Price				
b. Dependent Variable: Welfare Farmer				

Based on results testing obtained The R value is 0.852, which indicates that connection between price coconut palm oil and productivity with welfare farmer is in the very strong category . Next obtained The R Square value is 0.726 or 72.6%. This is show that variation welfare farmer can explained by variables price coconut palm oil and productivity by 72.6%, while the rest 27.4 % is influenced by other factors outside the research model that are not entered in study this , like cost production , area land , experience farming , use technology agriculture , conditions weather , market access , and factors other like cost production , area land and experience farming . Factors also has the potential influence level income and welfare farmers , so that can made into as variables in study furthermore For get a better model comprehensive in explain factors that influence welfare farmer coconut palm oil .

DISCUSSION

The Influence of Coconut Prices Palm oil to Welfare Farmer

Based on partial test results (t), price coconut palm oil influential positive and significant to welfare farmers . This is indicated by the value t count amounting to 5,989 which is more big from t table 2.00247 and mark significance $0.000 < 0.05$. With Thus , the hypothesis First accepted . The results show that the more tall price of Fresh Fruit Bunches (FFB) received farmers , increasingly big receipts and income earned so that ability fulfil need House stairs also increased . The price of fresh fruit bunches is one of the factor important in determine welfare Because change price in a way direct influence income farmer . More income tall allows farmer fulfil need food , clothing , shelter , education , health , and need social others . In addition , the price is relatively stable give certainty income so that farmer more capable do maintenance garden , fertilization , and rejuvenation plant in a way sustainable . Findings This in line with Thalib (2025), Andini et al. (2024), Syahputra (2023), Hermanwan (2023), and Ritonga (2021) which show that price coconut palm oil influential positive to welfare farmer . Based on research data , the average price of fresh fruit bunches received by 60 respondents is **Rp2,767/kg** , with price The highest price is Rp2,850/kg and the lowest is Rp2,670/kg. The difference price the among other things related with the quality of the fresh fruit bunches and the price set by the collector . With Thus , improvement and stability TBS price is one of the effort important in support improvement income and welfare farmer .

Influence Productivity to Welfare Farmer

Partial test results show that productivity influential positive and significant to welfare farmers . The t value count by 3,403 more big from t table 2.00247 with significance $0.001 < 0.05$, so hypothesis second accepted . This result show that the more tall productivity coconut palm oil , increasingly big the amount of fresh fruit bunches produced and increasing the potential is also great reception as well as income farmer . Improvement productivity related with ability farmer in manage garden optimally through use good seeds , fertilization , maintenance plants , as well as control pests and diseases . High productivity allows farmer get results harvest more big from land owned

so that can increase income and fulfill need House stairs . Average productivity of 60 respondents in study This of 17.51 tons/ha/ year , with productivity the highest is 19.4 tons/ha/ year and the lowest is 14.2 tons/ha/ year . Research result This in line with Syahputra (2023) and Ritonga (2021) who found that productivity influential positive and significant to welfare farmer coconut palm oil . However , the results the different with Thalib (2025) and Andini et al. (2024) who found that productivity No influential positive to welfare . Differences the can due to regional characteristics , costs production , conditions land , quality results harvest , and difference TBS price . With thus , high productivity need supported by price profitable sales to increase production truly give impact to welfare farmer .

The Influence of Coconut Prices Palm Oil and Productivity to Welfare Farmer

Simultaneous test results show that price coconut palm oil and productivity in a way together influential positive and significant to welfare farmers . This is indicated by the value F count amounting to 75,571, more big from F table of 3.16, with mark significance $0.000 < 0.05$. With Thus , the price coconut palm oil and productivity in a way simultaneous capable influence level welfare farmers in Rumah Galuh Village . Price and productivity is two interrelated factors support in increase income farmers . High prices increase mark sell per kilogram of fresh fruit bunches, while high productivity increase amount results harvest that can for sale . If second condition the achieved in a way simultaneously , then receipts and income farmer will the more big so that ability fulfil need House stairs and increase level life is also getting better Good . The R Square value of 0.726 indicates that amounting to 72.6% variation welfare farmer can explained by price coconut palm oil and productivity , while the other 27.4% influenced by other factors outside the research model . These factors can in the form of wide land , costs production , experience farming , conditions weather , and factors others . Research results This in line with Syahputra (2023) and Ritonga (2021) which show importance price and productivity in increase welfare farmers . Therefore that , the increase welfare farmer coconut palm oil need supported through profitable TBS prices as well as improvement productivity garden in a way sustainable .

CONCLUSION

Based on results study about influence price coconut palm oil and productivity to welfare farmers in Rumah Galuh Village , Sei Bingai District , Regency Langkat , can concluded that price coconut palm oil influential positive and significant to welfare farmers , who show that improvement TBS prices can increase income and welfare farmers . Productivity also has an impact positive and significant to welfare farmers , because improvement productivity produce amount more harvest big so that increase income farmers . In general simultaneous , price coconut palm oil and productivity influential positive and significant to welfare farmers , with second variables capable explains 72.6% of the variation welfare farmers , while 27.4% were influenced by other factors outside study .

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