E-ISSN : 2807-4998 (online)

Buletin Ekonomika Pembangunan
https://journal.trunojoyo.ac.id/bep
Vol. 6 No. 2 September 2025, hal 122-132

Analysis Of The Effect Of Rice and Corn Productivity On Economic Growth In The Agricultural Sector (Case Study in Lamongan, Tuban, and Ngawi Regencies)

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DOI: https://10.21107/bep.v6i2.31383

ABSTRACT
This study aims to examine the influence of rice and corn productivity on the economic growth of the agricultural sector in the districts of Lamongan, Tuban, and Ngawi, both partially and simultaneously. The dependent variable in this research is the economic growth of the agricultural sector, while the independent variables are rice productivity and corn productivity. This research employs a quantitative approach with a panel data regression method. The Fixed Effect model is considered the most appropriate. The study uses time series data covering the period from 2011 to 2023, with a cross-section consisting of three regions: Lamongan, Tuban, and Ngawi. The results of this study indicate that rice productivity has a significant positive influence on the economic growth of the agricultural sector, whereas corn productivity has a significant negative influence on the economic growth of the agricultural sector. Collectively, the independent variables of rice productivity and corn productivity significantly affect the dependent variable of agricultural sector economic growth.

Keywords: *Economic Growth, Productivity, Agricultural Sector.*

INTRODUCTION

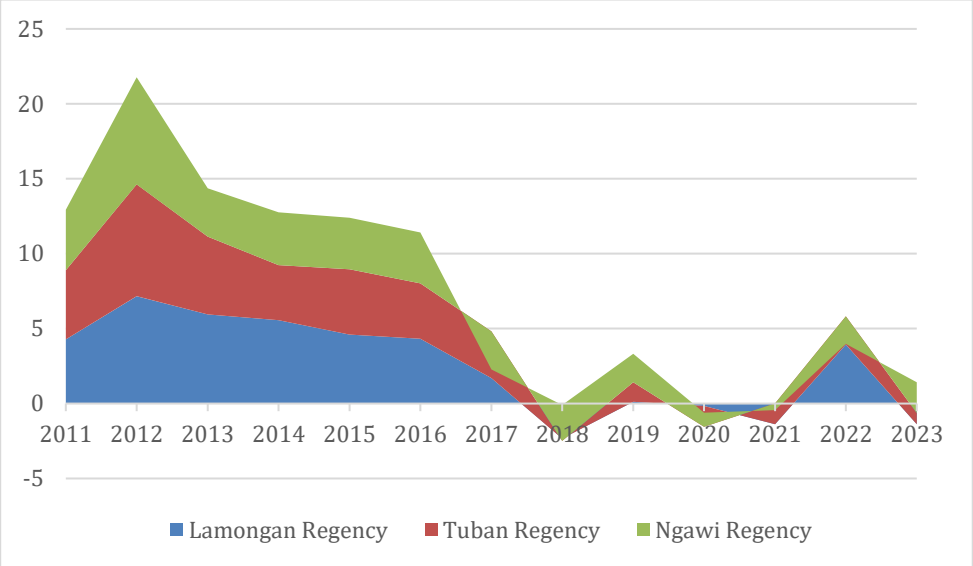
Economic growth is one of the key indicators in assessing the progress of a region. In many countries, including Indonesia, the agricultural sector plays a crucial role in the economy, especially in rural areas. In addition to being a source of livelihood for a large part of the population, agriculture can also improve food security and community welfare. Gross Regional Domestic Product (GRDP) is the total added value or value of final goods and services produced by all economic units in a region. GRDP reflects regional economic growth and activity. The rate of GRDP growth based on constant prices is an important indicator because it eliminates the effects of inflation, thus providing an accurate picture of economic development. High GRDP growth indicates a strong economy (Romhadhoni *et al.*, 2019).

Lamongan, Tuban, and Ngawi are regencies in East Java Province. These three regencies share similar characteristics in terms of the livelihoods of their residents, most of whom depend on the agricultural sector. In addition, these three regencies also play an important role in national food security (Zahra & Sutikno, 2025). Lamongan, Tuban, and Ngawi Regencies are known as national rice and corn granaries. Based on the East Java Provincial Statistics Agency (2024), Lamongan Regency was the largest rice producer at the end of 2023, followed by Ngawi Regency and Tuban Regency, with Tuban Regency ranking fifth in East Java. On the other hand, corn production in Tuban Regency Tuban is also very abundant, with Tuban Regency achieving the position as the highest corn producer

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E-ISSN : 2807-4998 (online)

in East Java Province, while Lamongan Regency ranks fifth, and Ngawi Regency has not yet entered the top ten corn producers in East Java Province.



Source: Central Statistics Agency of Lamongan, Tuban, and Ngawi Regencies 2011-2023

Figure 1: Gross Regional Domestic Product Growth Rate of the Agricultural Sector in Lamongan and Tuban Regencies Based on Constant Prices by Business Field (Percent)

From the data above, the growth rate of the agricultural sector GRDP from 2011 to 2023 in the three regencies shows a downward trend. Lamongan Regency reached a peak of 7.16% in 2012 but declined to -1.37% in 2023. Tuban Regency was more stable, with the highest growth of 7.47% in 2012 and 0.74% in 2023. Meanwhile, Ngawi Regency showed quite sharp fluctuations, reaching -2.54% in 2017 but growing again by 2.05% in 2023. Overall, the three regencies showed different growth patterns, reflecting the economic dynamics of each region.

The agricultural sector plays an important role as an economic driver in Lamongan, Tuban, and Ngawi Regencies. This sector's contribution to the GRDP of these three regencies is very significant. Agriculture has long been the backbone of the economy in various regions in Indonesia, including in East Java, especially in Lamongan, Tuban, and Ngawi. As a major sector, agriculture not only creates jobs but also increases community income and supports food security in the region (Berliana, 2023). The agricultural sector in Lamongan, Tuban, and Ngawi Regencies plays a very significant role. In Lamongan and Ngawi districts, the agricultural sector dominates the regional economy. Meanwhile, in Tuban district, the agricultural sector ranks second as the sector that contributes the most, after the mining sector. In Lamongan, Tuban, and Ngawi districts, the leading agricultural commodities are rice and corn. Rice is a staple food for the majority of Indonesians, so optimal rice production is crucial for maintaining food security (Abdurrozzaq et al., 2022).

Table 1. Rice and Corn Productivity in Lamongan, Tuban, and Ngawi Regencies 2011-2023

Year	Productivity (Tons/HA)					
	Lamongan		Tuban		Ngawi	
	Rice	Corn	Rice	Corn	Rice	Corn
2011	5.31	5.46	5.45	4.84	5.42	5.25
2012	6.24	5.83	7.01	5.58	6.10	6.14
2013	6.44	5.75	6.24	5.17	6.36	6.33
2014	6.56	5.77	6.28	4.80	6.01	6.97
2015	6.55	6.48	6.21	5.28	6.11	7.75
2016	6.75	5.82	5.95	5.40	6.20	7.10
2017	6.90	8.39	5.83	5.39	5.69	6.35
2018	7.13	10.26	5.98	5.58	6.34	7.24
2019	7.53	10.42	6.06	5.64	6.33	7.31
2020	7.65	10.97	6.12	5.65	6.72	7.10
2021	7.76	9.80	6.22	5.65	6.11	7.64
2022	7.70	9.03	6.22	5.65	6.06	7.69
2023	7.38	9.78	6.22	5.73	6.43	7.70

Source: Central Statistics Agency of Lamongan, Tuban, and Ngawi Regencies (2011-2023).

Based on data from the Central Statistics Agency (BPS) of Lamongan, Tuban, and Ngawi Regencies, rice and corn productivity from 2011 to 2023 shows an upward trend. In Lamongan, rice productivity increased from 5.31 tons/ha (2011) to 7.70 tons/ha (2022), then decreased to 7.38 tons/ha (2023). Corn showed a significant increase since 2017, reaching 10.97 tons/ha in 2020. In Tuban, rice productivity fluctuated and stagnated at 6.22 tons/ha since 2021, while corn remained relatively stable and reached 5.73 tons/ha in 2023. As for Ngawi district, rice and corn productivity also showed fairly stable data, with only a slight decline in some years.

Based on the above description, a study on the effect of rice and corn productivity on economic growth (case studies in Lamongan, Tuban, and Ngawi districts) is very important. This is because there is a problem in that the agricultural sector is the sector that contributes the most, one of which is in the commodities of rice and corn, which tend to increase, but despite this increase in commodities, economic growth in the agricultural sector in Lamongan, Tuban, and Ngawi districts shows a downward trend, resulting in a gap in theory. The objectives of this study are: (1) To determine the effect of rice productivity on economic growth in Lamongan, Tuban, and Ngawi Regencies. (2) To determine the effect of corn productivity on economic growth in Lamongan, Tuban, and Ngawi Regencies. (3) To determine the effect of corn and rice productivity on agricultural economic growth in Lamongan, Tuban, and Ngawi Regencies.
and Ngawi.

LITERATURE REVIEW

Economic growth theory

According to Adam Smith and David Ricardo, there are four factors that

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E-ISSN : 2807-4998 (online)

influence economic growth, namely population size, supply of capital goods, land area and natural resources, and technology application. Smith and Ricardo believed that land availability was the starting point of economic growth, with classical economists considering land to be a fixed factor (Amdan & Sanjani, 2023). Classical economists also stated that when the productivity of a society is low, economic growth will decline or stagnate because when productivity declines, production capacity also declines, and conversely, when productivity increases, economic growth can increase (Putri et al., 2024).

Productivity

Agricultural productivity is an important indicator that describes the level of efficiency in production activities in the agricultural sector. Simply put, productivity shows the ratio between the production results obtained (output) and the resources used (input). In the context of agriculture, one of the most commonly used approaches to measure productivity is through land productivity (Siringo & Daulay, 2014).

Contribution of the Agricultural Sector to Economic Growth

Traditionally, the agricultural sector has often been viewed as a passive element in economic development, serving only as a supporting factor. Its role is considered limited to providing labor and producing food. However, the agricultural sector has several vital roles in the Indonesian economy, namely as a producer of food, a source of labor, a generator of foreign exchange, and a driver of demand for industrial products. Thus, the agricultural sector not only functions as a supporter but can also be a major driver of overall economic growth (Nadziroh, 2020).

METHOD

This study uses a quantitative approach and secondary data obtained from publications available on the official websites of the Central Statistics Agency of Lamongan, Tuban, and Ngawi Regencies. This study uses variables that include rice and corn productivity as independent variables and agricultural sector economic growth as a dependent variable. The data used falls into the category of panel data. Panel data is a combination of *time series* and *cross-sectional* data*.* The *time series* data consists of annual data collected from 2011 to 2023, while the *cross-sectional* data covers the districts of Lamongan, Tuban, and Ngawi. The following is the formula used in the panel data regression model:

$Y = a + \beta_1 X1_{it} + \beta n_2 X2_{it} + e_{it}$.....1)

Explanation:
Y= Agricultural sector economic growth
a= Constant
$\beta 1$,$\beta 2$ = Regression coefficient
X_1= Rice productivity
X_2 = Corn productivity
e= Standard error
i= cross section
t= time series

According to Widarjono (2013) in Tutupoho (2019) There are three types of models estimation models used in panel data regression analysis: Common Effect

Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). To estimate panel data regression, the best model will be selected from these three techniques. To select the best model, there are three testing steps that must be carried out, namely the Chow Test (Likelihood Test), the Hausman Test, and the Lagrange Multiplier (LM) Test.

In order for the results of the regression model estimation to be considered accurate and reliable, the model must meet the classical assumption tests, which include the normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test.

Hypothesis Testing

The t-test is used to assess the effect of each independent variable on the dependent variable individually. The aim is to determine whether the effect is significant.

The Simultaneous Significance Test (F Test) is part of the analysis of variance (ANOVA) that serves to test the combined hypothesis, namely to determine whether all regression coefficients are simultaneously equal to zero.

The coefficient of determination (R^2) shows how well the independent variables explain the variation in the dependent variable in the regression. If $R^2 = 0$, it means that the independent variables do not explain the variation in the dependent variable at all. Conversely, if $R^2 = 1$, it means that all the variation in the dependent variable can be perfectly explained by the independent variables, so the model is very accurate.

RESULTS AND DISCUSSION

Model Selection Using the Chow Test

Chow test results

Effect test	Prob.
F(2,34)	5.62
Prob > F	0.0078*

Source: Output from STATA 14 software
*significant at level 5%

Based on the Chow test results table, it is known that the Prob > F value shows a figure of 0.0078, which means that (Prob > F) < 0.05, so H0 is rejected. Based on the Chow test results, the best estimation model is the Fixed Effect Model (FEM), compared to the Common Effect Model (CEM).

Hausman Test

Hausman Test Results

Effect test	Prob.
Chi2 (2)	21.97
Prob > chi2	0.0000*

Source: Output from STATA 14 software
*significant at level 5%

Based on the table above, the Hausman test results show that the Prob-chi2 value is 0.0000, which means (Prob> chi2)< 0.05, so H0 is rejected. Based on the

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Hausman test results, the best estimation model is the Fixed Effect Model (FEM), compared to the Random Effect Model (REM).
Therefore, based on the Chow and Hausman tests, the Fixed Effect Model is selected, so the Lagrange multiplier test is not necessary, and the best model is the Fixed Effect Model. According to research conducted by Candra & Irmeilyana (2024), if the model selected in the Chow and Hausman tests is the Fixed Effect Model (FEM), then the Lagrange Multiplier test is not necessary.

Classical Assumption Test
In selecting the fixed effect model as the best model for data estimation, it is necessary to perform a classical assumption test before estimation. The classical assumption test aims to ensure that the regression equation obtained is accurate in its estimation. The classical assumption tests to be performed include:
Normality Test

Results of the Normality Test

Variable	Prob>z
Residual (e)	0.63073

Source: STATA 14 software output
*significant at level 5%

The table above shows that the probability values for rice and corn productivity are higher than the significance level of 0.05, with a value of 0.63073. This proves that the data follows a normal distribution or passes the normality test. After the data is declared to be normally distributed or passes the normality test, the multicollinearity test is continued.

Multicollinearity test

Multicollinearity Test Results

Variable	VIF	1/VIF
x1	2.47	0.404388
x2	2.47	0.404388
Mean VIF	2.47	

Source: Output from STATA 14 software

In the table above, the data used in this research model is free from multicollinearity or passes the multicollinearity test because rice productivity, corn productivity, and *variance inflation factor* (VIF) values are< 10. The VIF value is 2.47 < 10.

Heteroskedasticity Test

Heteroskedasticity Test Results

Wald Test	Prob.
Chi2 (1)	0.25
Prob > chi2	0.6160

Source: Output from STATA 14 software
*significant at level 5%

Based on the table above, the results show that there is no heteroscedasticity, as evidenced by the probability value of 0.6160> 0.05. After it

has been determined that there are no signs of heteroscedasticity or that the heteroscedasticity test has been passed, the research can proceed to the autocorrelation test.

Autocorrelation Test

Autocorrelation Test Results

	Prob.
F(1,2)	4.155
Prob > F	0,1784

Source: Output from STATA 14 software
*significant at level 5%

Based on the table above, the autocorrelation test results show that the Prob value is greater than the significant value 0.1784 > 0.05, which indicates that the autocorrelation test is free from autocorrelation.

Hypothesis Test
T-Test

T-Test Results

Variabel	**Coef.**	**Std. Err.**	**t**	**p>|t|**
x1	2.576812	.9972543	2.58	0.014
x2	-2.091544	.3710286	-5.64	0.000
_cons	.1545063	4.795252	0.03	0.974

Source: Output from STATA 14 software

Based on the table above, the t-test analysis shows that rice productivity has a p>|t| value 0,014 which is smaller than the significant value of 0.05, and a t-value of 2.58 > t the table t value of 0.68137, so H0 is rejected and H1 is accepted, which means that rice productivity has a partial effect on economic growth in the agricultural sector in Lamongan, Tuban, and Ngawi Regencies. Corn productivity has a p>|t| value of 0.000, which is smaller than the significant value of 0.05, and a t-value of -5,64 > t-table, which is 0.68137. Therefore, H0 is rejected and H1 is accepted, which means that corn productivity partially has a significant effect on economic growth in the agricultural sector in Lamongan, Tuban, and Ngawi Regencies.

F Test

F Test Results

	Prob
F (2,34)	19.04
prob>F	0,0000*

Source: Output from STATA 14 software
*significant at level 5%

Based on the table above, it can be seen that the prob>F value is 0.0000. Because the probability value is smaller than the significance value of 0.05, H0 is rejected and H1 is accepted, which means that simultaneously, the independent variables

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of rice productivity and corn productivity affect the dependent variable of agricultural sector economic growth in Lamongan, Tuban, and Ngawi Regencies.

Determination Coefficient Test (R^2)

Coefficient of Determination Results (R^2)

R-Square
0,5283

Source: STATA 14 software output

Based on the data in the table above, the coefficient of determination (R^2) for rice productivity and corn productivity is 0.5443 or 52.83%, which means that the ability of the rice productivity and corn productivity variables is 52.83 percent of the growth of the agricultural sector. The remaining 47.17 percent is explained by other factors outside the scope of this study. Based on the R^2 value, it can be said that the relationship between the independent variables and the dependent variable is in the moderate to strong category. The R^2 value is between zero and one, where a value closer to one indicates that the independent variables are better at explaining the variation in the dependent variable. Thus, this model is quite effective in explaining the effect of rice and corn productivity on economic growth in the agricultural sector.

Panel Data Regression Results

Y	Coef.
x1	2.576812
x2	-2.091544
_cons	.1545063

Source: Output from STATA 14 software

Y= 0.1545063+ 2.576812*x1 – 2.091544*x2+ eit
Based on the regression equation above, it can be explained that the constant coefficient value of 0.1545063 means that without the variables of rice productivity (x1) and corn productivity (x2), the value of the dependent variable (Y), namely economic growth in the agricultural sector in Lamonga, Tuban, and Ngawi Regencies, would increase by 0.15%. Meanwhile, the coefficient value of the rice productivity variable (x1) is 2.576812, indicating that every 1 ton/ha increase in rice productivity will cause a 2.57% increase in economic growth in the agricultural sector in Lamonga, Tuban, and Ngawi Regencies. Then, the coefficient value of the corn productivity variable (x2) is -2.091544, indicating that every 1 ton/ha increase in corn productivity actually reduces the economic growth of the agricultural sector in Lamongan, Tuban, and Ngawi Regencies by 2.09%.

DISCUSSION

The effect of rice productivity on economic growth in the agricultural sector

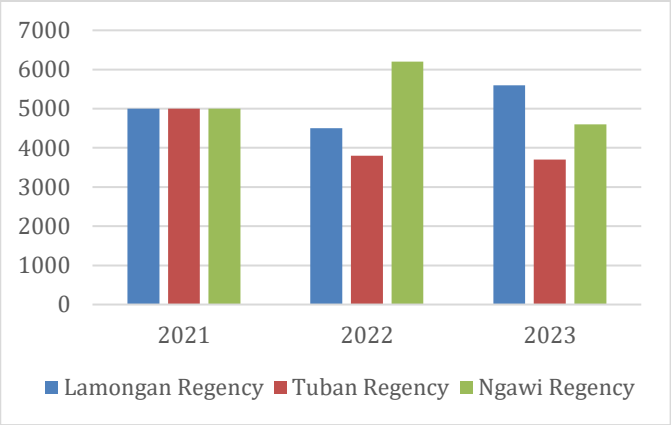
The regression results show that the rice productivity coefficient is 2.576812, meaning that every 1 ton/ha increase in rice productivity increases the economic growth of the agricultural sector by 2.57%. Meanwhile, the probability value is 0.014 < 0.05. This shows that rice productivity has a significant effect on economic growth in the agricultural sector in Lamongan, Tuban, and Ngawi

Regencies.

This study is in line with the findings of a study conducted by (Wahyuni *et al.*, 2023) entitled The Effect of Land Area, Harvest Area, Productivity, and Rice Production on the Gross Regional Domestic Product of the Agricultural Sector in West Bangka Regency. The results of the study state that rice productivity has a positive and significant effect on the GRDP of the agricultural sector in West Bangka Regency. In addition, research conducted by Muliati *et al*. (2022) also shows that in the F test, the results of the rice production and productivity variables have a positive and significant effect on the GRDP in 34 provinces in Indonesia.

The effect of corn productivity on agricultural sector economic growth

The regression results show a corn productivity coefficient of -2.091544, meaning that every 1 ton/ha increase actually reduces agricultural sector economic growth by 2.09%. With a probability value of 0.000 < 0.05, the effect is significant but negative on agricultural sector economic growth. These results show an inverse relationship between corn productivity and agricultural sector economic growth in Lamongan, Tuban, and Ngawi Regencies. This means that an increase in corn productivity can actually reduce the performance of the agricultural sector, which may be caused by a decline in prices due to overproduction, dependence on unstable external markets, high production costs, and the conversion of land to more productive commodities.



Source: National Food Agency 2021-2023

Figure 2 Corn Commodity Prices

Figure 1 above shows that corn prices in Lamongan, Tuban, and Ngawi during 2021–2023 fluctuated with a downward trend. Despite increased productivity, economic growth declined due to price instability. In 2021, the corn price was uniform at IDR 5,000/kg, but in 2022 it fell in Lamongan (IDR 4,500) and Tuban (IDR 3,800), while Ngawi saw an increase (IDR 6,200). In 2023, prices rose in Lamongan (Rp5,600), but fell in Tuban (Rp3,700) and Ngawi (Rp4,600). These fluctuations reflect instability influenced by production, demand, and distribution.

The seasonal nature of corn as a commodity causes price fluctuations. During harvest, abundant supply lowers prices, while during droughts or disasters, prices surge. In addition, increases in production costs such as fertilizers, seeds, fuel, and labor also contribute to the rise in corn prices in the market (Meilantika et al., 2024). Furthermore, the land substitution effect needs to be considered, whereby farmers who switch to growing corn due to policy incentives or cheaper

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input prices may abandon other commodities that contribute more to the GRDP. Thus, an increase in corn productivity may occur alongside a decline in the productivity of other commodities that are more economically valuable.

The results of this study contradict Adam Smith's theory, which states that increased productivity drives economic growth. However, without the support of market efficiency, infrastructure, and fair pricing policies fair pricing policies, increased productivity can actually have a negative impact on agricultural sector growth.

The effect of rice and corn productivity on agricultural sector economic growth

The panel regression results show a probability value (Prob> F) of 0.0000 < 0.05, so H0 is rejected and H1 is accepted. This means that simultaneously, rice and corn productivity has a significant effect on economic growth in the agricultural sector in Lamongan, Tuban, and Ngawi Regencies. This shows that changes in rice and corn productivity have an impact on the development of the agricultural sector in Lamongan, Tuban, and Ngawi. As the main sector, the productivity of both crops is an important indicator of agricultural economic development. This finding is in line with Adam Smith's classical economic theory, in which increased productivity drives output and the contribution of the agricultural sector to GRDP.

CONCLUSION

Based on the results of the discussion, it shows that rice productivity has a positive effect on the economic growth of the agricultural sector, while corn productivity has a negative effect due to price instability that tends to decline in Lamongan, Tuban, and Ngawi Regencies. Simultaneously, both variables have a significant effect on the economic growth of the agricultural sector in the three regencies.

From the discussion presented in this study, there are several suggestions that the author can convey, namely that the local government is expected to encourage increased rice productivity through the provision of high-quality seeds, training, modernization of tools, and irrigation subsidies. For corn, price stabilization is important by expanding market access, farmer partnerships, and setting minimum prices. For further research, it is recommended to add other variables, extend the time period, and use more diverse methods so that the analysis is more comprehensive and in line with field conditions.

REFERENCES

Abdurrozzaq, H., Nasution, S. P., Fitri, A. Y., Henni, A. H., & Nyak, F. (2022). Strategies for Improving Rice Farming to Boost the Economy of Rural Communities. *Journal of Community Service in Science and Technology*, *1*(4),

Amdan, L., & Sanjani, R. M. (2023). Analysis of Factors Affecting Economic Growth in Indonesia. *Economics, Management, Accounting*, *Vol. 3*, *No.* (1), 108.

Central Statistics Agency of East Java Province. (2024). *Rice Production by Regency/City (Tons), 2023*.

Lamongan District Statistics Agency. (2021). Lamongan District in Figures 2021. 1–604.

Lamongan District Statistics Agency. (2023). Lamongan District GRDP Growth Rate Based on Constant Prices by Business Field (Percent) 2011-2023.

BPS East Java. (2023). Corn Productivity by Regency/City in East Java (Tons/Ha), 2007-2017.

BPS East Java. (2023). Rice Productivity by Regency/City in East Java (Tons/Ha), 2007-2017.

BPS Ngawi Regency. (2023). Growth Rate of Ngawi Regency GRDP Based on Constant Prices by Business Field (Percent) 2011-2023.

Berliana, F. J. (2023). Analysis of Agricultural Technology Potential as a Driver of Economic Growth in Tuban Regency, East Java. *Scientific Journal of Economic Management and Accounting*, *1*(1), 142–149.

Candra, S. F., & Irmeilyana. (2024). Panel Data Regression Model on the Effect of Rainfall Factors on Coffee Production in South Sumatra Province in the Years 2014-2021. *Journal of Research Science*, *26*(1), 30. https://doi.org/10.56064/jps.v26i1.916

Meilantika, D., Salamudin, & Hartati, S. (2024). *Analysis of Corn Commodity Price Trends Using Python*. *4*(2). http://dx.doi.org/10.53514/jco.v4i2.568

Muliati, Juliansyah, H., & Rozalina. (2022). The Effect of Rice Production and Productivity on Indonesia's Gross Domestic Product. *Jurnal Penelitian Agrisamudra*, *9*(2), 90–99. https://doi.org/10.33059/jpas.v9i2.7206

Nadziroh, M. N. (2020). The Role of the Agricultural Sector in Economic Growth in Magetan Regency. *Agristan Journal*, *2*(1), 52–60. https://doi.org/10.37058/ja.v2i1.2348

Putri, A. A., Aryazeta, A. A., Fu'ad, Z., Ismikarimah, Devi, Y., & Kurniati, E. (2024). Theories of Economic Growth and Development. *Neraca: Journal of Economics, Management and Accounting*, *3*(1), 182–192.

Romhadhoni, P., Faizah, D. Z., & Afifah, N. (2019). The Effect of Regional Gross Domestic Product (RGDP) on Economic Growth and Open Unemployment Rates in DKI Jakarta Province. *Integrative Mathematics Journal, 14(*2), 113. https://doi.org/10.24198/jmi.v14i2.19262

Siringo, H. B., & Daulay, M. (2014). Analysis of the Relationship between Agricultural Productivity and Rice Imports in Indonesia. *Journal of Economics and Finance*, *2*(8), 488-499. https://media .neliti.com.

Tutupoho, A. (2019). Analysis Of The Basic Sector And Non-Basic Sector On Economic Growth In Maluku Province (Case Study Of Kota Regency). *Journal of Economics*, *XIII*(1).

Wahyuni, A., Zukhri, N., & Valeriani, D. (2023). The Effect Of Land Area, Harvest Area, Productivity, And Rice Production On The Gross Regional Domestic Product Of The Agricultural Sector In West Bangka Regency. *Planning Development and Innovation*, *3*(1), 18–28.

Zahra, K., & Sutikno. (2025). Clustering of Villages in Tuban Regency Using the K-Means Integration Method. *ITS Engineering Journal*, *14*(1).