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Research Article

The Influence of the Agricultural Sector on Poverty Levels in Rural Areas of North Sumatra 2015-2024

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Keywords:	Abstract
Agricultural Sector, Poverty Rate, Rural Area, North Sumatra, Number of Workers,	This study aims to analyze the influence of the agricultural sector on poverty rates in rural areas of North Sumatra during the period 2015–2024. The background of this study is based on the fact that most rural residents depend on the agricultural sector for their livelihoods, but the poverty rate is still relatively high. This study uses a quantitative approach with secondary data from the Central Statistics Agency (BPS) and simple linear regression analysis using SPSS version 2022. The results of the study show that the agricultural sector has a significant effect on poverty rates, as indicated by the significance value of the T test and F test of 0.009 (<0.05). A negative regression coefficient of -0.022 indicates an inverse relationship, namely that an increase in the contribution of the agricultural sector tends to reduce poverty rates. The R² value of 0.599 indicates that 59.9% of the variation in poverty rates is explained by the agricultural sector, while the remaining 40.1% is influenced by other factors. This study concludes that strengthening the agricultural sector through increased productivity, access to technology, and sustainable policy support is an important strategy in reducing poverty in rural areas of North Sumatra.

Introduction

Poverty in rural areas remains a major challenge in Indonesia's economic development, including in North Sumatra Province. Most rural residents depend on the agricultural sector for their livelihoods, making this sector the mainstay in poverty alleviation efforts. However, the dynamics of the agricultural sector's contribution to poverty reduction require in-depth study to understand the extent to which this sector is effective in improving the welfare of rural communities.

This becomes even more complex when faced with the fact that most farmers are still classified as small farmers with limited land ownership, minimal access to capital and modern technology, and limitations in marketing their produce efficiently, all of which cause low productivity and income of farmers and keep them away from opportunities to escape poverty in a sustainable manner. Therefore, a comprehensive analysis is needed to formulate a more inclusive and sustainable agricultural development strategy, in order to accelerate poverty reduction in rural areas. This strategy must include improving the agricultural distribution and logistics system, increasing human resource capacity through training and extension based on appropriate technology, and creating synergistic partnerships between farmers, government, the private sector, and financial institutions, so that a resilient agricultural ecosystem is created that is adaptive to economic and climate change, and is able to increase the competitiveness of local agricultural products in national and international markets.

Table 1
Data on the Agricultural Sector and Poverty Levels in Rural Areas of North Sumatra 2015 – 2024

Year	Agricultural Sector	Poverty Level
2015	82,1	10,53
2016	83.99	10,53
2017	81,01	10,22
2018	80,42	9,22
2019	78,15	8,83
2020	80,76	8,75
2021	80,66	9,01
2022	82,88	8,42
2023	80,62	8,15
2024	79,95	8,42

Source : Badan Pusat Statistika (BPS)

Data from the Central Statistics Agency shows that the contribution of the agricultural sector to the Gross Regional Domestic Product (GRDP) in rural areas of North Sumatra has fluctuated during the period 2015 to 2024. However, there is a downward trend in the poverty rate from 10.53% in 2015 to 8.42% in 2024. This phenomenon raises questions about the extent to which the agricultural sector plays a role in reducing poverty levels in the region. Several studies have tried to examine the relationship between the agricultural sector and poverty in North Sumatra. Salqaura (2021) in his research found that there was a positive correlation between the contribution of the agricultural sector and the poverty rate in the province, with a correlation value of 0.4499. This shows that increasing the contribution of the agricultural sector does not necessarily directly reduce poverty levels, and additional efforts are needed such as improving education and farmer independence to achieve this goal..

Meanwhile, Sihombing and Bangun (2019) found that the agricultural sector has a negative correlation with the poverty rate in North Sumatra. This means that the increase in the contribution of the agricultural sector tends to be inversely proportional to the poverty rate, indicating the potential of this sector in reducing poverty in rural areas. Harahap (2022) emphasizes the importance of investment and exports in the agricultural sector as significant factors in the growth of this sector, which in turn can contribute to poverty reduction. However, they also note that agricultural sector imports can have a negative impact on poverty rates, indicating the complexity of the relationship between the agricultural sector and community welfare.

Classical economic growth theory emphasizes that structural transformation from traditional sectors to modern sectors, such as industry and services, will drive growth and prosperity. However, in the context of rural Indonesia which is still predominantly agrarian, the agricultural sector remains the initial bridge to poverty reduction. Therefore, a deep understanding of the influence of the agricultural sector on poverty levels is important, not only for academic purposes, but also as a basis for formulating more effective and sustainable rural development policies.

From this background, this study aims to analyze the influence of the agricultural sector on poverty levels in rural areas of North Sumatra. By understanding this relationship empirically, it is hoped that the results of this study can provide concrete input for local governments and development actors in formulating strategies to improve the welfare of rural communities based on the agricultural sector.

Method

This study uses quantitative research used to determine the extent of the influence of the agricultural sector on the poverty rate in rural areas of North Sumatra. Sources and types of data used secondary data obtained from the Central Statistics Agency (BPS), namely the poverty rate in rural areas of North Sumatra and the number of workers in the agricultural sector, the data collection period at BPS is from the last 10 years (2015-2024).

Data analysis was performed using SPSS version 2022 through a simple linear regression model. Prior to the regression analysis, a classical assumption test was conducted including: normality test (Kolmogorov-Smirnov), autocorrelation test (Durbin-Watson), multicollinearity test (VIF and Tolerance), and heteroscedasticity test (Glejser and scatterplot). Furthermore, a simple linear regression test was conducted to see the effect of the agricultural sector on poverty, accompanied by a t-test (partial), F-test (simultaneous, and coefficient of determination test (R^2) to measure the contribution of independent variables in explaining the dependent variable. All tests were carried out systematically using SPSS 2022 to obtain accurate and valid results.

Results And Discussion

Result

Classical Assumption Test

Normality Test

Table 2

Normality Test

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		10
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	56.90770078
Most Extreme Differences	Absolute	.207
	Positive	.207
	Negative	-.114
Test Statistic		.207
Asymp. Sig. (2-tailed)		.200[c,d]

Source : SPSS (2022)
a.Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

The results of the Kolmogorov-Smirnov method for the normality test show that the Asymp. Sig. value is 0.200, which is higher than 0.05. Thus, the residual data can be said to be regularly distributed, meeting the requirements of normality and making the data suitable for use in regression and other statistical analysis.

Autocorrelation Test

Table 3
Autocorrelation Test

Runs Test

	Unstandardized Residual
Test Value[a]	-8.80527
Cases < Test Value	5
Cases >= Test Value	5
Total Cases	10
Number of Runs	4
Z	-1.006
Asymp. Sig. (2-tailed)	.314

Source : SPSS (2022)
a. Median

Based on the results of the autocorrelation test using the Runs Test method, a significance value of 0.314 was obtained, which is greater than the significance level of 0.05. This indicates that there is no significant autocorrelation in the residual data. Thus, the residuals in the regression model are random, and the model is declared free from autocorrelation problems.

Multicollinearity Test

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Table 4
Multicollinearity Test

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Coefficientsᵃ

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	1062.356	45.161		23.524	.000		
Sektor Pertanian	-.022	.006	-.774	-3.459	.009	1.000	1.000

Source : SPSS (2022)
a. Dependent Variable: Tingkat Kemiskinan

The tolerance and VIF values are both 1,000 based on the findings of the multicollinearity test on the independent variable "Agricultural Sector." It can be concluded that the regression model used does not show multicollinearity because these values are below the widely accepted criteria, namely Tolerance > 0.10 and VIF < 10. Therefore, the independent variables of the model are suitable for use in additional regression analysis because they do not have a high level of correlation with each other.

Heteroscedasticity Test

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Table 5
Heteroscedasticity Test

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Coefficientsᵃ

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	5.096	29.236		.174	.866		
Sektor Pertanian	.005	.004	.404	1.248	.247	1.000	1.000

Source : SPSS (2022)
a. Dependent Variable: ABS_RES

Based on the results of the heteroscedasticity test indicated by the significance value of the Agricultural Sector variable of 0.247 > 0.05, it can be concluded that there are no symptoms of heteroscedasticity in the model. Thus, the regression model is feasible to use because it meets the assumption of homoscedasticity.

Simple Linear Regression Test

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Table 6
Simple Linear Regression Test

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Coefficientsᵃ

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1062.356	45.161		23.524	.000
Sektor Pertanian	-.022	.006	-.774	-3.459	.009

Source : SPSS (2022)
a. Dependent Variable: Tingkat Kemiskinan

Dari nilai koefisien di tabel, maka model regresi linier sederhananya adalah:

$$Y = 1062.356 - 0.022\ X$$

1. Constant (Intercept) = 1062.356

If the agricultural sector variable (X) has a value of 0, then the poverty rate (Y) is estimated at 1062.356 units. This is the basic value of the poverty rate without any contribution from the agricultural sector.

2. Coefficient X (Agricultural Sector) = -0.022

Every additional 1 unit in the agricultural sector will reduce the poverty rate by 0.022 units, provided that other variables are considered constant (ceteris paribus).

Because the coefficient value is negative, the relationship between the agricultural sector and the poverty rate is negative/inverse: The more the agricultural sector develops, the poverty rate tends to decrease.

Partial Hypothesis Test (T-Test)

Because the Significance value = 0.009 <0.05, then: H_0 is rejected and H_1 is accepted, meaning that the Agricultural Sector variable has a significant effect on the Poverty Level. The regression coefficient value of the agricultural sector (B = -0.022) shows that every 1 unit increase in the contribution of the agricultural sector will reduce the poverty level by 0.022 units, assuming other variables remain constant. This means that the agricultural sector has an important role in reducing the poverty level in the studied area.

F-test (for simultaneous test)

Table 7
F-test (for simultaneous test)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	43581.222	1	43581.222	11.962	.009[b]
	Residual	29146.378	8	3643.297		
	Total	72727.600	9			

Source : SPSS (2022)
a. Dependent Variable: Tingkat Kemiskinan
b. Predictors: (Constant), Sektor Pertanian

Based on the results of the F test shown in Table 6, the calculated F value is 11.962 with a significance level (Sig.) of 0.009. Because the significance value is less than 0.05 (0.009 <0.05), it can be concluded that: The agricultural sector variable simultaneously has a significant effect on the poverty rate. This means that the regression model used in this study is appropriate to explain the relationship between the agricultural sector and the poverty rate. The greater the contribution of the agricultural sector, the greater its influence in reducing the poverty rate in the area studied.

Test of Determination Coefficient (R2)

Table 8
Test of Determination Coefficient (R2)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.774[a]	.599	.549	60.35973

Source : SPSS (2022)
a. Predictors: (Constant), Sektor Pertanian

The R Square (R^2) value = 0.599 shows that 59.9% of the variation in poverty rate changes can be explained by the agricultural sector variable. While the remaining 40.1% is influenced by other variables outside the model that are not examined in this study, such as education, employment, infrastructure, and so on.Discussion

The Influence of the Agricultural Sector on Poverty Levels

Based on the results of data analysis, it was found that the agricultural sector has a significant effect on the poverty rate in rural areas of North Sumatra in 2015–2024. This is indicated by the results of the F test with a significance value of 0.009, which is below the significance level of 0.05. This means that simultaneously, the agricultural sector is able to explain variations in changes in poverty rates in the area. In other words, the existence and development of the agricultural sector significantly affect changes in poverty rates in rural areas.

This result is also supported by the T-test, which shows that the agricultural sector partially also has a significant influence on the poverty rate. This means that without considering other variables, the agricultural sector still has a real contribution in reducing poverty rates. In addition, the coefficient of determination (R^2) value of 0.599 indicates that 59.9% of the variation in poverty rates can be explained by the agricultural sector variable. While the remaining 40.1% is influenced by other factors, such as education, health, infrastructure, and other economic sectors.

This finding is supported by various expert opinions and the results of recent research in the last five years. According to Suryahadi et al. (2019), the agricultural sector is still the backbone of the household economy in rural areas of Indonesia, and increasing agricultural productivity has proven effective in reducing poverty levels directly. They emphasized that investment in the agricultural sector has a greater effect on the welfare of poor households than other sectors.

In line with that, Haryono (2020) stated that the growth of the agricultural sector in the Sumatra region is directly proportional to the decline in poverty rates, especially in households that depend on income from farming and plantations. In the context of North Sumatra, this is very relevant considering that most of the rural population works as farmers. Data from the Central Statistics Agency (2021) also shows that areas with increased agricultural production experienced a faster decline in poverty. This proves that the agricultural sector plays an important role in supporting the economic resilience of poor households, especially after the COVID-19 pandemic.

Maulana & Nugroho (2022) stated that farmers' access to capital, technology, and markets are key factors in strengthening the contribution of the agricultural sector to poverty reduction. When farmers are able to increase the efficiency of their farming efforts, their income will increase, which ultimately has an impact on welfare. Simanjuntak (2023) highlighted the importance of the role of local governments in providing agricultural infrastructure, training, and input subsidies as a form of support for this sector. He stated that policies that support sustainable agriculture will have a direct impact on increasing farmers' incomes and reducing poverty structurally.

Thus, based on the results of statistical analysis and support from current literature, it can be concluded that the agricultural sector has a strong and significant influence on poverty levels in rural areas of North Sumatra. Strengthening the agricultural sector through increased productivity, access to technology, and policy support can be an effective strategy in reducing poverty rates sustainably.

Conclusion

This study proves that the agricultural sector has a significant influence on reducing poverty rates in rural areas of North Sumatra Province during the period 2015 to 2024. The results of a simple linear regression analysis show that an increase in the contribution of the agricultural sector is negatively correlated with poverty rates, with a regression coefficient value of -0.022 and a significance level of 0.009. In addition, the coefficient of determination (R^2) value of 0.599 indicates that 59.9% of the variation in poverty rates can be explained by the agricultural sector variable.

This finding confirms that the agricultural sector has strategic potential in encouraging improvements in the welfare of rural communities. Therefore, strengthening the agricultural sector through increased productivity, access to technology, and support for farmer-oriented policies is crucial. However, because there are still 40.1% of other factors that influence poverty, a multisector approach also needs to be applied. This includes the development of education, health services, and rural infrastructure to create more comprehensive and sustainable poverty alleviation efforts.

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