International Journal of Applied and Advanced Multidisciplinary Research (IJAAMR)
Vol.3, No.6, 2025: 417-426

The Relationship Between the Number of Farmers and Harvested Area to the Amount of Rice Production as a Food Asset in Ten (10) Cities in West Java Province in 2023

Adang Djatnika Effendi[1*], Budiman Soekarna[2], Muhammad Faris Ihsan[3]
Universitas Islam Negeri Sunan Gunung Djati Bandung
Corresponding Author: Adang Djatnika Effendi djeffadang@uinsgd.ac.id

A R T I C L E I N F O
Keywords: Rice, Farmers, Land, West Java Land

Received : 2 April
Revised : 10 May
Accepted: 20 June

A B S T R A C T
This study aims to analyze the relationship between the number of farmers and the area of harvested land on rice production in ten cities in West Java Province in 2023. The agricultural sector, especially rice, has an important role in supporting national food security. The data used include the number of farmers, the area of harvested land, and the volume of rice production obtained from official sources such as the Central Statistics Agency and the Department of Agriculture. The analytical method applied is multiple linear regression to assess the contribution and significance of each variable to rice production. The findings of the study indicate that both the number of farmers and the area of harvested land have a positive and significant relationship with rice production, where the area of harvested land provides a greater contribution. This study is expected to provide policy recommendations to local governments to increase rice production through more efficient management of human resources and land

DOI: https://doi.org/10.59890/ijaamr.v3i6.29
ISSN-E: 3026-2437
https://journal.multitechpublisher.com/index.php/ijaamr

INTRODUCTION

Rice is a major commodity in Indonesia's agricultural sector that plays a strategic role in maintaining national food security. West Java, as one of the provinces with the largest contribution to national rice production, has significant agricultural potential. With adequate agricultural land area and a large number of farmers, this province plays an important role in supporting the sustainability of Indonesia's agricultural system.

In an effort to increase rice production, two main factors that are often the focus of research are the number of farmers and the harvested area. The number of farmers indicates the number of workers directly involved in the production process, while the harvested area describes the potential land used to plant rice. Both are interrelated and have a significant influence on the amount of rice production in a region.

However, government policies, land conversion, climate change, and urbanization are some of the factors that can affect changes in the harvested area and the number of farmers. This phenomenon raises important questions about the extent to which the number of farmers and harvested area contribute to the amount of rice production in various regions, especially in 10 cities in West Java Province.

METHODOLOGY

This study applies a quantitative approach with multiple linear regression analysis method to evaluate the relationship between the number of farmers and harvested area on the level of rice production in 10 cities in West Java Province in 2023. The data used are secondary data obtained from official sources such as the Central Statistics Agency and the Department of Agriculture, covering the variables of the number of farmers, harvested area, and rice production. In this study, the method used to measure the relationship between the three main variables is statistical analysis with reliability value testing. Measurement of research reliability is carried out internally to ensure the quality of the data used. The tests carried out include Validity Test, Reliability Test, Heteroscedasticity Test, Normality Test, Correlation Test and Regression Test. Descriptive analysis techniques are also used to provide an overview of the pattern of harvested area, production, and rice productivity in West Java. The results of this study are expected to be a reference in policy planning that supports increasing rice productivity in the region. The results of this study not only reveal the importance of effective management of labor and land, but also provide strategic recommendations for local governments in increasing rice productivity to support national food security in a sustainable manner.

RESULT AND DISCUSSION

This study was conducted to analyze the relationship between the number of farmers and harvested area on the amount of rice production in 10 cities in West Java Province in 2023 with the following data:

Table 1. Data

NO	CITY	Number of Farmers	Rice Harvested Area (Ha) (Hectares)	City	Rice Production (Tons)
1	Bogor	179993	50999	Bogor	283267
2	Sukabumi	343945	93866	Sukabumi	512392
3	Cianjur	292536	115750	Cianjur	650123
4	Bandung	157875	49366	Bandung	300143
5	Garut	320256	74538	Garut	453788
6	Tasikmalaya	287669	69686	Tasikmalaya	391380
7	Ciamis	186667	53976	Ciamis	299124
8	Kuningan	110475	44816	Kuningan	261023
9	Cirebon	86544	82797	Cirebon	495878
10	Majalengka	143552	100124	Majalengka	558430

Source: West Java Central Statistics Agency

In 2023, the rice farming sector in West Java Province will be one of the main focuses in supporting national food security. This province, with its great agricultural potential, faces challenges and opportunities in maintaining rice productivity, especially in the 10 cities that are the research areas. The main factors such as the number of farmers and the harvested area are important variables that are interrelated in determining the level of rice production. The number of farmers represents the workforce directly involved in the rice cultivation process, while the harvested area reflects the availability of land used for production. The combination of these two factors contributes significantly to the harvest yield. However, the phenomenon of land conversion, urbanization, and other socio-economic dynamics have affected the distribution of the number of farmers and the harvested area in the region.

This study began with observations of rice production data that showed quite significant fluctuations in 10 cities in West Java Province. The data collected showed a pattern of relationships between the number of farmers, harvested area, and production volume that was not fully understood. Therefore, this study aims to examine the relationship between these three variables.

To ensure the quality of this research, an internal validity test will be carried out first. The validity of the measuring instrument shows the extent to which the

measuring instrument is in accordance with what is to be measured, so that it can be considered accurate and reliable.

Table 2. Validity Test

	Number of Farmers		Harvest Area	Rice_Production
Number of Farmers	1.000		.415	.389
Harvest Area	.415		1.000	.992
Rice_Production	.389		.992	1.000

Source: Processed Data

Based on the results of the validity test conducted, a value of > 0.3 was obtained for the three variables, indicating a positive and valid relationship. Thus, the variables of the number of farmers and the harvested area are declared feasible and can be used further because they have met the objectivity aspect in quantitative research.

Table 3. Reliability Test

Cronbach's Alpha	Crobach's Alpha Based on Standardized Items	N of Items
.598	.817	3

Source: Processed Data

The reliability test showed a result of 0.817 which indicates that the data used is very reliable and acceptable.

Table 4. Heteroscedasticity Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.993	.986	.981	1.825.213.146

Source: Processed Data

Table 5. Heteroscedasticity Test Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.993	.986	.981	1.825.213.146

a. Predictors: (Constant), Harvested Area, Number of Farmers
b. Dependent Variable: ABS_RES

The R Square result is 0.986 as an indication of no relationship between the absolute residual and the independent variable.

Table 6. Anova

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.589852E+11	2	7.9492596E+10	238.616	1.000
	Residual	3.33140302E+9	7	3.33140302E+9		
	Total	1.631174E+11	9			

Source: Processed Data

a. Dependent Variable: ABS_RES

b. Predictors: (Constant), Harvested Area, Number of Farmers

Anova results show a sig value in the regression >0.05, which is 1,000, indicating that there is no heteroscedasticity

Table 7. Linear Regression

		Unstandardized Coefficients				
Model		B	Std. Error	Standardized Coefficients (Beta)	t	Sig.
1	(Constant)	21423,922	20.514.240		1,044	1.000
	Jumlah_Petani	-,039	.072	-.027	-0,535	1.000
	Luas_Panen	5,535	.275	1.004	20,096	1.000

Source: Processed Data

a. Dependent Variable: ABS_RES

• Based on the coefficients table, the sig value is 1,000, thus strengthening the conclusion that no heteroscedasticity was found (homoscedastic data).

• Obtained

Table 8. Normalitas Test

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Produksi_Padi	.216	10	.200*	.924	10	.388
Jumlah_petani	.204	10	.200*	.915	10	.316
Luas_Panen	.190	10	.200*	.932	10	.471

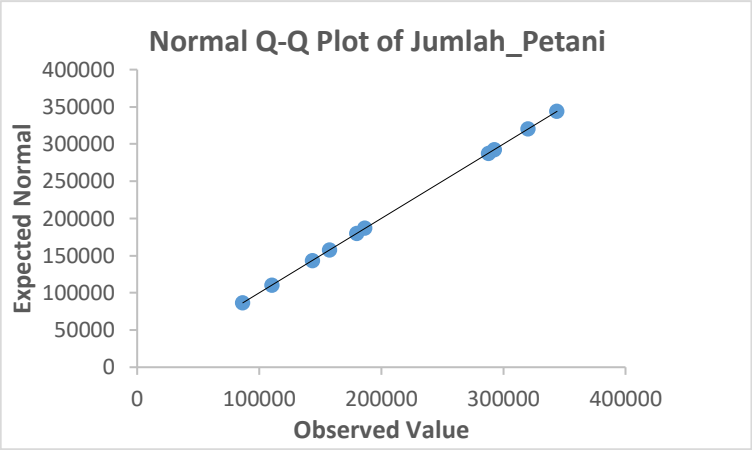

Figure 1. The Normality Test
Source: Processed Data

The normality test of the three data shows a sig value of more than 0.005, which indicates that the data is normally distributed. Therefore, a correlation test with Pearson can be performed.

Table 9. Correlation Test

		Number of Farmers	Harvest Area	Rice_Production
Number of Farmers	Pearson Correlation	1	.415	.389
	Sig. (2-tailed)		.234	.266
	N	10	10	10
Harvest Area	Pearson Correlation	.415	1	.992**
	Sig. (2-tailed)	.234		.000
	N	10	10	10
Rice_Production	Pearson Correlation	.389	.992**	1
	Sig. (2-tailed)	.266	.000	
	N	10	10	10

Source: Processed Data

Correlation is significant at the 0.01 level (2-tailed). Based on the results of the correlation test, it was obtained:

• A weak positive relationship between the number of farmers and the amount of rice production with a correlation coefficient of 0.389 and a significance value > 0.05, indicating that the relationship is not significant.

• A very strong positive relationship between the harvested area and the amount of rice production with a correlation coefficient of 0.992 and a significance value < 0.005, indicating that the relationship is very significant.

Table 10. Determination Test

Model	R	R Square	Adjusted R Square	Std. Error of The Estmate
1	.993[a]	.986	.981	18252.131

Source: Processed Data

a. Predictors: (Constant), Harvested Area, Number of Farmers
b. Dependent Variable: Rice Production

The closer the R value is to 1, the stronger the correlation is, and the r square value (determinant coefficient) with a value of 0.986 multiplied by 100, shows the magnitude of the X variable influencing the variability of the Y variable (98.6% of the y variable is influenced by the x variable).

So that Y = 21423.922 - 0.039X1 + 5.535X2 is obtained, indicating that 98.6% of the variability of rice production is explained by the number of farmers and the harvested area (R Square = 0.986), with the harvested area providing a dominant contribution.

The resulting regression equation is Y = 21423.922 - 0.039X1 + 5.535X2, where the constant of 21423.922 indicates that if all independent variables are zero, then the Amount of Rice Production remains at a value of 21423.922. This means that hypotheses 1 and 2 are not accepted. The variable Number of Farmers (X1) has a coefficient of -0.39, which indicates a negative effect on the Amount of Rice Production, but this effect is not statistically significant. Meanwhile, the variable Harvested Area (X2) has a coefficient of 5.535, which reflects a positive effect on the Amount of Rice Production, but this effect is also not significant. This shows that the two independent variables have not had a substantial impact on the dependent variable in this model.

Table 11. Anova

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	158985193400.000	2	79492596710.000	238.616	.000
	Residual	2331982119.000	7	333140302.700		
	Total	161317175500.000	9			

Source: Processed Data

a. Dependent Variable: Rice_Production
b. Predictors: (Constant), Harvested_Area, Number_of_farmers
A sig value <0.05 indicates that the equation of the line is linear

Table 12. Partial Test

Coefficients

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	T	Sig.
1	(Constant)	21423.922	20514.240		1.044	.331
	Number of Farmers	-.039	.072	-.027	-.535	.609
	Harvest Area	5.535	.275	1.004	20.096	.000

Source: Processed Data

a. Dependent Variable: Rice_Production

So that the Y value is obtained = 21423.922−0.039X1 +5.535X2

This study successfully analyzed the relationship between the number of farmers and harvested area on the amount of rice production in 10 cities in West Java Province in 2023. According to the results of multiple linear regression analysis, it shows a positive relationship between the number of farmers and harvested area.

Based on the results of the regression analysis, the relationship between the independent variables (number of farmers and land area) and the dependent variable (rice production amount) is very strong, with an R value of 0.993. The R Square value of 0.986 indicates that 98.6% of the variability in the amount of rice production can be explained by the number of farmers and land area, while the rest is influenced by other factors outside the model. The ANOVA test shows that this regression model is statistically significant (sig. = 0.000), with an F value of 238.616 indicating a very good predictive ability of the model. The regression equation obtained is , where each increase in one unit of land area (X2) will increase rice production by 5,535 units significantly (sig. = 0.000), while the number of farmers (X1) does not have a significant effect on rice production (sig. = 0.609). Thus, land area is a more dominant factor in influencing rice production than the number of farmers.

CONCLUSIONS

The validity test results showed a value of >0.3, indicating valid data, while the reliability test produced a Cronbach Alpha value of 0.817, indicating reliable data. The normality test showed that the data was normally distributed (sig value>0.005), while the heteroscedasticity test confirmed that there was no heteroscedasticity problem (sig value>0.05). The Pearson correlation test showed a weak positive relationship between the number of farmers and rice production (r = 0.389, sig>0.05) and a very strong positive relationship between harvested area and rice production (r = 0.992, sig <0.005). The resulting regression model obtained Y = 21423.922 - 0.039X1 + 5.535X2, indicating that 98.6% of the variability in rice production was explained by the number of farmers and harvested area (R Square = 0.986), with harvested area providing a dominant contribution. The results of this study indicate that optimal land management is a major factor in increasing rice productivity, while labor management also requires attention so that its impact on productivity is maximized. This study is expected to be a strategic reference for local governments in formulating effective and sustainable agricultural sector development policies to support national food security.

This study is expected to be able to provide real contributions to local governments in formulating strategic policies for more effective and sustainable agricultural sector development. Thus, the findings of this study can serve as an important reference to support national food security, especially by optimizing the management of land and labor resources in West Java Province.

This section gives you the opportunity to thank your colleagues who provided suggestions for your paper. You can also express your appreciation for the financial assistance you received, in completing this research.

REFERENCES

B. P. S. P. J. Barat, "Jumlah Petani Pengguna Lahan Pertanian dan Petani Gurem Menurut Kabupaten/Kota di Provinsi Jawa Barat (orang), 2023," Badan Pusat Statistik , 2024 Januari 2023. [Online]. Available: https://jabar.bps.go.id/id/statistics-table/1/NjY1IzE=/jumlah-petani-pengguna-lahan-pertanian-dan-petani-gurem-menurut-kabupaten-kota-di-provinsi-jawa-barat-orang-2023.html. [Accessed 12 Desember 2024].

B. P. Statistik, "Luas Panen Tanaman Padi (Ha) (Hektar), 2023-2024," Badan Pusat Statistik Provinsi Jawa Barat, 18 November 2024. [Online]. Available: https://jabar.bps.go.id/id/statistics-table/2/MzAwIzI=/luas-panen-tanaman-padi-ha-.html. [Accessed 12 Desember 2024].

B. P. S. P. J. Barat, "Produksi Padi Menurut Kabupaten/Kota (Ton), 2023-2024," Badan Pusat Statistik, 18 November 2024. [Online]. Available: https://jabar.bps.go.id/id/statistics-table/2/NTIjMg==/produksi-padi-menurut-kabupaten-kota--ton-.html. [Accessed 12 Desember 2024].

I. Prisgunanto, "PENGARUH SOSIAL MEDIA TERHADAP TINGKAT KEPERCAYAAN BERGAUL SISWA," Jurnal Penelitian Komunikasi dan Opini Publik , vol. 19, no. 125, pp. 105-110, 2015.