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(RESEARCH ARTICLE)

Income analysis of rice farmers in medan krio village

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Abstract

The agricultural sector is unique and has its characteristics in the structure of the national economy. This sector is relatively a sector that receives serious attention in development actions. This study aims to analyze the effect of crop production and farmer exchange rates on farmers' income in Medan Krio Village both partially and simultaneously. The research was conducted in Medan Krio Village, Sunggal District, Deli Serdang Regency, North Sumatra Province. The research data used are primary. In addition to primary data, secondary data is also used as a support for primary data. Data analysis techniques are obtained from direct interviews of respondents with the help of prepared questionnaires. The data analysis method used is Multiple Linear Regression. The results of the study partially affected the variables of crop production had a significant effect on the income of rice farmers and the variables of the farmer exchange rate had an insignificant effect on the income of farmers in Medan Krio Village. Simultaneously, the variables of crop production and farmer exchange rates do not affect the income of farmers in Medan Krio Village.

Keywords: Crop Production; Farmer Exchange Rate; Rice Farmers' Income; Medan krio village

1. Introduction

In general, the goal of national development in the agricultural sector is to create prosperity and prosperity for farmers. Thus, the main goal to be achieved from agricultural development is to increase farmers' incomes.

The agricultural sector is unique and has its characteristics in the structure of the national economy. This sector is relatively a sector that receives serious attention in development actions. However, this sector is a sector that accommodates a lot of labor overflow and a large part of the population depends on the agricultural sector (Farizi, 2018).

Efforts to improve the welfare of the population as a whole need to be accompanied by an increase in the welfare of rural residents, especially residents who work in the agricultural sector. One of the analyses that can be done to measure the welfare of farmers and rural economic conditions is the Farmer Exchange Rate (FER) (BAPPEDA, 2020).

The following is the development of the exchange rate of farmers in North Sumatra province.

Figure 1 shows that farmers' exchange rates are fluctuating. Over the past 10 years, the lowest farmer exchange rate occurred in 2018 at 97.98% and the highest exchange rate occurred in 2020 at 109.83%.

One of the causes of the decline in the farmer exchange rate is the reduction in the price index of agricultural production. The ease with which agricultural sales are obtained is reduced, so that receipts are cut. And vice versa, the exchange rate of farmers rose due to the high price index of agricultural products.

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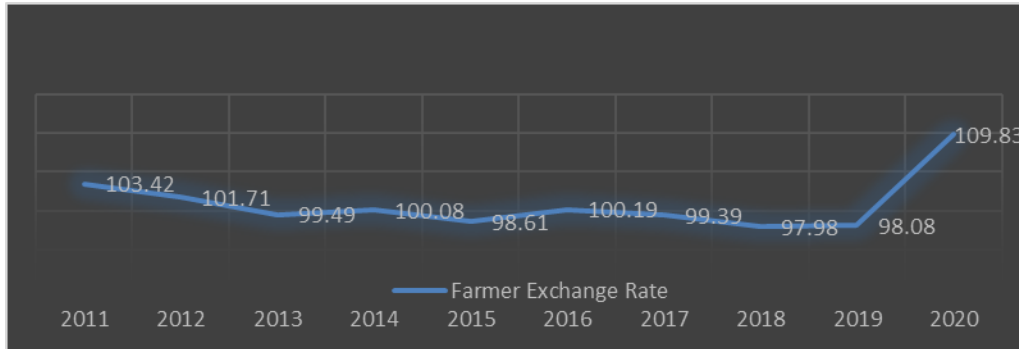
Source: BPS Sumatera Utara

Figure 1 Development of Farmer Exchange Rate in North Sumatra Province from 2011 to 2020 (%)

This research focuses on food garden farming, namely rice. Rice as the main food commodity has a very high strategic value so serious handling is needed to increase productivity. The large role of the government in the processing of food commodities, especially rice, can be seen starting from pre-production such as providers of superior seeds, fertilizers, medicines, irrigation facilities, production credit, and capital strengthening (Hasa, 2018)

The following is the result of rice crop production in Deli Serdang regency.
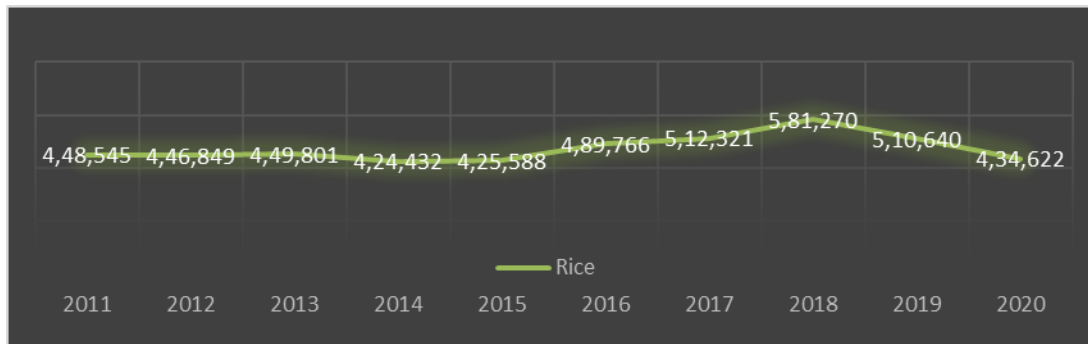
Source: BPS Deli Serdang

Figure 2 Rice Crop Production Results of Deli Serdang Regency from 2011 to 2020 (Tons)

This research was conducted in Medan Krio Village, Sunggal District, Deli Serdang Regency, North Sumatra Province. The total population of Medan Krio village is recorded to be ± 17,864 people (BPS Deli Serdang, 2021) which has an area of 828.5 ha. Medan Krio village has XIII (thirteen) hamlets and ± 4,153 heads of families (KK). Most of the population is a farmer, and the other part is a laborer who works in Medan and its surroundings.

2. Material and Methods

2.1. Material

This research is quantitative research which is a type of research using a number of statistical figures. The research was conducted in Medan Krio Village, Sunggal District, Deli Serdang Regency, North Sumatra Province. The data used are primary data. In addition to primary data, in this study secondary data was also used as supporting data. Data collection techniques in the study were obtained from direct interviews with respondents with the help of prepared questionnaires. The samples taken in this study were criteria for 150 rice farmers in Medan Krio village. The data that has been collected will pass a validity test and reliability test to measure the level of validity and concentration level of a question in a questionnaire.

2.2. Methods

The study used the method of multiple linear regression analysis. This is done to determine the relationship between the free variable (X) and the bound variable (Y) assisted by the SPSS 26 program. with the equation formula as follows.

$$Y = a + \beta 1 X1 + \beta 2 X2 + e$$

Where :

- Y = Rice Farmer Income
- X_1= Crop Production
- X_2= Farmer Exchange Rate
- A = Constant/intercept
- B = Regression Coefficient
- E = *Error term*

Four (4) classical assumption tests were carried out in this study such as normality, multicollinearity, and heteroscedasticity tests which were explained as follows:

2.2.1. Normality Test

There are two ways to detect whether the residual is normally distributed or not, namely by chart analysis and statistical testing.

2.2.2. Multicollinearity Test

Detection of the presence or absence of multicollinearity in the regression model can be seen from the magnitude of VIF (Variance Inflation Factor) and tolerance. Regression is free from multicollinearity if the VIF value is < 10 and the tolerance value is> 0.10.

2.2.3. Heteroscedasticity Test

Detection of the presence or absence of heteroskedasticity can be seen by the presence or absence of certain patterns on the scatterplot graph. If there is a specific plot then it indicates that heteroskedasticity has occurred. But if there is no clear pattern of dots spreading above and below the number 0 on the Y axis, then heteroskedasticity does not occur (Haslindan & Jamaluddin, 2016).

Hypothesis tests are carried out in research such as partial significance tests (statistical t-tests), significance tests, and simultaneous (statistical F tests) which are described as follows:

a. t-Test (Partial)

The criteria for acceptance or rejection of a partial test (t-test) in a study used are as follows:
- H0 is accepted if the t-count is in the receiving area, where the t-count < t-table or sig < α (0.05).
- H0 is rejected if the t-count is in the receiving area, where the t-count is > t-table or sig < α (0.05).

b. F-Test (Simultaneous)

The statistical test F shows whether all independent variables together have a significant influence on the dependent variables. The criteria for acceptance or rejection of simultaneous tests (F tests) in a study used are as follows:

- H0: βi = 0, meaning that independent variables do not influence dependent variables.
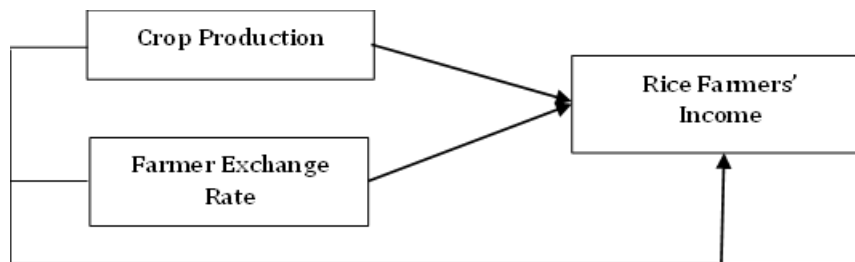- Ha: βi > 0, meaning that independent variables influence dependent variables.

Figure 3 conceptual framework

The conceptual framework for research on the income analysis of rice farmers in Medan Krio Village is as above.

3. Results

Medan Krio Village, Sunggal District, was formerly a former tobacco plantation area under the name of Krio River garden and Sei Semayang Garden. From 1939 to 1940 the Netherlands no longer used the Krio River Garden because it was considered unproductive. After all, the soil conditions were not suitable for tobacco plants. So since then, the Krio river garden has been used as a farming area for farmers and migrants from outside the area. The area of Medan Krio Village, Sunggal District, at that time started from Glugur Rimbun to Paya Geli Village.

From 1952 to 1953 the Krio River farming area was compiled and regulated by the Government of North Sumatra which designated and inaugurated the former Krio river plantation area to become Medan Krio Village. Because this area is fed by the Krio River and inhabited by farmers and migrants from Medan, this area is designated as Medan Krio (that is to say, the Medan people live in the gardens of the Krio River).

3.1. Research Results

This research has distributed 150 questionnaires to respondents, namely rice farmers spread across Medan Krio village. Then the results of the validity and reliability test of the questionnaire in the study can be seen in the following table.

Table 1 Research Variable Validity Results

Variables	Indicator	Value		Information
		Correlation (r)	Sig	
Crop Production (X1)	Cp1	0.480	0.000	Valid
	Cp2	0.639	0.000	Valid
	Cp3	0.769	0.000	Valid
	Cp4	0.655	0.000	Valid
Farmer Exchange Rate (X2)	Fer1	0.639	0.000	Valid
	Fer2	0.705	0.000	Valid
	Fer3	0.650	0.000	Valid
	Fer4	0.605	0.000	Valid
Income (Y2)	Inc1	0.650	0.000	Valid
	Inc2	0.712	0.000	Valid
	Inc3	0.791	0.000	Valid
	Inc4	0.709	0.000	Valid

Source: SPSS Processed Data, 2022

Table 1 above shows that all indicators have a correlation coefficient value (r) > 0.30 and a Sig value < 0.05. This means that all questions in the questionnaire used for all respondents who have been targeted are declared valid and feasible.

Table 2 Results of Research Variable Reliability

| Variable	Nilai Cronbach's Alpha	Value Standards	Information
Crop Production (X1)	0.634	0.60	Reliable
Farmer Exchange Rate (X2)	0.668	0.60	Reliable
Income (Y2)	0.680	0.60	Reliable

Source: SPSS Processed Data, 2022

From Table 2 above, it can be seen that the value of Cronbach's Alpha in each variable in the study was > 0.60. Thus the results of this study are declared reliable.

3.1.1. Test classical assumptions

The study also conducted classical assumption testing to determine if the sample data processed could truly be representative of the population as a whole. The results of the classical assumption test are as follows.

Normality Test
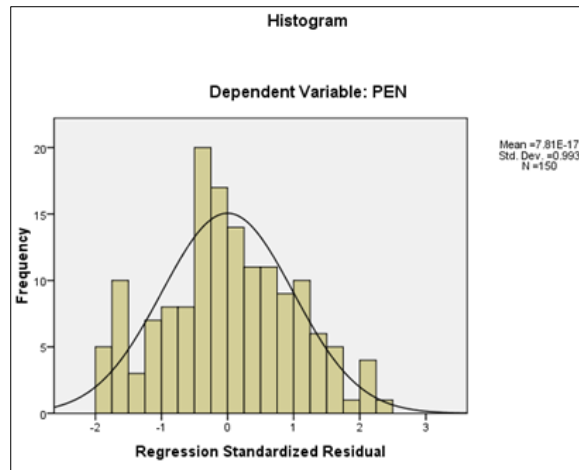
Source: SPSS Processed Data, 2022

Figure 3 Normality Test Results

When viewed from figure 3 of the data normality test, the curve at the output results forms a bell curve. Thus, the research data is distributed normally.
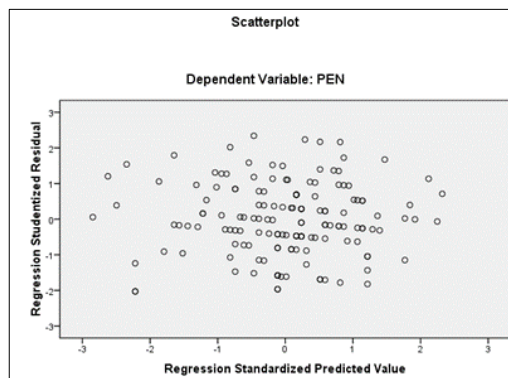
Multicollinearity Test

Table 3 Multicollinearity Test Result

Collinearity Statistic	
Tolerance	VIF
0.999	1.001

Source: SPSS Processed Data, 2022

Table 3 above shows that the tolerance value is 0.99 (0.99 > 0.10) and the VIF value is 1.001 (1.001 < 10). That is, the data in the study were free from the symptoms of multicollinearity.

Heteroscedasticity Test

Source: SPSS Processed Data, 2022

Figure 4 Heterochedasticity Test Results (Scatterplot)

The scatterplot results in this study showed that no plot formed a certain pattern. The plot points are evenly spread, above and below the number 0 on the Y axis. Thus, the data are free from heteroscedasticity.

3.1.2. Multiple linear regression results

This study used multiple linear regression to test independent (free) variables, namely crop production, and farmer exchange rates against the dependent (bound) variable, namely rice farmers' income. here are the results of multiple linear regression estimation using the SPSS program.

Table 4 Multiple Linear Regression Results

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	10.873	2.007		5.417	0.000
Crop Production	0.159	0.090	0.143	1.762	0.040
Farmer Exchange Rate	0.125	0.010	0.101	1.242	0.216

Source: SPSS Processed Data, 2022

Partial Test (t-test)

The calculated value of crop production is 1.762 < 1.655 (n-2=150-2=148 a5%) then the sig value is 0.040>0.05%. So Ha was rejected and Ho was accepted, meaning that crop production had a significant effect on income.

While the value t calculates the farmer exchange rate of 1.242 > 1.655 (n-2=150-2=148 a5%) then the sig value is 0.216>0.05%. So Ha was accepted and Ho was rejected, meaning that crop production had an insignificant effect on income.

Simultaneous Test (Test F)

Table 5 Simultaneous Test Results (F)

F	Sig.
2.256	0.108[a]

Source: SPSS Processed Data, 2022

The results of the ANOVA test with F (Fisher) analysis found a calculated F value of 2.256 < F table of 3.06 (n-k-1 5% error) so Ha was rejected and Ho was accepted. This means that crop production and farmers' exchange rates together do not significantly affect income.

4. Discussion

4.1. The Effect of Crop Production on the Income of Rice Farmers in Medan Krio Village

The production is the most awaited thing by rice farmers, what they hope is an increase in production yields at every harvest period. When the production results are maximum, the income to be processed by rice farmers will be maximized or in other words, farmers will get a lot of profit (Aisyah & Yunus, 2019).

The results of this study are the results of research conducted (Asmarantaka & Zainuddin, 2017) that crop production is a factor that has a significant effect on farmers' income. The greater the amount of crop production obtained by farmers, the greater the opinions received by farmers. Because the entire yield of crop production will be multiplied by the current price. So that the more the level of crop production, the higher the income received.

4.2. The Effect of Farmer Exchange Rate on Rice Farmers' Income in Medan Krio Village

The Farmer Exchange Rate figure created is an indicator of the level of purchasing power of the community/farmer and this can be used to measure the welfare of farmers in this case their income, in terms of purchasing power to the price of non-agricultural goods.

In this study, the Farmer Exchange Rate did not have a significant effect on the income of rice farmers in Medan Krio Village. The rise and fall of FER are considered "normal" because it only describes the dynamics of the price received and the price paid by farmers. When the prices of necessities have increased, it turns out that the ability / purchasing power of farmers has decreased. Thus, the farmer exchange rate does not measure the size of farmers' income optimally (Keumala & Zainuddin, 2018).

5. Conclusion

Based on the results of the analysis that has been carried out in the previous chapter, it can be concluded as follows:

- Crop production variables have a significant effect on the income of rice farmers in Medan Krio Village. The higher the level of crop production obtained by farmers, the higher the income received by farmers.
- Variable farmer exchange rate has an insignificant effect on the income of farmers in Medan Krio Village. The exchange rate of farmers, cannot optimally measure the high or low income received by farmers.
- Variables of crop production and farmer exchange rates simultaneously do not affect the income of farmers in Medan Krio Village.

Based on the conclusions that have been stated above, suggestions can be put forward in the study, namely the need for intervention from the government and the private sector to increase farmers' crop production yields. Which then directs farmers in terms of marketing the harvest obtained and how to use technology in the field of production both in quality and quantity.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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