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The Effect of Rice Consumption, Rice Prices, and Rice Harvest Area on Dependence on Rice Imports in Indonesia in 2015-2014

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ABSTRACT

Rice is a leading agricultural commodity in Indonesia. This is reflected in Indonesia's position as the fourth-largest producer and consumer of rice in the world. The high demand for rice makes its availability one of the government's priorities, which is fulfilled through various policies, including rice imports. Indonesia imports rice to ensure the availability of domestic rice stocks. This study aimed to analyze the effects of rice consumption, rice prices, and harvested paddy area on rice import dependency in Indonesia during the period 2015–2024. Data were analyzed using the Ordinary Least Squares (OLS) multiple linear regression method based on secondary data. The results show that rice consumption, rice prices, and harvested paddy area simultaneously affect rice import dependency in Indonesia. Partially, rice consumption and rice prices have a significant effect on rice import dependency, whereas harvested paddy area does not have a significant effect on rice import dependency during the 2015–2024 period.

INTRODUCTION

Food is a primary human need, and its fulfillment is a fundamental right of every individual, as stipulated in Law Number 18 of 2012. As an agrarian nation, Indonesia's agricultural sector plays a crucial role in meeting its population's food needs, relying on natural resources to produce key food ingredients. Through the management of agricultural resources, this sector is one of the largest contributors to national food needs and serves as a key foundation for Indonesia's economic development.

Meeting the public's food needs is a government responsibility that must be taken seriously. Physical food security will be achieved if the government is able to meet these needs sustainably. Within the scope of national economic development, the agricultural sector, particularly rice paddies, has significant multifunctional value in enhancing and developing food security (Kusumaningrum, 2019).

One of the food commodities produced in large quantities in Indonesia is rice. Rice is a commodity consumed by almost all levels of Indonesian society, from lower-middle to upper-middle socioeconomic groups (Food Consumption Statistics, 2023). Rice is a staple food commodity whose availability is prioritized over corn, sugar, and soybeans (Paipan & Abrar, 2020). Rice consumption continues to increase over time, influenced by population growth. Data from the Central Statistics Agency (BPS) (2025) shows that Indonesia's population has reached 278,696.2 thousand people, with a growth rate of 1.13%.

In an effort to meet the high demand for rice, the Indonesian government imports. Imports are a form of activity in international trade aimed at gaining opportunities or profits. Imports can be defined as the activity of bringing goods from abroad carried out by the government or private sector into a customs area (Prinadi et al ., 2016). Imports can be called international trade because they involve the official transfer of goods or services from one country to another. Imported goods or services are goods brought into the country from abroad, and the business entity or individual carrying out the imports is called the importer. Imports can provide new opportunities for developing countries, but can also create new problems that must be addressed by the government.

The legal basis for the implementation of rice imports is stated in Law Number 18 of 2012 concerning Food Article 14 Paragraph (2) of the Ministry of Trade of the Republic of Indonesia (2015), which states "If domestic food supplies cannot be met by production, a food import policy will be implemented according to needs." Provisions regarding rice imports are also regulated in the Regulation of the Minister of Trade Number 01 of 2018 concerning Provisions for Rice Exports and Imports, which explains that imports of rice from abroad are only permitted for certain purposes. Article 5 states that these purposes include general needs, grant assistance, and other needs.

Table 1. Development of rice consumption, rice prices, rice harvested land area and rice imports from 2015 to 2024.

Year	Rice Consumption (kg/capita/year)	Rice Price (Rp)	Rice Harvest Area (Ha)	Rice Imports (Tons/Year)
2015	84,889	10,915	13,797	861,601
2016	86,818	11,511	14,117	1,283,179
2017	81,611	11,534	15,156	305,729
2018	80,641	12,054	11,378	2,253,824
2019	78,429	12,091	10,678	444,509
2020	78,487	12.26	10,657	356,286
2021	81,518	10,395	10,412	407,741
2022	81,044	10,656	10,453	429,207
2023	80,905	12,465	10,214	3,062,858
2024	79,077	15,308	10,050	4,519,421

Source: Center for Agricultural Data and Information Systems 2015-2024 (2015, 2019, 2023 & 2025) & International Trade Center (ITC), processed by the author

Table 1. The amount of rice imported by Indonesia during the period 2015 to 2024 experienced fluctuations, with the highest amount occurring in 2024, at 4,519,421 tons. On the other hand, per capita rice consumption in 2024 actually decreased to 79,077 kg/capita/year. This condition indicates that the increase in rice imports is not always followed by an increase in public consumption. This phenomenon indicates that there are other factors influencing rice import policy in Indonesia. One factor suspected to be related to the increase in rice imports is the decline in harvested rice area that has occurred in recent years. This reduction in harvested land area has the potential to affect the availability of domestic rice supply, requiring the government to import to maintain national food security. Furthermore, the tendency for rice prices to increase during the observation period is also suspected to be a consideration in rice import policy. Considering these conditions, further research is important to analyze the influence of rice consumption, rice prices, and harvested rice area on rice imports in Indonesia.

The continued increase in rice imports without adequate management has the potential to cause various problems, such as competition between domestically produced and imported rice. Food self-sufficiency will also be disrupted due to conditions on the ground; Indonesia does not produce rice independently but through imports. In fact, rice can be a profitable trade commodity for the Indonesian people because high domestic demand provides significant opportunities for profit. Based on problems including declining rice consumption and the area of rice harvested, as well as the continuously increasing price of rice, it is necessary to identify factors that contribute to rice import dependence. Therefore , this study aims to analyze whether these three variables are considered in rice imports in Indonesia.

METHODOLOGY

The research was conducted in Indonesia, focusing on analyzing rice import dependence during the 2015–2024 period. The data used in this study is secondary data presented in time series form for the 2015–2024 period. The data was obtained from publications from relevant agencies, such as the Central Statistics Agency (BPS), the Food and Agriculture Organization (FAO), the International Trade Center , and other agencies.

This study uses a quantitative descriptive approach to analyze the phenomena under study. Data analysis was performed using SPSS software through an econometric approach, namely multiple linear regression analysis with the Ordinary Least Squares (OLS) method. This method is used to estimate regression coefficients (β)while minimizing errors. This method also includes classical assumptions that must be met to increase the validity of the data used in the study. If any of these classical assumptions are violated, the OLS method cannot be used in the study.

Multiple Linear Regression Model

The analysis method used in this study is multiple linear regression with the Ordinary Least Squares (OLS) approach, which is formulated in the following equation model:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e_t$$

With the following information:

Y : Rice imports in Indonesia
α : Constant
$\beta_1\beta_2\beta_3$: Regression coefficient of each independent variable
X_1 : Rice consumption
X_2 : Price of rice
X_3 : Area of rice harvest land
e_t : *Standard error*

Classical Assumption Test

Normality Test

The normality test is carried out to determine whether the independent variables and dependent variables in the regression model have a normal distribution using the One-Sample Kolmogorov-Smirnov test, with the result that the data is said to be normally distributed if the significance value (p-value) is greater than 0.05. (Ginting & Silitonga, 2019) . The purpose of the normality test in this study was to ensure that the data used met the basic assumptions in multiple linear regression analysis, thus resulting in more accurate and unbiased estimates. Furthermore, the normal distribution of the data indicates that the regression model used is suitable for further analysis in testing the research hypothesis.

Multicollinearity Test

A multicollinearity test is performed to determine whether there is a strong relationship or correlation between the independent variables in a regression model. This test is measured by examining the tolerance value and the Variance Inflation Factor (VIF). A regression model is considered free of multicollinearity if the tolerance value is greater than 0.10 and the VIF value is less than 10. If both criteria are met, the independent variables used in the study can be considered valid and will not cause bias in the regression analysis results.

Heteroscedasticity Test

The heteroscedasticity test is a test used to see whether or not there is inequality in residual variance between observations in the model. regression (Ginting & Silitonga, 2019) . In this study, heteroscedasticity testing was conducted using the Glejser test . The Glejser method is carried out by regressing the absolute value of the residual against the independent variables in the model. The test criteria indicate that if the significance value is greater than 0.05, heteroscedasticity does not occur, whereas if the significance value is less than 0.05, heteroscedasticity occurs.

Autocorrelation Test

The autocorrelation test is used to determine whether there is a relationship between the residuals in the current period and the residuals in the previous period in a regression model. A good regression model should not experience autocorrelation (Ginting & Silitonga, 2019). In this study, the autocorrelation test was conducted using the Run Test because the amount of data used was limited. The Run Test is used to determine whether the residuals in the regression model are random or not. The regression model is declared to not experience autocorrelation if the significance value in the Run Test is greater than 0.05.

Hypothesis Testing

Coefficient of Determination Test (R 2)

The coefficient of determination (R^2) indicates the level of contribution of the independent variable to changes in the dependent variable. If the coefficient of determination (R2) is small, it indicates that the independent variable's ability to explain the dependent variable is very limited.

Simultaneous Test (F Test)

The simultaneous test, or F-test, is used to determine the simultaneous effect of independent variables on the dependent variable in a regression model. If the significance value is <0.05, the independent variables simultaneously influence the dependent variable. Conversely, if the significance value is >0.05, the independent variables simultaneously have no effect on the dependent variable.

Partial Test (T-Test)

Testing was conducted using a t-test to determine the partial influence of each independent variable. The test criteria indicate that if the calculated t value is greater than the t table value or the significance value is less than 0.05, then the independent variable has a significant influence on the dependent variable.

RESULTS AND DISCUSSION

The analysis of the influence of rice consumption, rice prices, and harvested rice area on Indonesia's dependence on rice imports shows diverse findings for each research variable. This diversity indicates that each variable has a different level of influence on rice import dependence during the 2015–2024 study period.

Multiple Linear Regression Results

Table 2. Multiple linear regression results

Variables	Coefficient			
	B	T	Sig.	VIF
(Constant)	-32242253.14	-3,186	0.019	
Rice Consumption (X_1)	317028,932	2,519	0.045	2,211

Price of Rice (X 2)	989,630	5,341	0.002	1,263
Rice Harvest Area (X 3)	-337719,425	-2,010	0.091	1,968

Source: Results of data processing by the author using SPSS 21

Based on Table 2. the results of multiple linear regression show the regression model equation as $Y = -32242253{,}14 + 317028{,}932\,X_1 + 989{,}630\,X_2 - 337719{,}425\,X_3 + \varepsilon$. The constant obtained is - 32242253,14which means that if the constant value is negative, then if all independent variables are considered to be zero, then the dependence on rice imports is estimated to decrease. The coefficient of the rice consumption variable (X1) shows a positive influence on the dependence on rice imports in Indonesia. Thus, every increase of one in the rice consumption variable (X1) will increase the dependence on rice imports in Indonesia (Y) by 317028,932 one unit assuming the variables X1, X2 , and X3 remain constant.

The coefficient of the rice price variable (X2) produces a value of 989.630, which indicates that rice prices have a positive relationship with dependence on rice imports in Indonesia. Every increase of one in the rice price variable (X 2) will increase dependence on rice imports in Indonesia (Y) by 989.630 units, assuming variables X1 , X2 , and X3 remain constant.

The coefficient of the rice harvested land area variable obtained a result of -33719.425 which indicates that the rice harvested land area has a negative relationship with the dependence on rice imports in Indonesia. This negative effect indicates that a one-unit increase in the rice harvested area variable (X3) will reduce import dependence in Indonesia by 33719.425 units, assuming the variables X1, X2, and X3 remain constant.

Classical Assumption Test Results

Normality Test Results

Table 3. Results of normality test

One-Sample-Kolmogorov-Smirnov Test	
Kolmogorov-Smirnov Z	0.521
Asymp. Sig. (2 tailed)	0.949

Source: Results of data processing by the author using IBM SPSS 21

In Table 3, the results of the normality test show that the Asymp. Sig. (2-tailed) value is 0.949 and the Kolmogorov-Smirnov value is 0.521. The significance value is greater than 0.05, so based on the normality test criteria, it can be stated that the data in this study are normally distributed. These results indicate that the regression model of rice import dependence in Indonesia meets the normality assumption.

Multicollinearity Test Results

Table 4. Results of multicollinearity test

Variables	Tolerance	VIF	Information
Rice Consumption (X 1)	0.452	2,211	No Multicollinearity
Price of Rice (X 2)	0.792	1,263	No Multicollinearity

Rice Harvest Area (X_3)	0.508	1,968	No Multicollinearity

Source: Results of data processing by the author using IBM SPSS 21

Table 4 shows the results of the VIF value calculation in the multicollinearity test consisting of the rice consumption variable (X1) of 2.211, the price of rice (X2) of 1.263, and the area of rice harvest (X3) of 1.968. In addition, the tolerance value of each variable was obtained at 0.456; 0.792; and 0.508. Based on these results, the VIF value for each independent variable is below 10 and the tolerance value is above 0.10. These values indicate that the regression model has met the criteria in the multicollinearity test, where a low VIF value and a high tolerance value indicate the absence of a strong relationship between the independent variables in the regression model. This condition indicates that each independent variable is able to explain the dependent variable separately without any interference from the high linear relationship with other variables.

Heteroscedasticity Test Results

Table 5. Results of heteroscedasticity test

Variables	Sig.	Information
Rice Consumption (X_1)	0.538	No Heteroscedasticity
Price of Rice (X_2)	0.717	No Heteroscedasticity
Rice Harvest Area (X_3)	0.430	No Heteroscedasticity

Source: Results of data processing by the author using IBM SPSS 21

Based on Table 5. The results of the heteroscedasticity test using the Glejser method were carried out by regressing the absolute value of the residual against the independent variables in the model. The calculation results show that the significance value of each independent variable, namely rice consumption (X1) is 0.538; rice price (X2) is 0.717; and rice harvested area (X3) is 0.430. All calculation results for each variable are above 0.05, which is in accordance with the test criteria. If the significance value is greater than 0.05, the regression model does not experience symptoms of heteroscedasticity.

Autocorrelation Test Results

Table 6. Autocorrelation test results

Run Test
Asymp. Sig. (2-tailed)
0.314

Source: Results of data processing by the author using IBM SPSS 21

In Table 6, the calculation results show that the Asymp. Sig. (2-tailed) value in the run test is 0.314, which means it is greater than 0.05. This value indicates that the regression model does not experience autocorrelation symptoms based on the Run Test that has been conducted.

Hypothesis Test Results

Results of the Determination Coefficient Test (R2)

Table 7. Results of the coefficient of determination test (R2)

R	R Square

0.371	0.138

Source: Results of data processing by the author using IBM SPSS 21

Based on the test results in Table 7, the R- square value of 0.138 indicates that the independent variables in the model—rice consumption, rice price, and rice harvest area—explain 13.8% of the dependent variable. This value indicates that the independent variables' ability to explain Indonesia's dependence on rice imports is still relatively low. Meanwhile, the remaining 86.2% is explained by variables outside the research model that were not included in this analysis. This indicates that there are other variables outside this study that influence Indonesia's dependence on rice imports that are not included in the regression model used.

Simultaneous Test Results (F Test)

Table 8. Results of simultaneous test (F test)

Model	Df	F_{count}	F_{table}	Sig.
Regression	3	11,314	4.76	0.007
Residual	6			
Total	9			

Source: Results of data processing by the author using IBM SPSS 21

Based on the calculation results in Table 8, a significance value of 0.007 was obtained. These results indicate that the significance value is smaller than the 0.05 significance level (0.007 < 0.05). This condition proves that the independent variables simultaneously have a significant influence on the dependent variable. Thus, the model applied in this study is able to interpret the relationship between rice consumption, rice prices, and rice harvested area on Indonesia's dependence on rice imports together.

These results align with the theory of supply and demand, which states that the balance between consumption needs and production availability will influence the market conditions of a commodity. High rice consumption in Indonesia increases demand for rice, while production limitations, influenced by the area of rice harvest, result in inadequate domestic supply capacity to meet public demand.

Partial Test Results (T-Test)

Table 9. Partial test results (T-test)

Model	t_{count}	t_{table}	Sig.
Rice Consumption (X_1)	2,519	2,446	0.045
Price of Rice (X_2)	5,241	2,446	0.002
Rice Harvest Area (X_3)	-2,010	2,446	0.091
Rice Import Dependence (Y)			
Constant = -32242253.14			

Source: Results of data processing by the author using IBM SPSS 21

Table 9 shows the partial test results of the rice consumption variable (X1) is 2.519 and the t- table value is 2.446 (t count > t table). Then, the significance value of the variable is 0.045 which is smaller than 0.05. This shows that rice consumption has a partial influence on

dependence on rice imports in Indonesia. This result is in line with research conducted by Aisyah et al ., (2025), that partially rice consumption has an influence on dependence on rice imports in Indonesia but is not significant. This condition is caused by the amount of rice consumption that exceeds the country's rice reserves, so it requires rice supplies from abroad.

increase in consumption is not always matched by an increase in domestic rice production. As noted in research by Basia et al. (2025), dependence on rice imports is determined not only by the level of rice consumption but also by government policy. If the government implements a policy of limiting rice imports, the volume of rice imports can be reduced even though rice consumption increases. Therefore, an appropriate policy is needed for rice imports.

calculated t value for the rice price variable (X2) is 5.241 and the t table is 2.446 (calculated t > t table). The significance value for this variable is 0.002, which is smaller than 0.05. It can be concluded that rice prices have a partial influence on Indonesia's dependence on rice imports (Y). This research is in line with the research of Armaini & Gunawan (2016), when there is an increase in domestic rice prices, consumers will buy imported rice at a lower price, thus causing an increase in rice imports by Indonesia.

According to Ardhi's (2024) post, the increase in rice prices in 2024 could also be influenced by political conditions, particularly during the election period. During this period, rice is often used in campaign activities, which indirectly increases public demand. This increased demand also puts pressure on rice prices in the market, potentially strengthening the relationship between rising domestic prices and Indonesia's increasing dependence on rice imports.

Calculated t value for the rice harvested area variable (X3) is -2.010 and the t table is 2.446 (calculated t < t table). The significance value for this variable is 0.091, greater than 0.05. This indicates that the rice harvested area variable does not have a partial influence on import dependence in Indonesia (Y). These results indicate that changes in the area of rice harvested land do not directly determine the level of rice imports carried out by Indonesia.

This situation demonstrates that increasing harvested rice area is not the sole factor determining domestic rice availability. While in theory, increased harvested area can increase production, in practice, production capacity is also influenced by land productivity, cultivation technology, climate conditions, and distribution efficiency. Therefore, changes in harvested rice area do not necessarily have a direct impact; even if the harvested area changes, Indonesia's dependence on rice imports may persist.

CONCLUSION AND SUGGESTIONS

Based on the results and discussion in the analysis of the influence of rice consumption, rice prices, and the area of rice harvested land on dependence on rice imports in Indonesia from 2015 to 2024, it is evident that there is a simultaneous influence on dependence on rice imports in Indonesia. Partially, rice consumption and rice prices have a positive and significant effect on rice imports in Indonesia. This finding indicates that increased rice

consumption and increases in domestic rice prices tend to drive increased rice imports. Meanwhile, rice harvested area does not show a significant effect on rice imports in Indonesia. These results indicate that changes in harvested area do not necessarily directly affect the need for rice imports because there are other factors that also determine domestic production capacity, such as land productivity, climate conditions, agricultural technology, and food distribution and reserve systems.

The results of this study are expected to serve as a reference for the government in determining policy directions related to managing rice imports and strengthening national food security. The significant influence of rice consumption and rice prices on imports demonstrates the importance of maintaining a balance between public consumption needs, domestic production availability, and stable rice prices in the market. Furthermore, increased rice production needs to be accompanied by strengthening storage systems, managing food reserves, and effectively distributing rice to ensure optimal utilization and meeting future demand. Thus, efforts towards food self-sufficiency and reducing dependence on rice imports can be achieved in a more sustainable manner.

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