

IMPACT OF RICE PRODUCTION, RICE SUPPLY AND RICE PRICES ON FOOD SECURITY IN NORTH TIMOR DISTRICT

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Abstract: This research was conducted in North Central Timor District, with the aim of analyzing food security by making the variables of rice production, rice supply, and rice prices as indicators that have an impact on food security. The analytical approach used is quantitative analysis with the ordinary least square. The results of the research analysis show that rice production has a positive and significant effect on food security. The availability of rice affects food security. Meanwhile, the price of rice has no effect on food security. Rice is a basic need so that when there is a price change it does not affect food security in the community. From the results of this study, it is hoped that the local government will carry out an extensification and diversification program for agricultural land so that there will be more and more variety in preparing food security for the people as well as adding knowledge and references for writers related to food security for the people of North Central Timor.

Keywords: rice production, rice availability, rice prices, food security

Abstrak: Penelitian ini dilakukan di Kabupaten Timor Tengah Utara, dengan tujuan menganalisis ketahanan pangan dengan menjadikan variabel produksi beras, ketersediaan beras, dan harga beras sebagai indikator yang berdampak pada ketahanan pangan. Pendekatan analisis yang digunakan adalah analisis kuantitatif dengan kuadrat terkecil biasa. Hasil analisis penelitian menunjukkan bahwa produksi beras berpengaruh positif dan signifikan terhadap ketahanan pangan. Ketersediaan beras mempengaruhi ketahanan pangan. Sedangkan harga beras tidak berpengaruh terhadap ketahanan pangan. Beras merupakan kebutuhan pokok sehingga ketika terjadi perubahan harga tidak mempengaruhi ketahanan pangan di masyarakat. Dari hasil penelitian ini diharapkan pemerintah daerah melakukan program ekstensifikasi dan diversifikasi lahan pertanian sehingga semakin banyak variasi dalam mempersiapkan ketahanan pangan bagi masyarakat serta menambah pengetahuan dan referensi bagi penulis. terkait ketahanan pangan bagi masyarakat Timor Tengah Utara.

Kata kunci: produksi beras, ketersediaan beras, harga beras, ketahanan pangan

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INTRODUCTION

The COVID-19 pandemic situation has caused a lot of disruption in economic activities in all business sectors, including the agricultural sector. One of the issues that need to be anticipated also related to the impact of Covid-19 on people's lives is the availability of food for the community. With the Food Security Movement (GKP) promoted by the Indonesian Ministry of Agriculture in the midst of the threat of the corona virus which continues to undermine various aspects of life, in principle, it must be supported by various parties, especially farmers and agricultural extension workers as spearheads and drivers of the community's agricultural sector. A very serious and very serious disturbance was detected in the flow and distribution system as well as the marketing of agricultural products, so it is necessary to encourage farmers and extension workers to accelerate the planting of agricultural commodities to support the GKP program nationally.

In order to improve domestic food security through the Extension and Human Resources Development Agency, the Ministry of Agriculture in 2020 has formulated four methods of action to achieve food security, namely: 1) Increasing production capacity. The Ministry of Agriculture invites agricultural actors to accelerate rice planting in the second period of planting season with an area of 6.1 million ha and the development of swamp land in Central Kalimantan Province covering an area of 164,598 ha, including the program for intensification of 85,456 ha of swamp land and extensification of agricultural land covering an area of 79,142 ha. 2) Diversification of local food, by developing local food diversification based on local wisdom that focuses on one main commodity. 3) Strengthening reserves and food logistics systems by strengthening the rice reserves of the provincial government, then strengthening the rice reserves of the district/city governments. 4) Development of modern farming patterns, through the development of smart farming and the use of screen houses to increase the production of horticultural commodities outside the growing season, the development of farmer corporations and the development of food estates to increase the production of main food (rice/corn) (BKP Ministry of Agriculture, 2019).

In the conditions of the COVID-19 pandemic, the Ministry of Agriculture has a short, medium and long term agenda. In the short term, the SOS or emergency

agenda includes maintaining food price stability and building buffer stocks (Umanailo, 2018). Meanwhile, the medium-term agenda is stated by continuing the post-Covid-19 labor-intensive program, diversifying local food, helping food availability in the regions, anticipating drought, maintaining agricultural work spirit through the assistance of agricultural production and machinery, encouraging family farming, helping smooth food distribution, increasing agricultural exports. , strengthen the boarding house. Meanwhile, the permanent long-term agenda is carried out by encouraging an increase in production by 7 percent per year and reducing losses to 5 percent.

Rice productivity tends to stagnate with an average increase in productivity of 0.24% per year while the average growth in paddy fields is -0.71% per year. Changes in productivity factors in the form of increases or decreases have a more significant effect on national rice production compared to changes in the area of paddy fields. The decrease in the area of rice fields which is not significant, does not affect the decline in national rice production. Productivity factors play a more important role in increasing rice production. If the area of paddy fields decreases, rice production does not always decrease. This is because there are programs that increase rice productivity. However, when productivity decreases, rice production also decreases (Syifa, 2021).

In maintaining community food security, it is necessary to have a national food reserve which is a food stock supply throughout the territory of the Republic of Indonesia in order to fulfill consumption and face problems of food shortages, supply and price disruptions as well as anticipating emergency conditions. Food reserves carried out by the Government are food stocks that are controlled and managed by the Government. Meanwhile, food reserves by the provincial and district/city governments are food supplies controlled and managed by the provincial and district/city governments (Rachmaningsih & Priyarsono, 2012). The food reserves are aimed at meeting food needs as well as managing disaster emergencies and post-disaster food insecurity, fulfilling international cooperation in the field of social assistance and controlling domestic rice price fluctuations. Meanwhile, the target is for people who are in an emergency situation and experiencing food insecurity after the disaster as well as people who are affected by changes in food price fluctuations. Government programs in order to support

food self-sufficiency, especially rice, efforts are needed to increase sustainable rice production (Neonbota & Kune, 2016).

Public company Logistics Affairs Agency (PERUM-BULOG) in managing the central government's food reserves is based on the RI Presidential Instruction Number 3 of 2012 in dictum 5 (b): Procurement and distribution of government rice reserves (CBP) in order to maintain rice price stability, overcome emergencies, disasters and food insecurity, international assistance and/or cooperation as well as other needs determined by the Government (Mahdalena & Supriana, 2015). The role of rice as a staple food in Indonesia is currently difficult to substitute with other types of staple food. Even dependence on rice commodities is like an uncontrollable virus. Areas in eastern Indonesia that used to make non-rice staple foods such as corn and sago over time have instead turned to consuming rice as a staple food. It is not surprising that today the ratio of Indonesian consumers compared to the population continues to increase so that Indonesian rice consumption is the largest consumption in the world (Septiadi & Joka, 2019).

At the regional level, North Central Timor district, food crop production during 2022 generally fluctuated compared to the previous year. For food crops whose planting time is relatively precise and adaptive to fluctuations in rainfall but the production results have not been maximally obtained, yields tend to improve, such as upland rice, corn, cassava, peanuts and green beans (Neonbota & Kune, 2016). Meanwhile, the production of crops such as lowland rice and sweet potato has decreased slightly because the average

rainfall is only normal after the fertilization phase of these plants has passed (Joka & Mambur, 2020). The availability of food production from rice commodities during 2021 is 38 409 tons of milled dry grain (conversion to rice: 28 374 tons) or an increase of 21.94 percent from the previous year. Partially, lowland rice production decreased by 13.98 percent and upland rice production increased by 212.80 percent. The increase in rice production this year is thought to be caused more by natural factors and also by an increase in land area. The availability of corn production which is the staple food for most TTU people during 2021 is 62,948 tons of dry shells or an increase of 78.01 percent from the previous year (Dinas Pertanian TTU, 2021).

This study was conducted to determine the impact of several determinant variables that affect food security in TTU district. The production of each legume crop was as follows: peanuts rose 0.14 percent, green beans rose 200 percent, while soybean production was the same as last year at 4 tons. The availability of production for starchy foods during 2021, namely cassava, increased by 77.93 percent, and sweet potatoes actually decreased by 34.38 percent (Table 1). Allegedly due to natural adaptive ability or timeliness of planting for some commodities with fluctuating rainfall conditions. The development areas for lowland, rain-fed and upland rice as well as secondary crops (maize, tubers and beans) and fruit crops are prioritized in all sub-districts (Septiadi & Joka, 2019). Meanwhile, vegetable crops are focused on West Miomaffo District. The emphasis on commodity development is prioritized on corn, peanuts and garlic as potential commodities (TTU Distan, 2021).

Table 1. Land area (ha), production (tons) and productivity (kw/ha) food crops in TTU District, 2021

Types of food crops	Land area (Ha)	Production (ton)	Productivity (Kw/Ha)
Paddy	15.019	40.668	27.08
- Rice Paddy	8.365	31.760	37.97
- Paddy Fields	6654	8.908	13.39
Corn	27.092	56.655	20.91
Cassava	5.202	53.927	103.67
Sweet potato	273	2227	81.58
Peanuts	724	510	7.05
Mung beans	275	232	8.44
Soybeans	-	-	-

The definition of food itself has a broad dimension. Starting from food that is essential for a healthy and productive human life (balance of calories, carbohydrates, protein, fat, vitamins, fiber, and other essential substances); as well as food consumed for social and cultural interests such as for pleasure, fitness, beauty and so on (Abidin, 2015). Thus, food does not only mean staple food and clearly does not only mean rice but food related to various other things. Food is one of the basic human needs that is part of human rights (HAM), as stated in the Universal Declaration of Human Rights in 1948, as well as Law Number 7 of 1996 concerning Food (Faqih & Rohayati, 2016).

The definition of food according to the ingredients that are eaten daily to meet the needs for maintenance, growth, work, tissue replacement and regulate processes in the body. In addition, there is also an understanding of what is meant by staple food, namely food that is eaten regularly by a group of residents in large enough quantities, to produce most of the energy sources (Nawawi et al., 2018). Food is consumed by humans to obtain energy in the form of energy to carry out life activities (including breathing, working, building, and replacing damaged tissue). Food is a fuel that serves as a source of energy.

Meanwhile, according to the POM, food is food for consumption which is not only in the form of rice, but also vegetables, fruits, meat, both poultry and beef, fish, eggs, and water. Food security according to Law Number 7 of 1996 concerning Food Article 1 paragraph 17 is the condition of the fulfillment of sufficient food, both in quantity and quality, as well as safe, equitable, and affordable. Meanwhile, food security according to the Rome Declaration and World Food Summit Plan of Action (2007) is "... when all people, at all time, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and foods preferences for an active and healthy life" (Umanailo, 2018).

The main food commodities consumed by the Indonesian people are rice, corn, tubers, and sago. However, the majority of Indonesian people choose rice as a source of daily food fulfillment. Based on statistical data as reported by the Central Statistics Agency (2020), people's preference for consuming rice is higher than other food commodities with an average consumption of 2,047 kilograms per capita per week. Other types of food such as tubers, corn, and

sago have not been able to replace the position of rice as the main staple food in the household. Hence, rice is a commodity with inelastic demand, where price changes almost do not cause changes in the amount of consumer demand.

In general, food security is a guarantee that the food and nutritional needs of each population are the main requirements in achieving a sufficient degree of health and welfare (Khasanah & Jasman, 2019). Factors that affect food security: land, infrastructure, technology, expertise and insight, energy, funds, physical environment/climate, work relations and availability of other inputs

METHODS

This research was conducted on people who have a working background as farmers in TTU district which includes 12 rice-producing districts for 2 months (April-May 2022). The research data are secondary data obtained from the Central Statistics Agency (BPS) of TTU district. The sampling technique used is simple random sampling, namely the number of samples consisting of a number of elements selected at random, where each element of the population has an equal chance of being selected as a sample.

The type of research in this study is quantitative research, using the dependent variable, namely food security which is a comparison of production with consumption in TTU district. While the independent variables are rice supplies, rice production and rice prices prevailing in the consumer market. The method of data collection is by using the documentation method to determine the amount of rice supply, the amount of rice production, the price of rice and the ratio of food security. In determining the method of estimating the panel data regression model, the Chow test and Hausman test were used. The Chow test is used to decide whether to use the Common Effect Model or the Fixed Effect Model. While the Hausman test to decide whether to use the Fixed Effect Model or the Random Effect Model. The panel data in this study is data for 2021 for 12 months in 12 rice-producing districts.

The analytical method used is the panel data analysis method. According to Agus Widarjono (2007) the panel data regression method has several advantages when compared to time series or cross section data, namely:

- a. Panel data which is a combination of two time series data and a cross section that is able to provide more data so that it will produce a greater degree of freedom.
- b. Combining information from time series and cross section data will be able to overcome the problems that arise when there is a problem of eliminating variables (committed-variables).

According to Widarjono (2007) suggests several methods that can be used in estimating the regression model with panel data, namely:

Common Effect

The technique used in the Common Effect method is only by combining time series and cross section data. By combining the two types of data, the Ordinary Least Square (OLS) method can be used to estimate the panel data model. This approach does not pay attention to individual and time dimensions and it can be assumed that the behavior of the data between sub-districts in TTU is the same in various timescales. This assumption is clearly very far from the actual reality, because the characteristics between sub-districts are clearly very different.

Fixed Effect

The technique used in the Fixed Effect method is to use a dummy variable to capture the difference in intercept. This method assumes that the regression coefficient (slope) remains constant between sub-districts and over time, but the intercept is different between sub-districts but the same over time (time invariant). However, this method brings a weakness, namely by reducing the degree of freedom, which in turn reduces the efficiency of the parameter.

Random Effect

The technique used in the random effect method is to add a disturbance variable (error terms) that might appear in the relationship between time and between districts. The OLS method cannot be used to get an efficient estimator, so it is more appropriate to use the Generalized Least Square (GLS) method.

The form of the Ordinary Least Square equation is:

$$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_p X_{ip} + \varepsilon_i$$

Information: Y_i (response variable ($i = 1,2,3, \dots$)); β_0 (coefficient constant); $\beta_{1,2,3\dots n}$ (coefficient or regression parameter ($i = 0,1,2,3, \dots, n$)); $X_{i1,2,3}$ (i -th predictor variable on item $1,2,3 \dots n$); ε_i (regression error value which is independent and normally distributed $\varepsilon_i \sim (0, 2)$).

This study was conducted to analyze the predictions of rice production, rice supply and rice prices that affect food security in TTU district.

The rice production factor will have a positive effect on food security if it is properly considered by the community and the government (Figure 1). This is because increasing the supply of adequate rice production will provide support for increasing food security. Rice supply also has a positive influence on food security. If the supply of rice is sufficient to meet public consumption in a certain period of time, it will increase food security in the community. While the price factor is also a determinant of community food security. If prices continue to increase, it will certainly have a negative impact on food security because of an increase in rice prices because the amount of rice supply decreases or production is only slightly.

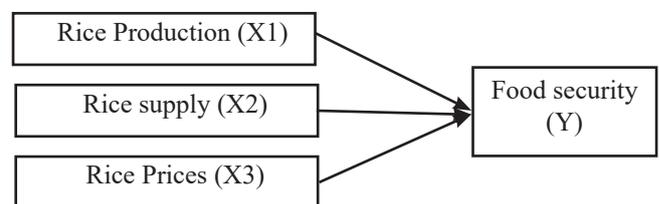


Figure 1. Research framework

RESULTS

Chow Test and Haussman Test

Chow Test is used to determine the best model between CE and FE (Table 2). If the P-value is greater than alpha then the best choice is FE, whereas if the P-value is smaller than alpha then the best choice is CE. From the results of the Chow test analysis, the cross-sectional Chi-square value of 12.184506 with p-value is $0.0000 < 0.05$, the better model is Common Effect than Fixed Effect (Table 3). Furthermore, the choice of chow test fell on the Common Effect, then the test continued with the Lagrange Test. In order to perform the Lagrange test, first perform the Random Effects (RE) test.

From the results of the LM analysis (Table 4), the Breusch-Pagan cross-section value is 0.180456 with a p-value of $0.6710 > 0.05$, so it can be determined that the Common Effect model is better than the Random Effect. The final CE model is based on model selection using the Lagrange Multiplier Test (LM Test).

Normality test

The normality test on the residuals aims to determine the estimated error or the difference between the predicted Y and Y values by using the Jarque-Bera test. From the results of the normality analysis, a p-value of $0.062235 > 0.05$ was obtained, so the residuals were obtained with a normal distribution so that the assumption of normality was met (Figure 2).

Heteroscedasticity Test

Heteroscedasticity test was carried out using the Glejser method, namely by regressing between the independent variables and absolute residuals which would indicate that if there were symptoms of heteroscedasticity, most of the p-value of the t-partial < 0.05 and the p-value of the f-test < 0.05 (Table 5).

The results of the analysis show that several variables p-value partial t test (PROB) $0.4386, 0.6764, 0.1430 > 0.05$ and the p-value of the f test: $0.0547191 > 0.05$ which indicates that the model does not have heteroscedasticity problems so that the model meets the requirements or meet the assumption of homoscedasticity.

Table 2. The results of the analysis of selecting the best model with Pooled Least Square or Common Effect (CE)

Variable	Coefficient	Standar Error	t-statistics	Probability
Constant	0.811923	0.011935	76.41047	0.0000
Rice production (X1)	0.730184	9.63E-06	-76.00716	0.0000
Rice supply (X2)	0.79E-07	7.14E-07	0.533501	0.5993
Rice price (X3)	-0.597671	-6.04E-06	132.1299	0.0000

Table 3. The results of the analysis of selecting the best model

Variable	Coefficient	Standar Error	t-statistics	Probability
Constant	0.811404	0.007655	119.0595	0.0000
Rice production (X1)	0.730184	4.18E-06	-174.8513	0.0000
Rice supply (X2)	0.79E-07	4.25E-07	0.798250	0.4306
Rice price (X3)	-0.597671	-3.91E-06	203.8766	0.0000

Table 4. Langrange Multiplier Test (LM Test) analysis results

	Cross-section	Time	Both
Breusch-Pagan	0.180456 (0.6710)	1.805520 (0.1790)	1.985975 (0.1588)
Rice production (X1)	-0.424801 --	1.343696 (0.0895)	0.649757 (0.2579)
Rice supply (X2)	-0.424801 --	1.343696 (0.0895)	1.069400 (0.1424)
Rice price (X3)	0.014294 (0.4943)	1.929188 (0.0269)	-2.184067
Standardized	0.014294 (0.4943)	1.929188 (0.0269)	-0.955245 --
Gourieriou et al.*	--	--	1.805520 (≥ 0.10)

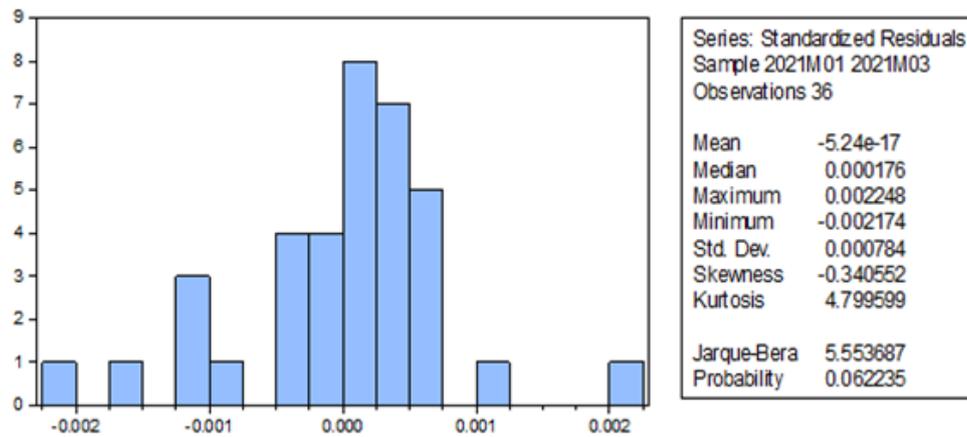


Figure 2. Normality test

Table 5. Heteroscedasticity Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Rice production (X1)	5.84E-06	2.71E-06	2.156693	0.4386
Rice supply (X2)	1.16E-07	2.75E-07	0.421268	0.6764
Rice price (X3)	-3.81E-06	2.54E-06	-1.501656	0.1430
C	0.002176	0.004966	0.438231	0.6642
R-squared	0.135744	Mean dependent var	0.000554	
Adjusted R-squared	0.054719	S.D. dependent var	0.000547	
S.E. of regression	0.000532	Akaike info criterion	-12.13513	

Autocorrelation Test

By using the Breusch Godfrey LM Correlation Serial test (Table 6), which is carried out by regressing all independent variables plus Lag-1 residual and Lag-2 residual to residual. The lag-1 residual is the residual of the previous 1 period and the lag-2 residual is the residual of the previous 2 periods. While the residual is the estimation error, namely the difference between y and y prediction, where Y is the actual value of the dependent variable while Y prediction is Y the result of the regression equation formed.

The results of the analysis show that the p-value of partial t-value (PROB) is mostly $> \alpha 0.05$ and the p-value of the f test is $0.706870 > 0.05$, so there is no serial correlation so that there is no autocorrelation, which means the model meets the requirements or assumes non-autocorrelation. The results of the analysis show that the p-value of the Breusch-Pagan LM test is $0.000 < 0.05$, so there is a dependence between cross sectional or between individuals (between rice-producing sub-districts in TTU district).

Multicollinearity Detect

The detection of multicollinearity using the correlation matrix between independent variables (Table 7). From the results of the analysis with eviws-9, the results of the correlation test between the independent variables showed that there was no strong correlation between the independent variables. This is indicated by the value of the correlation coefficient > 0.9 or < -0.9 so that it is said that the model does not have multicollinearity problems. The form of the OLS linear equation obtained from the results of the research analysis is (Table 8 and Table 9):

$$Y_i = 0.812 + 0.730 X_1 + 0.789 X_2 - 0.597 X_3$$

From the results of the analysis above, it shows that if there is no change in rice production, rice supply and rice prices in TTU district, the ratio of food security will be 81 percent.

Table 6. Autocorrelation Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID01(-2)	-0.260036	0.449030	-0.579106	0.5836
RESID01(-1)	0.300611	0.489309	0.614358	0.5615
Rice production (X1)	4.45E-06	1.19E-05	0.374996	0.7206
Rice supply (X2)	2.25E-06	1.39E-06	-1.618268	0.1567
Rice price (X3)	-1.01E-05	1.19E-05	-0.844272	0.4309
C	0.031386	0.021320	1.472123	0.1914
R-squared	0.331744		Mean dependent var	-0.000346
Adjusted R-squared	-0.225136		S.D. dependent var	0.000826
S.E. of regression	0.000914		Akaike info criterion	-10.84956
Sum squared resid	5.02E-06		Schwarz criterion	-10.60711
Log likelihood	71.09736		Hannan-Quinn criter.	-10.93933
F-statistic	0.595719		Durbin-Watson stat	0.000000
Prob(F-statistic)	0.706870			

Table 7. Multicollinearity Test

	Rice production (X1)	Rice supply (X2)	Rice price (X3)
Rice production (X1)	1.000000	0.547889	0.805987
Rice supply (X2)	0.547889	1.000000	0.678113
Rice price (X3)	0.805987	-0.678113	-1.000000

Table 8. Common Effects analysis results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Rice production (X1)	0.730184	4.18E-06	174.8513	0.0000
Rice supply (X2)	0.79E-07	4.25E-07	0.798250	0.4306
Rice price (X3)	0.597671	-3.91E-06	203.8766	0.0000
C	0.811404	0.007655	119.0595	0.0000
R-squared	0.836408		Mean dependent var	0.914971
Adjusted R-squared	0.176353		S.D. dependent var	0.032242
S.E. of regression	0.000820		Akaike info criterion	11.26958
Sum squared resid	2.15E-05		Schwarz criterion	-11.09364
Log likelihood	206.8525		Hannan-Quinn criter.	-11.20817
F-statistic	18016.88		Durbin-Watson stat	1.576691
Prob(F-statistic)	0.000000			

Table 9. Partial Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.	conclusion	Hypothesis answer	Information
Rice production (X1)	0.730730	4.18E-06	174.8513	0.0000	< 0,05	Reject H0	Partially significant effect
Rice supply (X2)	0.789642	4.25E-07	0.798250	0.6306	> 0,05	Accept H0	No partial significant effect
Rice price (X3)	-0.597731	3.91E-06	-203.8766	0.0000	< 0,05	Reject H0	Partially significant effect
C	0.812404	0.007655	119.0595	0.0000			

Effect of rice production on food security in TTU District

Based on the results of the study, it showed that rice production had a positive and significant effect on the ratio of food security in TTU district. The analysis is also in line with the hypothesis put forward with the assumption that every 1 percent increase in rice production will cause an increase in the rice food security ratio by 73.0 percent in TTU district. Food security cannot be completely separated from the ability of rice production in a region or region because rice is considered a strategic base commodity. In the formulation of agricultural development, it is stated that the indicative target for the production of the main food crop commodities and the government's food reserves is still based on rice production (Salsyabilla, 2017). However, if the arable area of the farmers decreases, the limited supply of water from irrigation and the high prices of agricultural inputs and the relatively low prices of products can become limiting factors for the program to increase food security and self-reliance of farmers based on local resources.

Effect of rice supply on food security in TTU district

From the results of the research analysis, it is known that the supply of rice has a positive and significant effect on the ratio of food security in TTU district. This finding is in line with the hypothesis put forward with the assumption that every 1 percent increase in rice supply will lead to a 78.9 percent increase in the rice food security ratio in TTU district. Good management of rice supplies is important in supporting efforts to fulfill the need for rice as a staple food for the community. Sufficient supply of rice can encourage the creation of food stability so as to facilitate the fulfillment of rice food needs. This research is in line with research conducted by (Putri & Gunawan, 2018), which says that there are five aspects that affect the food security index, namely the percentage of rice production, average per capita expenditure, purchasing power index, percentage of harvested area and population density.

The effect of rice prices on food security in TTU District

From the results of the study, it is known that the price of rice has a negative and insignificant effect on the ratio of food security in TTU district. This variable has an insignificant relationship because the commodity rice is a basic need (primary goods) and is inelastic, so that consumers still have to buy any kind of rice at a relatively high or increasing price level. Thus, when there is an increase in the price of rice by 1 rupiah/kg, it will reduce food security by 59.7 percent and conversely a decrease in rice prices by 1 rupiah/kg will increase food security by 59.7 percent. This is in line with this research conducted by (Danna et al., 2014), which shows that the availability of food that is smaller than the need can create economic instability. Various social and political turmoils can also occur if food security is disturbed, namely before the increase in rice prices, the economic condition is sufficient, but when there is an increase in rice prices, the economic conditions of rice farmers become less good and the increase in rice prices affects farmers' income levels. The price of rice is one of the important instruments in maintaining the stability of the supply and availability of rice. In the context of food security, stabilization of rice supply and prices is an important aspect in achieving food security as a national development priority. So that in an effort to increase development and community welfare, rice is always treated as an economic and social commodity.

Effect of rice supply, rice production and rice prices on food security in TTU District

Based on the results of the research analysis, the coefficient of determination R square is 0.812. This shows that rice supply, rice production and rice prices in TTU district have a simultaneous (simultaneous) effect on food security by 81.2 percent, while 18.8 percent is influenced by other variables not included in the this research. Availability of rice which is quite influenced also by the results of rice production which also has an impact on the price of rice prevailing in the market. These three aspects have a dominant influence on the food security of a region. This research is in line with research (Putri & Gunawan, 2018) which says that there is a positive effect of rice production on food security, which means that increasing rice production will increase food security and a decrease in rice production will reduce food security in every district/ city in the province of Central Java.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The results of unhulled rice production from the community in TTU have a direct impact on the availability of rice in the community. With the availability of rice in the community which is quite good, there is a positive relationship that will increase food security, but on the contrary if there is a decrease in the supply of rice in the community, it will also reduce food security. Furthermore, if rice production increases along with the increase in food security, this means an increase in unhulled rice production, it will increase food security and vice versa if there is a decrease in rice production it will reduce food security. Meanwhile, if the price of rice increases (increases) it will reduce food security in the community and vice versa if there is a decrease in rice prices it will increase food security in the community. Furthermore, if the supply of rice and rice production and prices are increased, it will increase food security in TTU district.

Recommendations

In an effort to improve food security in TTU district, local governments need to develop agricultural areas with a pattern of extensification and diversification of agricultural land. With the opening of rice fields and the expansion of rice fields, it will increase the yield of rice production which will certainly increase food security in the community. In addition, various kinds of regulations are needed in favor of farmers in increasing their production.

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