

RESEARCH ARTICLE

Do Food Assistance and Welfare of Rice Farmers Affect Food Security?

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Poverty is always accompanying unmet food needs; hence it can disrupt food security. Efforts to improve food security can be made with government policy through food assistance, namely, rice for the poor and also increasing the amount of rice production from rice farmers to meet the adequacy of rice in an area. The purpose of this study is to analyze the effect of food assistance (*Rastra*) and farmers' welfare on food security in terms of rice availability in Aceh-Indonesia in the short and long term. The model used is auto regression distributed lag (ARDL), and the determinant variables that are considered in this study are food assistance, farmers' welfare, human capital (health), harvested area, and regional inflation conditions. The results show that, in the short term, food assistance, farmers' welfare, harvested area, and health have a positive effect on food security. Meanwhile, inflation has a significant negative effect. However, in the long run, only the harvested area has a positive effect, and health has a significant and negative effect on food security in the availability of rice. This implies that the amount of local rice must be increased by utilizing existing agricultural land; hence, it can meet the availability of rice for food security in the short and long term.

Keywords: Food Security, Welfare of Rice Farmers, Food Assistance

JEL Classifications: C13, C23, I132, I138

Food security is important for a country because it is the government's responsibility to meet the basic needs of its population. Population growth every year will affect food sufficiency.

Population growth can cause food needs that are not linear because the population composition could be dominated by a productive age population

who have higher consumption needs. Syawie (2012) stated in his review that Indonesia is a country that has a comparative advantage compared to any other country in terms of the area of arable agricultural land and plantations. With these advantages, Indonesia should be able to become a developed country in the agricultural sector. Hence, there is no food security

problem in Indonesia. However, in reality, it is estimated that Indonesia needs 15 million hectares of agricultural land to meet food needs by 2030.

The problem of rice demand in one of Indonesia’s provinces, Aceh, can be seen in Figure 1. Data shows that the availability of local rice is still not able to meet the needs of the people of Aceh (Bureau Statistic Center, 2018a). Therefore, over time, the government continues to strive to improve food security with various assistance programs to the community.

The name of food assistance for the poor in Indonesia is *Raskin/Rastra*. The first name for the food assistance was *Raskin* in 1998 and then changed to *Rastra* in 2017. The role of the local government is very important in increasing the effectiveness of the *Raskin* program to target beneficiary households, which are realized in the form of right to target beneficiaries, to the right amount, to the right price, to the right time, to the right administration, and the right quality.

To streamline the program implementation and accountability, *Raskin* Coordination Teams were formed from the central to the sub-districts and implemented the *Raskin* distribution at the village/ government level. The logistics agency appointed by the government is responsible for managing and distributing *Raskin*. The government has made changes to the system of providing rice assistance to the poor population in some periods. However, its main goal remains the same, that is, reducing poverty in Indonesia.

The transition from cash assistance systems to non-cash experienced several considerations and stages so that they can be adapted to regional conditions. The Aceh region is one of Indonesia’s food self-sufficiency regions (in 2016) but is currently the recipient of rice assistance from the central government. The highest number of poor people in Aceh in Sumatra Region in March 2018 was 15.97% (Bureau Statistic Center, 2018b).

The transition of the system from social assistance to food assistance, according to Lentz and Barrett (2013), is to improve food assistance instruments, including local and regional procurement, cash, and vouchers that has increased understanding of tradeoffs. The impact of this choice is relative to traditional food assistance and also has an effect on cost-effectiveness, local markets, recipient satisfaction, food quality, and small suppliers. It was also stressed that the food assistance program was effective in achieving several objectives with various key factors, including targeting, addition, seasonality, schedules, incentive effects, social acceptance, and political economy considerations.

According to Rahman et al. (2018) on their research on the effectiveness and perspective of the application of non-cash food assistance, recommended that there is a need for stability in rice prices. Rice assistance is still badly needed by the poor population in Aceh. This is because the purchasing power of poor people is too small to meet their food needs. The importance of

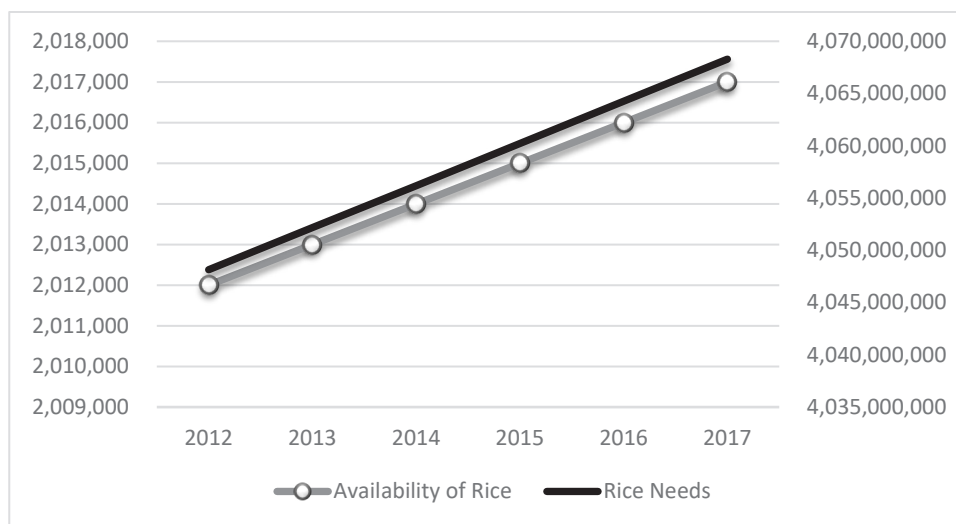


Figure 1
Rice Availability and Rice Needs

rice assistance for the people of Aceh is confirmed by the research by Suriani et al. (2018), which explained that the demand elasticity of rice for the poor (food assistance) is very elastic compared to the demand for other commodities. This is because rice is a basic need of the people of Aceh.

Reality shows the rice availability in Aceh Province is still inadequate, as *Bulog* (logistic agency) had to import rice by 25% in mid-2017 to meet rice reserves in Aceh Province until June 2018. The availability of local rice produced by rice farmers increases every year, as shown in Figure 1. However, it has not been able to meet the total rice needs of the community. Therefore, the Aceh government still needs additional rice from outside the region or imported rice.

If local rice farmers can increase the amount of production, their rice needs can be met. It can be said that increasing farmers' productivity can improve the welfare of farmers. The approach used in this study is the exchange rate of farmers as a measure of the ability to exchange goods (rice products) produced by farmers against goods and services needed for rice farmers' consumption activities (Bureau Statistic Center, 2020). This means that the farmer exchange value is greater than the expenditure, so the farmer is more prosperous and eager to increase productivity.

Many previous studies have examined food security. Folke and Bie (2014) examined food security against poverty alleviation, Berchin et.al (2019) paid attention to public policy on food security, whereas Charoenratana and Shinohara (2018) analyzed food security and farmers' welfare. Lancker et al. (2019) examined the contribution of fisheries to food security. It can be concluded from several studies that there are many factors that can be studied related to food security, such as irrigation investment under climate change and impacts on food security (Perez et al., 2018); availability food, and poverty (Cororaton et al., 2018) floods, and extended periods of drought recurring in most of the regions. The agricultural commodity that is severely affected by climate change is rice, which is the staple food of Filipinos. Using a computable general equilibrium model calibrated to Philippine data, the paper analyzes the effects of climate change as it affects palay productivity. The analysis looks at the impact on palay production and rice supply, prices, consumption, household income, and welfare. The paper extends the analysis by computing the income distribution and poverty effects of the productivity

changes by applying a poverty microsimulation using the 2012 Family Income and Expenditure Survey. The results indicate that climate change decreases palay production in rainfed (or non-irrigated; and factors affecting food security and community welfare of farmer households (Srnita, 2017). This study is different in the sense that it examines food security through food assistance and welfare of rice farmers by adding other determinants of the condition of harvested area, regional inflation, and human capital.

This paper focuses empirically on the effect of food assistance and the rice farmers' welfare on food security by taking into account other independent variables. The importance of food security in meeting the needs of the people is the government's responsibility to anticipate the shortage of rice sufficiency in Aceh Province is the motivation in this study to examine the problem of food security empirically.

Rice adequacy is an affirmation of the meaning for the operational definition of food security in this research. This is the difference with the previous study. The government's food assistance program serves to provide rice for the poor. Meanwhile, the other independent variables are used as explanatory variables for economic conditions.

From the background of the problem formulation described, the research question is whether food assistance, the welfare of rice farmers, harvested area, regional inflation, and human capital affect food security in the short and long term? In line with the research question, this research aims to analyze the effect of food assistance, the welfare of rice farmers, regional inflation, and human capital on food security in the short and long term. The reason for taking the test for short-term and long-term analysis is to analyze in detail the influence of the determinants of the variables analyzed in different time periods, which are shown by the lag.

Literature Review

The problem of food for the poor is a problem that will never run out. A large number of people in the poverty group will reflect the level of resilience in an area. Food security refers to food security at the household level related to the ability to meet food

needs in terms of physical and affordability. Poverty is indirectly an indication of the weak stage of food use due to the unequal impact of the income distribution, which results in a food-insecure community. Rachman and Ariani (2002) explained that poverty is closely related to the ability of families to meet their basic needs, namely food. Those who are categorized as poor are families who are food insecure because they do not consume enough food. Apart from low purchasing power, knowledge of poor household nutrition is low; thus, in consuming food, they do not consider the nutritional content of the food.

With this food assistance, the poor can meet basic needs despite inflation. Inflation is described as a recurring increase in the overall level of prices for goods and services. When inflation increases, there is usually a decrease in purchasing power. Inflation is measured by the consumer price index, which reflects the annual percentage change in the costs borne by the average consumer when buying goods and services. The Laspeyres formula is commonly used (Anyanwaokoro, 1999, as cited in Modebe & Ezeaku, 2016). There are several causes of inflation where aggregate demand rises faster than aggregate supply, thereby increasing the costs of goods and services.

Hossain et al. (2012) explained some of the effects of inflation on conditions of economic performance. High inflation rate conditions can hamper economic performance, zero inflation conditions can cause economic performance to stagnate, and mild (single digit) inflation rates are the sine qua non for economic prosperity. Apart from that, the problem raised by inflation is a global phenomenon because it cuts development in both developed and developing countries.

In another research, Barro (2013) observed that the severity of inflation in the short term growth is not significant, but it hurts living standards. Likewise, Mwakanemela (2013) argued that inflation harms growth, emphasizing that there is no long term relationship with growth. Furthermore, Bruno and Paskah (1998) asserted that growth declined significantly during periods of high inflation, adding that inflation still promotes growth when the rate is at a lower level. This means that high inflation does not encourage growth (Bruno & Easterly, 1998); it negatively affects economic growth after reaching a certain threshold (i.e., the rate at which the effect starts).

Munyeka (2014) referred to economic growth as the single most important measure of economic performance. Economic growth connotes an increase in a country's capacity to produce goods and services by comparing the level of contemporary output with the previous year, and this comparison can produce positive or negative growth. Economic growth becomes apparent when the productive capacity of the economy increases, and then it is used to produce more goods and services (Jhingan, 2014).

Good economic growth is supported by the process of economic development. In this case, Nurkholis (2016) analyzed the theory of human resource development and concluded that the concept of human capital could be defined as: (1) human capital is an ability possessed by human beings, such as knowledge and skills; (2) human capital is the knowledge and skills gained through various educational activities, such as schools, courses, and training; and (3) human capital is a fundamental source of economic productivity and can be an investment made by humans to increase their productivity.

Human capital, as an important factor in increasing economic productivity in a country, is also emphasized by Schultz (1961). Education and training obtained by humans will increase the ability and skills; thus, productivity will increase. In this case, Todaro and Smith (2003) also revealed that human capital could be measured through education and health. Higher education without a healthy body will not increase productivity, and higher education can affect one's level of health awareness.

In the concept of economics, productivity is one indicator to calculate the output produced by individuals on a micro and aggregate basis at a macro level. One measurement of the level of national income in the aggregate is the amount of production. The amount of rice produced by farmers is an income for farmers. Farmers, as the main actors of rice production, become important actors in economic activities in meeting the adequacy of rice. The development of the amount of rice production in an area also depends on the price of the grain itself, macroeconomic conditions such as regional inflation and farmer exchange rates. Zakiah (2016) explained from the results of her research that efforts to improve food security could be pursued by empowering farmers both as producers and consumers.

The farmer exchange rate is one indicator used to measure farmers' welfare (Nurhemi et al., 2014).

Some indicators that measure farmers' exchange rates as producers are taken into account: the consumption index (IK), pay index (IB), and receive index (IT). If the received index is higher, there will be a surplus for farmers (producers) that would increase the level of welfare of rice farmers. If the rice still has to be imported, it means that the amount of rice production from local farmers is not enough. This also means that if rice production from farmers is low, the level of productivity is low, then it can affect the availability of food in an area. However, if rice imports are carried out (Abidin, 2015), it is necessary to review the rice import duty policy with the suitability of farmers' welfare and food security from the perspective of social welfare.

Empirical Framework

The methodology used in this study limits the scope of the research to analysis of food security by taking into account government policy on food assistance variable and explanatory variables of economic conditions (welfare of rice farmers, regional inflation conditions, local harvest area, and population health index for human capital). Based on the theories referred to in the theoretical framework are the theory of farmer exchange rates, the relationship of food security and farmer's welfare from the producer side to the availability of rice, and the relationship of rice assistance to the availability of rice to support food security or the adequacy of rice population (Nurhemi et al., 2014; Zakiah, 2016; Srinita, 2017; and Suriani et al., 2018). Therefore, the purpose of this study is to empirically analyze the effect of food assistance, the welfare of rice farmers, harvested area, regional inflation, and human capital on food security in the short and long term.

The model used is the cointegration approach in the auto lag distributed regression model (ARDL) using time series data (monthly). ARDL is a time series model with a single-equation (one marketing). Generally, this model looks for relationships between variables. The variables used in this modeling are food security (FS), the welfare of rice farmers (WRF), food assistance (Brastra), harvest area (HA), human capital by health index (HC), and inflation (Inf). All of these variables are in natural logarithm except inflation.

ARDL model can distinguish short-run responses and the long run of the dependent variable on one unit change in the value of the explanatory variable

(Gujarati, 2003). Thus, it can be explained that what distinguishes the short term and the long term is the response of the dependent variable (food security) to a unit change in the value of the independent variables. Even in the short term, the dependent variable (food security) can respond to changes that occur in itself in the previous period.

The model looks at the function of time, the validity of the theory, and relations between variables (Gujarati, 2003). The basic equation of the ADRL model adapted from Doğan et al. (2014) is as follows (Equation 1 and 2):

$$Y_t = \alpha_0 + \alpha_1 t + \sum_{i=1}^p \theta_i \gamma_{t-i} + \beta' X_t + \quad (1)$$

$$\sum_{i=0}^{q-1} \beta^{*'} \Delta X_{t-i} + u_t$$

$$\Delta X_t = P_1 \Delta X_{t-1} + P_2 \Delta X_{t-2} + \quad (2)$$

$$\dots + P_i \Delta X_{t-i} + \varepsilon_t$$

where X_t is a k-dimension (I(1)) variable that is not co-integrated by itself, u_t and ε_t are assumed to have no serial relationship between errors with zero mean and constant variance-covariance. P_i is the matrix coefficient, which is an autoregressive vector process in ΔX_t . The ARDL model equation is as follows:

$$Y_t = \alpha_0 + \alpha_1 t + \sum_{i=1}^p \theta_i Y_{t-i} + \beta' X_{t,t} + \quad (3)$$

$$\sum_{i=0}^{q-1} \beta^{*'} \Delta X_{t-1} + u_t$$

To facilitate the research, we then substituted Equation 3 into the research variables. Thus, to analyze the effect of independent variables on the dependent variable in the short and long term, the modeling of this research can be written in the following equation (Equation 4):

$$\begin{aligned} \Delta LKP_t = & \alpha_0 + \sum_{i=1}^n \alpha_1 \Delta LFS_{t-1} + \sum_{i=1}^n \alpha_2 \Delta LWRF_{t-1} \\ & + \sum_{i=1}^n \alpha_3 \Delta LBRASTRA_{t-1} + \sum_{i=1}^n \alpha_4 \Delta LHC_{t-1} + \\ & \sum_{i=1}^n \alpha_5 \Delta LHA_{t-1} + \sum_{i=1}^n \alpha_6 \Delta INF_{t-1} + \beta_{11} LFS_{t-1} \\ & + \beta_{21} LWRF_{t-1} + \beta_{31} LBRASTRA_{t-1} + \\ & \beta_{41} LHC_{t-1} + \beta_{51} LHA_{t-1} + \beta_{61} INF_{t-1} + u_t \quad (4) \end{aligned}$$

The initial stages carried out in the ARDL test in this study were to do unit root tests. In time series analysis, the assumption of data stationarity is an important

trait. In a stationary model, the statistical nature of the future can be predicted based on historical data that has occurred in the past.

Data stationarity is done by observing whether the time series data contains unit roots, that is, whether there is a trend component in the form of a random walk in the data. The methods for carrying out these tests include augmented Dickey-Fuller test (ADF), Philip-Perron (PP) test, and Kwiatkowski Philips Schmidt Shin (KPSS) test. Data stationarity testing conducted on all variables in this research model is based on the ADF test and PP test.

Then proceed with determining the optimal lag length. In the ARDL model, it is necessary to determine the lag on how many variables will produce the best estimate. The lag that is too long will reduce the number of degrees of freedom, whereas lag that is too short will lead to specification errors (Gujarati, 2003). Selecting the optimum lag in the ARDL model used the Schwarz Criterion (SC) and Akaike Information Criterion (AIC). If the magnitude of a lag gives the smallest SC and AIC values to the model, the number of lags is chosen.

A cointegration test on the ARDL method is done to determine whether there is a long-term relationship between variables. It says there is a long-term relationship if the regression model is cointegrated. The method that can be used to test for cointegration is the bound test cointegration by comparing the value of F-statistics with the F-tables that have been compiled by Pesaran et al. (2001). To describe the speed of adjustment from short-term to long-term balance is explained from the error correction term (ECT). If the

F-statistic value is below the lower bound value, it can be concluded that cointegration does not occur. If the F-statistic value is above the upper bound value $I(1)$, it can be concluded that cointegration occurs. However, if the F-statistic is between the lower bound value $I(0)$ and upper bound $I(1)$, then the result is inconclusive.

The hypotheses in this F test are $H_0 = \theta_1 = \theta_2 = \theta_n = 0$; no long term relationship (no cointegration) and $H_1 \neq \theta_1 \neq \theta_2 \neq \theta_n \neq 0$; there is a long term relationship (cointegration). If the F-statistic value is below the lower bound value, we cannot reject H_0 , which means there is no cointegration. Conversely, if the F-statistic value exceeds the upper limit value, then reject H_0 , as cointegration occurs. However, if the F-statistic is located between the lower and upper limits, then it cannot be concluded. We then proceeded with the model stability test, the Cusum (cumulative sum) test. The Cusum of recursive residual test and cumulative sum of squares (Cusum q) determine the structural stability of the model. If Cusum and Cusum q are between line plots with a significance level of 5%, then the parameters estimated in the model are stable. The definition of research operational variables in this study for food security is the adequacy of local rice in Aceh province, which is obtained from the availability of rice minus the need for rice. In this case, the availability of rice is the amount of grain production that is converted to rice.

Meanwhile, rice needs are obtained from the population multiplied by the consumption of rice per person per year by the unit of kg. Food aid is rice assistance (Rastra) for the poor that is provided on a non-cash basis monthly. The food land area is the

Table 1
Unit Root Test

Variables	ADF		PP	
	I(0)	I(1)	I(0)	I(1)
LFS	0.3626	0.0000**	0.0002**	-
LHA	0.0000**	-	0.0398*	-
LWRF	0.4320	0.0000**	0.4320	0.0000**
LBRASTRA	0.0000**	-	0.9835	0.0000**
LHC	0.2718	0.0000**	1.2514	0.0000**
INF	0.0000**	-	0.0001**	-

Description: (.) adalah T-statistic. Significance at level α ** (1%) dan * (5%)

total land area for planting rice in hectares, and human capital is in the form of population health level by using a unit of life expectancy per year.

Results and Discussion

Time-series regression analysis in this study will be carried out after the data is known stationary through the unit root test results (ADF and PP). By comparing the two test results, it can be concluded that at the level, some variables are not stationary either with ADF and PP. Meanwhile, at the first difference level, all data is stationary. The unit root test results determine the selection of models in this empirical analysis by ARDL modeling. The specialty of this model is that it can estimate data with a different level of stationarity.

We then determine the optimal lag by using the Akaike informatics criteria. The results show that the ARDL modeling lag (3,1,4,3,4) in Figure 2 is the smallest lag, which is 1.57.

From the selection results of the chosen ARDL model (3,1,4,4,3,4) in this study, the regression results from the modeling can be seen in Table 2. Estimation results show that several variables with different lags have a significant effect on food security. To examine the ARDL model (3,4,1,4,3,4), it is necessary to do a classic assumption test. The classic assumption test results show that there is no violation of the classical assumptions, to facilitate the estimation results can be made. The stability of the model can be seen at the results of Cusum and Cusum q shown in Figures 3 and 4.

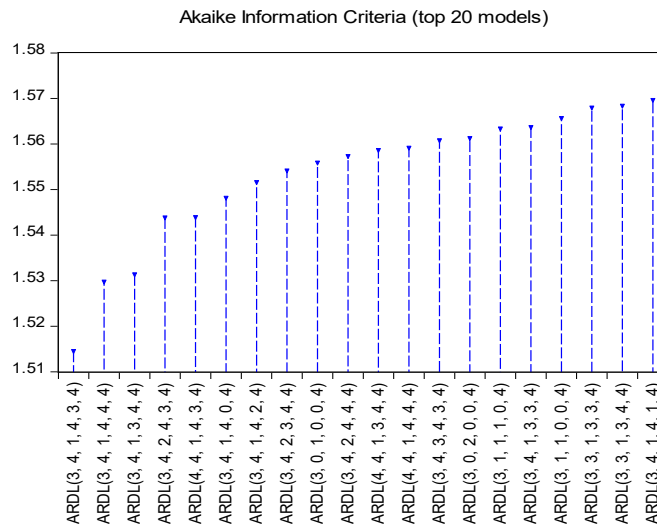


Figure 2
Optimal Lag

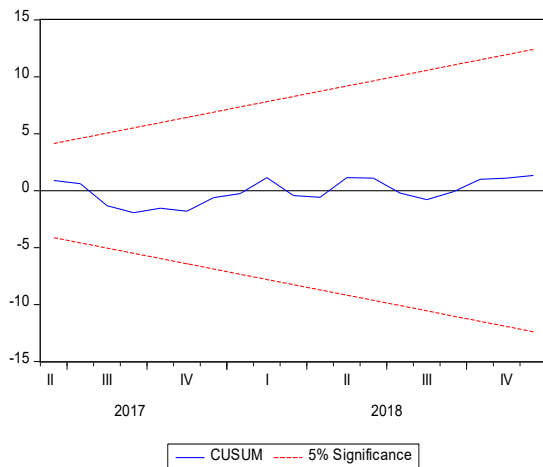


Figure 3
Cusum

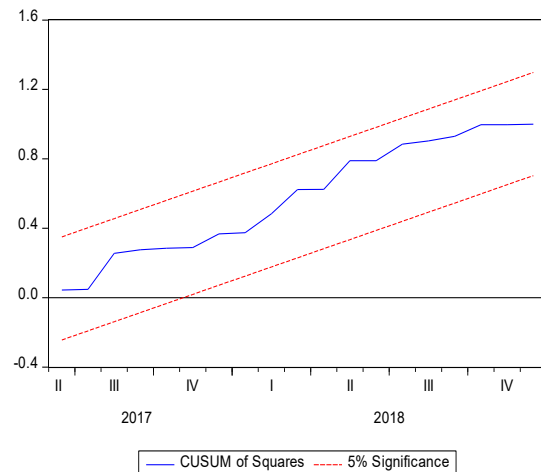


Figure 4
Cusum Q

Tabel 2
Bound Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	11.82430	10%	2.08	3
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Table 3
Estimation Results

Variables	Coefficient	t-Statistic	Prob.
LFS(-1)	-0.124989	-1.026630	0.3103
LFS(-2)	-0.259088	-2.136934	0.0383
LFS(-3)	-0.391322	-3.401219	0.0015
LWRF	10.30044	2.151210	0.0371
LWRF(-1)	-10.71549	-2.326889	0.0247
LBRASTRA	-2.599371	-1.398867	0.1690
LBRASTRA(-1)	0.112081	0.044363	0.9648
LBRASTRA(-2)	-0.476209	-0.195207	0.8462
LBRASTRA(-3)	1.859413	0.850975	0.3995
LBRASTRA(-4)	2.817424	1.875258	0.0676
LHA	0.442838	3.209686	0.0025
LHA(-1)	0.368842	2.337813	0.0241
LHA(-2)	0.060605	0.374423	0.7099
LHA(-3)	0.171343	1.168574	0.2490
LHA(-4)	0.280099	2.118954	0.0399
LHC	-1003.073	-3.664819	0.0007
LHC(-1)	-597.0287	-1.758091	0.0858
LHC(-2)	32.59153	0.104198	0.9175
LHC(-3)	431.9294	1.719720	0.0927
INF	-0.087169	-0.597332	0.5534
INF(-1)	0.057043	0.384361	0.7026
INF(-2)	0.250652	1.758933	0.0857
INF(-3)	0.268310	1.990304	0.0529
INF(-4)	-0.343701	-2.442309	0.0188
C	4826.478	7.039827	0.0000
Adjusted R-squared			0.7264
F-statistic			8.4107
Prob(F-statistic)			0.0000
Durbin-Watson stat			2.1572

The bound test determines whether there is a long-term relationship between the independent and dependent variables. The bound test results in Table 2 show that at some level of confidence, the F-statistic value is greater than the critical value, which is 11.824. It can be concluded that there is cointegration. Thus, the independent variables simultaneously have a long-term relationship with food security in Aceh Province.

Based on the estimated coefficient parameters (Table 3), the variable food security coefficient in the previous period (lag 2 and 3) has a significant and negative effect on itself. This leads to the availability of food to meet food sufficiency. If food availability in the previous period increases, then it will decrease for the next period because food sufficiency has been fulfilled. The welfare of farmers in the future has a positive effect on food security. However, the welfare of farmers in the previous period could negatively affect food security. This explains that in Aceh, farmers are still subsistent, that is, they can only meet their own needs. The rice produced is consumed to meet the needs of the household itself.

Harvest area has a positive effect on food security in the future and in the past. Meanwhile, the level of health can have a negative and positive effect on food security. If the health level of rice farmers decreases, their productivity is low and vice versa, if their health increases, their productivity increases. Similarly, inflation can have positive and negative effects on food security. Estimation results show that in the previous four periods, inflation harmed food security in Aceh Province. Although, inflation that occurred the past two to three previous periods could have a positive effect on food security. In anticipation of the rice need for the next period, the Aceh Province must facilitate needed rice importation.. Therefore, rice reserves must be available in Bulog for the next year.

The estimation results in Table 4 show that, in the long run, the harvested area has a positive effect on food security because it increases the amount of rice available to the population. On the other hand, health has a negative effect on food security. This is because if people are healthier (have a higher life expectancy index), the need for rice will be more, which reduces the availability of rice for food security. The people of Aceh consume rice as a staple food.

Conclusion

Based on the estimation results, food assistance has a significant and positive effect on food security in the short term but has no effect in the long term. This is because food assistance in the form of rice is only intended for the poor who are recorded nationally for a certain time only. When they are established, food assistance will be diverted to other poor people.

As with the welfare of rice farmers, it can have positive and negative effects on food security in the short term. This explains that if the rice farmers are in a surplus condition, they will increase their productivity. However, if the farmers are not in a surplus condition (the farmer exchange rate is lower than the farmer's household expenditure and capital expenditure for farming), then the rice farmer prefers to consume rice produced rather than sell it.

In the long run, only harvested areas and human capital (health) will affect food security. The harvested area has a significant and positive influence on food security in the long run. Therefore, the government is expected to facilitate rice farmers' efficient land utilization and pay attention to the availability of rice in the long run because rice is a staple food among Indonesians. This is supported by the previous study by Syawie (2012), who explained that there would

Table 4
The Results of Estimation in the Long Run

Variable	Coefficient	t-Statistic	Prob.
LWRF	-0.233780	-0.212938	0.8324
LBRASTRA	0.965044	1.538167	0.1313
LHA	0.745594	4.856070	0.0000
LHC	-639.6201	-11.86262	0.0000
INF	0.081748	0.372186	0.7116
C	2718.531	11.84733	0.0000

be a food crisis if the conversion of agricultural land cannot be prevented. Charoenratana and Shinohara (2018) confirmed that sustainable food security is only possible with land security guarantees.

Meanwhile, human capital, in terms of health, has a significant and negative effect on the long term. The measurement of health used in the study is the life expectancy index. If life expectancy increases, it will require more rice, which would reduce the adequacy of rice or food security. This is expected to be a concern of the government; hence, that it will continue to strive to maintain food security both in the short and long term.

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