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Analysis of Factors Affecting Organic Rice Exports in Indonesia

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Abstract---The market opportunities from organic farming which are getting bigger globally are being utilized by farmers in various regions in Indonesia and have succeeded in cultivating organic rice and have quite wide market coverage even abroad. This research aims to determine the factors that influence the volume of organic rice exports in Indonesia. The results of multiple linear regression prove that the domestic price of organic rice, the international price of organic rice and the dollar exchange rate against the rupiah influence the volume of organic rice exports in Indonesia. The price of organic rice, both domestic and international, has a negative effect on organic rice exports. Meanwhile, the dollar exchange rate against the rupiah has a positive effect on organic rice exports. The policy implications based on the research results are (a) Seeing the research results showing that the price of domestic organic rice has a negative and significant effect on organic rice exports, the government must maintain prices (inflation), especially the price of domestic organic rice. (b) When the rupiah depreciates, organic rice exports will increase, but exchange rate stability must be maintained by the government. So the increase in organic rice exports is the result of increased rice production, not just the exchange rate.

Keywords---Analysis of factors, consumer knowledge, exports, organic farming, organic rice in Indonesia.

Introduction

Organic farming has now developed widely in Indonesia. This can be seen in terms of cultivation, production facilities, product types, marketing, consumer knowledge, and community organizations or institutions that are interested in organic farming. Figure 1. shows that from 2007 to 2016, organic agricultural land and organic rice land were still stagnant, but starting in 2017, there was an increase in organic agricultural land and organic rice land in Indonesia.

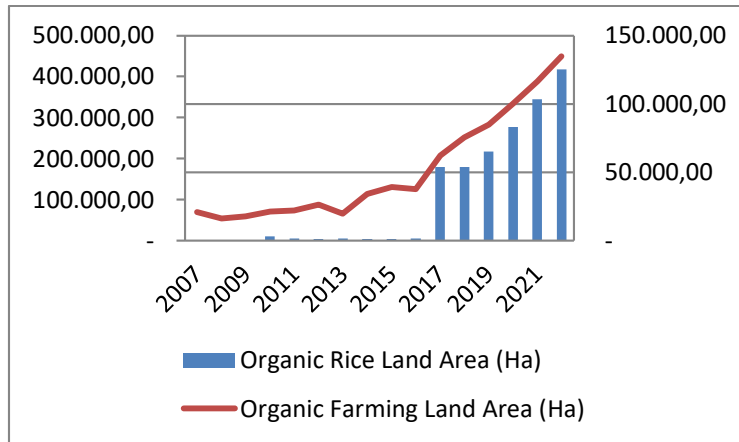


Figure 1. Total area of organic agricultural land in Indonesia (Ha)
 Source: Indonesian Organic Agriculture Statistics (SPOI), 2019

Every year, demand from countries outside Indonesia for organic rice reaches 100 thousand tons. However, Indonesia only can export around 9 thousand tons of organic rice each planting season. Since 2017, Indonesia has sent 2,100 tons of organic rice to five countries, namely the Netherlands, Bangladesh, Malaysia, Belgium and the United States. 2018 was the peak year with exports reaching 1,400 tons of organic rice. However, export volume experienced a decline in the year

In 2019 it was 230 tons and in 2020 it was 341 tons. This decline was mainly caused by tight international trade policies due to the COVID-19 pandemic. However, the amount of exports still does not reach 10 percent of global market needs. Indonesia is still far behind compared to neighboring countries such as Thailand and Vietnam in terms of becoming an exporter of organic rice.

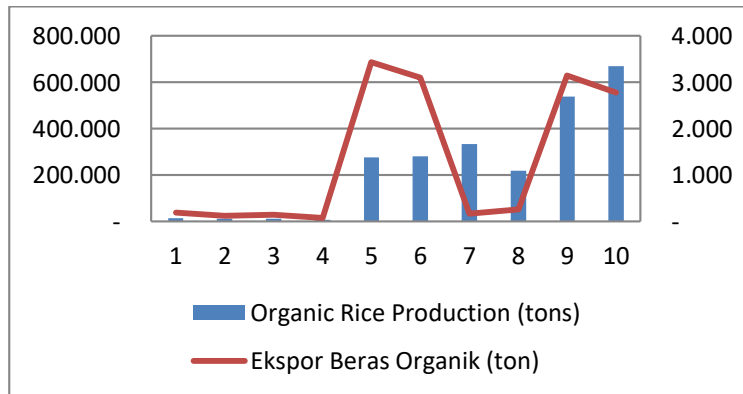


Figure 2. Production and Export of Organic Rice in Indonesia (Tons)
 Source: Organic Certification Institute

Organic market opportunities are utilized by farmers in various regions in Indonesia and have succeeded in cultivating organic rice and have quite wide market coverage. Organic rice produced by farmers from various regions in Indonesia has won awards at both national and international levels. One of the awards received came from the Sleman Organic Certification Institute (LSOS), which is an organic certification center and a reference for organic farmers in Indonesia. Currently, the price of dry grain for organic rice reaches IDR 8,000, while the price of dry grain for conventional rice ranges from IDR 5,500 to IDR 6,000.

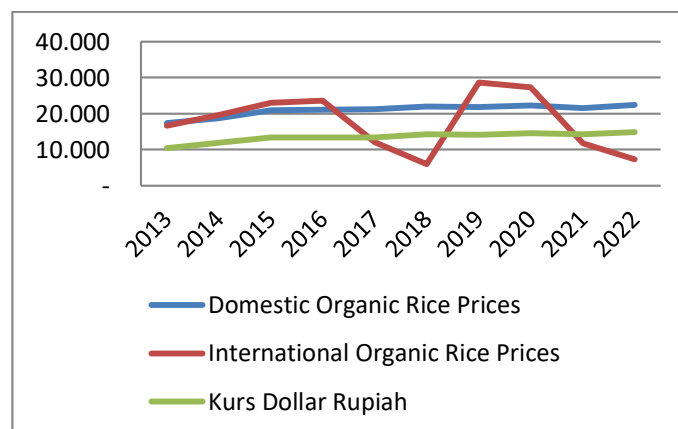


Figure 3. Rupiah Dollar Exchange Rate and Domestic Organic Rice Prices and International (Rupiah)

Source: Indonesian Ministry of Trade

Based on this background, it is necessary to carry out an analysis to find out what factors influence organic rice exports in Indonesia and how these influencing factors have an impact on organic rice exports in Indonesia.

Method

This research uses descriptive analysis methods and is analyzed using two analytical methods, namely qualitative analysis and quantitative analysis. The analytical method used is multiple linear regression with a natural logarithm transformation model. Data search and data processing activities were carried out in March-May 2023. The data used in this research is secondary data. This data was collected from several government agencies such as: BPS (Central Statistics Agency), BI (Bank Indonesia), Ministry of Trade, Ministry of Agriculture, Directorate General of Plantations, and Organic Certification Institute. This research was conducted using the Classic Assumption Test, Normality Test, Heteroscedasticity Test, Multicollinearity Test, Autocorrelation Test, and Hypothesis Test (Coefficient of Determination (R²), F Test, and t-test).

Results and Discussion

Results

Descriptive Analysis

In the modern era, the world is experiencing new trends in the agricultural industry. This trend emphasizes the importance of a healthy lifestyle and adopts the motto "Back to Nature". The public is increasingly aware of the negative consequences of the use of unnatural chemicals such as inorganic fertilizers, inorganic pesticides and growth hormones on human health and the environment (Gonzalez et al., 2006). Therefore, people are increasingly careful in choosing food that is safe and sustainable for health and the environment. In this case, organic farming is a solution used to produce healthy and nutrient-rich food by utilizing organic farming technology (Beasley et al., 2005).

One example of organic farming is organic rice. The various benefits of organic rice for the environment include using an environmentally friendly production system and not polluting the environment with synthetic chemicals. Apart from that, organic farming can also create a balanced and sustainable ecosystem (Jouzi et al., 2017; Leifeld, 2012).

Every year, demand from countries outside Indonesia for organic rice reaches 100 thousand tons. However, Indonesia only can export around 9 thousand tons of organic rice each planting season. Since 2017, Indonesia has sent 2,100 tons of organic rice to five countries, namely the Netherlands, Bangladesh, Malaysia, Belgium and the United States. 2018 was the peak year with exports reaching 1,400 tons of organic rice. However, export volume decreased in 2019 to 230 tons and in 2020 by 341 tons. This decline was mainly caused by tight international trade policies due to the COVID-19 pandemic. However, the amount of exports still does not reach 10 percent of global market needs. Indonesia is still far behind compared to neighboring countries such as Thailand and Vietnam in terms of becoming an exporter of organic rice (Yodkhum et al., 2017).

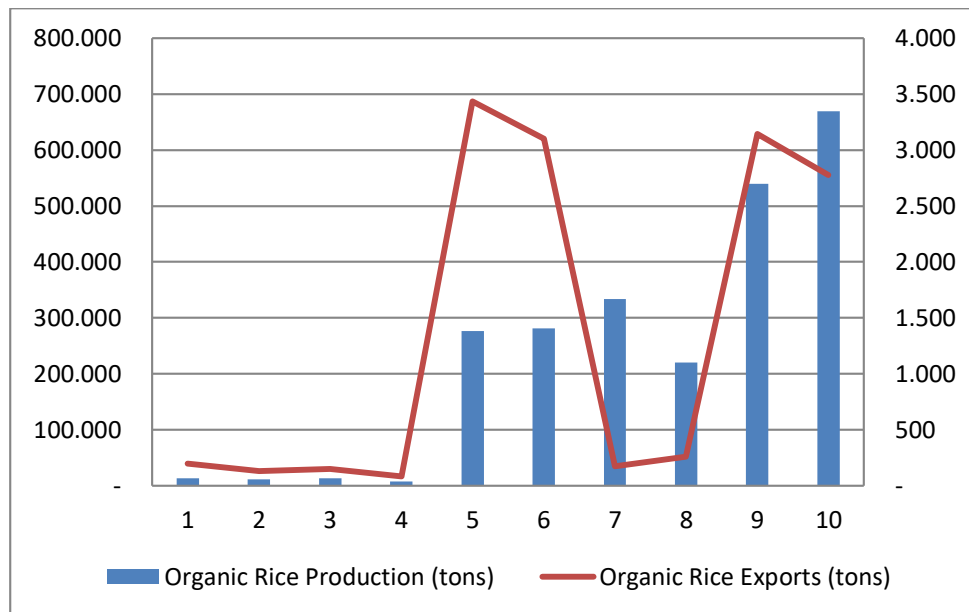


Figure 4. Production and Export of Organic Rice in Indonesia (Tons)

Source: Organic Certification Institute

Based on Figure 4, organic rice production in Indonesia continues to experience an increasing trend every year. The same thing happens to organic rice exports, which always experience an increasing trend. However, in 2020, there was a decline in both production and export volume of organic rice. It is suspected that the COVID-19 pandemic is the main cause of this phenomenon. Strict international trade policies due to the COVID-19 pandemic have caused a decline in the volume of organic rice exports from Indonesia to export destination countries (Park & Kim, 2008).

In terms of trends, the increase in production and export volume of organic rice was seen significantly starting in 2017. Meanwhile, in the previous year, the production and export volume of organic rice was still less visible. The trend of healthy lifestyles and the widespread dissemination of information via social media are the main causes of the increasing demand for organic rice (He et al., 2018). This is a catalyst for farmers to grow crops in organic agriculture as market share increases, both domestically and abroad. However, the COVID-19 pandemic has had an impact on organic farming in Indonesia, as evidenced by the decline in production and export volume of organic rice. However, as conditions improved after the COVID-19 pandemic, there has also been an increase in organic rice production and exports in Indonesia (Bolek, 2020).

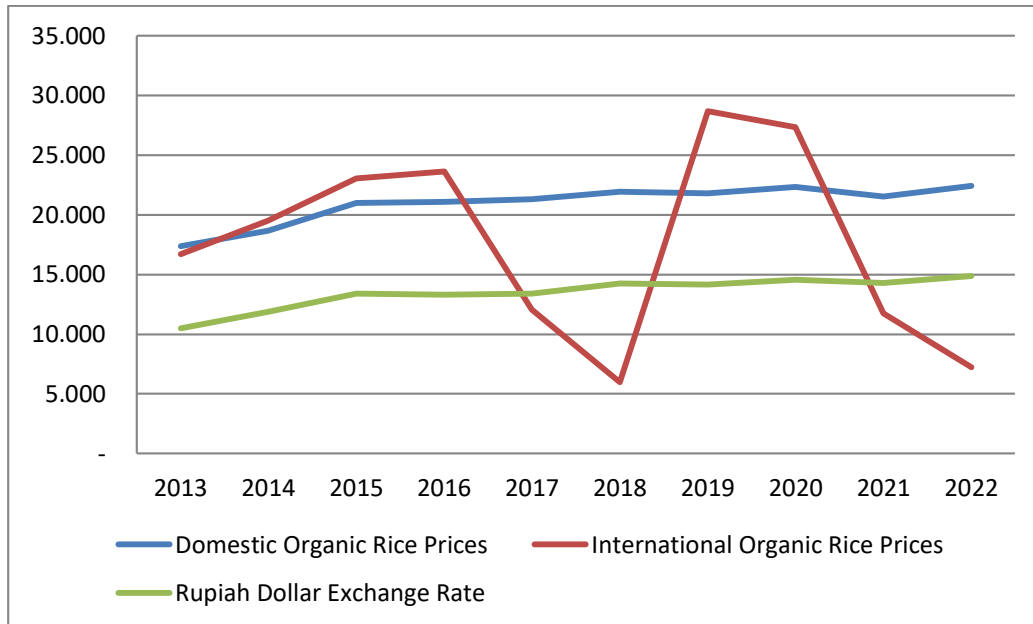


Figure 5. Rupiah Dollar Exchange Rate and Domestic Organic Rice Prices and International (Rupiah)
 Source: Indonesian Ministry of Trade

The price of domestic organic rice in the Indonesian market shows an increasing trend every year, in line with the rupiah exchange rate against the US dollar. This trend of increasing domestic organic rice is a good signal for Indonesian farmers to expand their business in organic farming, especially organic rice. On the other hand, international rice prices show a downward trend in 2017, 2018, 2021 and 2022. This is likely influenced by the economic conditions of the countries where organic rice is exported.

Discussion

F test

This test was carried out to find out whether all independent variables had a joint influence on the volume of organic rice exports. From the results of data processing using SPSS, a fairly large F-count value was obtained, namely 65.019 with a significance level of 0.000 (smaller than the value $\alpha = 0.05$) so that the Regression Coefficient is acceptable. In other words, together all independent variables influence the volume of organic rice exports.

t-test

Next, partial testing was carried out on all independent variables which were thought to influence the volume of organic rice exports. The results are as follows:

Table 1
 Regression Coefficient Values and Their Significance Values

Independent Variable	Coefficient	Standard Error	t value	Significance
Constant	2990,773	1794,710	1,666	0.157
Organic Rice Production	-0.001	0.001	-0.712	0.508
Domestic Organic Rice Prices	-0.998	0.257	-3,876	0.012
International Organic Rice Prices	-0.062	0.022	-2,889	0.034
Dollar to Rupiah exchange rate	1,467	0.283	1,651	0.004

Source: Data Processing Results

Of the four independent variables analysed in the research, only one variable does not affect organic rice exports, namely organic rice production. These results are similar to research (Putra, 2013). Meanwhile, three other variables

influence Indonesia's organic rice exports, namely the domestic price of organic rice, the international price of organic rice, and the dollar exchange rate against the rupiah.

The domestic organic rice price coefficient is -0.998. This shows that every increase in the price of domestic organic rice by 1 rupiah will reduce the volume of organic rice exports by 0.998 tons. This is following research conducted previously by Lubis, 2010, Siburian, 2012, and Tyanma Maygirtasari, 2015.

The phenomenon of increasing domestic rice prices has a negative effect on organic rice exports due to securing food stocks, several countries have decided to stop exporting rice to secure their food stocks. This usually occurs when domestic rice prices rise, indicating that domestic demand exceeds supply. In this situation, the country may choose to prioritize domestic needs over exports*. The policy of producing countries, currently, is that 19 countries limit food exports to secure their domestic reserves. This usually occurs when domestic rice prices rise, indicating that domestic demand exceeds supply†.

The international organic rice price coefficient is -0.062. This shows that every increase in the international price of organic rice by 1 rupiah will reduce the volume of organic rice exports by 0.062 tonnes. This is following research conducted previously by Rahmawati, 2015, Siburian 2012, and Sidabalok, 2017.

The phenomenon of increasing international rice prices has a negative effect on organic rice exports due to the El Nino weather phenomenon. Weather phenomena such as El Nino can affect crop yields widely throughout the world, including Indonesia. This could lead to a decrease in rice production, which in turn could lead to an increase in domestic rice prices. In this situation, countries may choose to reduce rice exports to ensure adequate domestic supplies (Koopman et al., 2012; Vannoorenberghe, 2012).

The dollar exchange rate coefficient against the rupiah is 1.467. This shows that every 1-point increase in the dollar exchange rate against the rupiah will increase the volume of organic rice exports by 1,467 tons. This is following previous research conducted by Rahmawati, 2015, Lubis, 2010, Setyawan, 2016, Radifan, 2014, and Sidabalok, 2017.

Model Feasibility Test

An important part of Regression Analysis is assessing the feasibility of the model. Assessment of the feasibility of the model is carried out by looking at the Termination Coefficient value, either the usual (R²) or the adjusted one (R² Adjusted). The closer the value of the Termination Coefficient to 1, the better and more feasible the regression model. From the processing results, the R² value = 0.981. This means that the Linear Regression Model as mentioned above can explain around 98.10 percent of the variation in the value of the dependent variable, namely Indonesian organic rice exports.

Classic assumption test

Normality test

The normality test of a model can be carried out in various ways, but in this research, the normality test will be carried out using the Normal PP Plot of Regression Test from Residuals.

*<https://www.liputan6.com/hot/read/5415493/pembebab-harga-beras-naik-2023-begini-penanganan-government>

†<https://Ekonomi.republika.co.id/berita/s3r5zg502/bi-beberkan-pembebab-harga-beras-naik-dan-tak-turuturuturun>

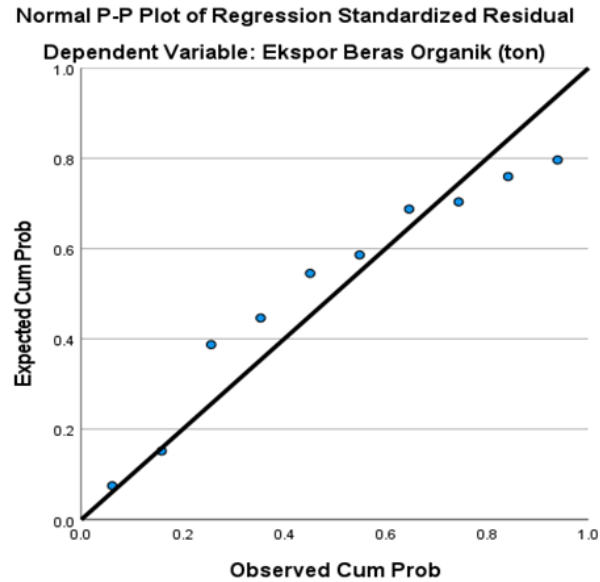


Figure 5. Normal PP Residual Regression Plot

In Figure 5, it can be seen that the residual distribution points are around or close to the diagonal line, so it can be concluded that the data in this study is normally distributed.

Heteroscedasticity Test

The heteroscedasticity test aims to determine whether, in the regression model, there is an inequality of variance from the residuals of one observation to another observation. The heteroscedasticity test can be seen with a graphic plot (scatterplot) where the distribution of the points generated is formed randomly, does not form a particular pattern and the direction of the distribution is above or below the number 0 on the Y axis.

The basis for decision-making using scatterplot images is as follows, if the scatterplot graph shows dots that form a certain, regular pattern (e.g. wavy, widening then narrowing), then it can be concluded that a heteroscedasticity problem has occurred. If on the scatter plot graph, the points spread above and below zero on the Y axis and do not form a certain regular pattern (e.g. wavy, widening then narrowing), then it can be concluded that there is no heteroscedasticity problem (same variance/homoscedasticity)

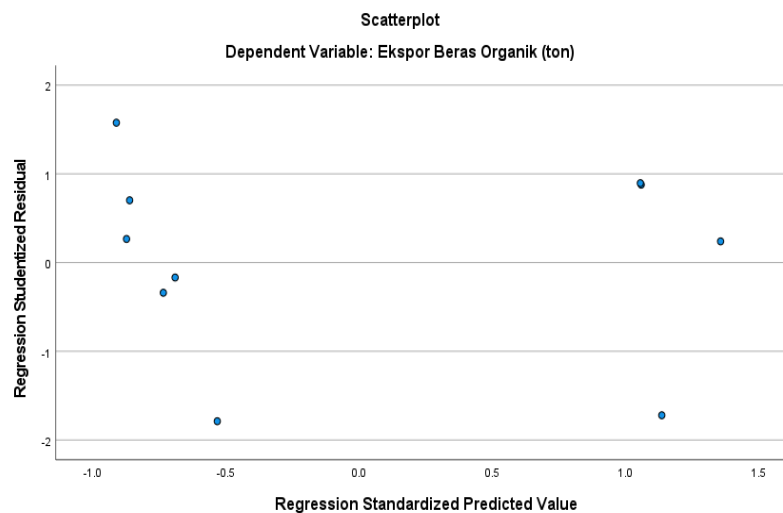


Figure 5. ScatterPlot Residual Regression

From the scatterplot graphic image above, it can be seen that the dots are spread out and do not form a particular pattern. Thus it can be concluded that heteroscedasticity does not occur.

Autocorrelation Test

The Durbin Watson value in this study was $dw=2.204$. By criteria:

$dL=0.2427$

$dU=2.8217$ $dL=0.2427 < dw=2.204 < dU=2.8217$

$dL=0.2427 < (4-dw=1.796) < dU=2.8217$

The conclusion that can be drawn when conducting an autocorrelation test using Durbin Watson is that it is inconclusive or cannot be concluded, so another autocorrelation test is carried out with the Run Test.

Table 2
Run Test Results

Run Test Results	Unstandardized Residuals
Asymp. Sig. (2-tailed)	0.314

Source: Data Processing Results

To detect autocorrelation by paying attention to the Asymp section. Sig. (2-tailed), or can also be called p-value. By using $\alpha = 5$ percent and the hypothesis H_0 : there is no autocorrelation vs H_1 : there is autocorrelation, the rejection area for this test is to reject H_0 if the p-value $< \alpha$. In the Runs Test table output above, the p-value is 0.314, where this value is greater than α (0.05). Thus the decision taken is to fail to reject H_0 and it can be concluded that there is no autocorrelation.

Multicollinearity Test

Multicollinearity detection is carried out using the Variance Inflation Factor (VIF) value, where if the VIF value is no more than 10, then the model is free from multicollinearity (Ghozali, 2013). The hypothesis for this multicollinearity test is:

H_0 : $VIF > 10$, indicating multicollinearity between the independent variables.

H_1 : $VIF < 10$, indicating there is no multicollinearity between the independent variables.

Table 3
Run Test Results

Variable	VIF value
Organic Rice Production	3,146
Domestic Organic Rice Prices	2,050
International Organic Rice Prices	3,470
Rupiah Dollar Exchange Rate	2,947

Source: Data Processing Results

Based on Table 3, it can be seen that the VIF value is < 10 , indicating that there is no multicollinearity between the independent variables.

Conclusion

Based on the initial research objectives, it can be concluded that the factors that influence organic rice exports, especially in Indonesia, are domestic organic rice prices, international organic rice prices and the dollar exchange rate against the rupiah. The price of organic rice, both domestic and international, has a negative effect on organic rice exports. Meanwhile, the dollar exchange rate against the rupiah has a positive effect on organic rice exports.

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