Journal of Agribusiness Management and Development, Vol 2 No 1, March 2021, Page 18-24
ISSN 2775-0248 (Print) ISSN 2775-0256 (Online)
Available at https://journal.ugm.ac.id/v3/JAMADEV

FOOD SECURITY OF THE SHALLOT FARMER HOUSEHOLDS IN THE DISTRICTOF WANASARI, BREBES REGENCY

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Received : 15 November 2020 Accepted : 5 January 2021 Published : 3 March 2021

ABSTRACT

Food security exists when all people have physical, social, and economic access to sufficient, safe, and nutritious foodthat meets their dietary needs. This research aims to determine: (1) the level of the share of farm household food expenditure, (2) the level of energy sufficiency, (3) food security conditions, and (4) the factors that affect the level of the share of farm household food expenditure in the district of Wanasari Brebes Regency. Household food securityconditions can be detected through Jonsson and Toole's cross-classification, and factors affecting the share of food expenditure can be determined by multiple linear regression analysis. The results showed that shallots farm householdsin the district of Wanasari have a share of food expenditure were categorized as low (43.13%), and the value of energysufficiency was categorized enough (96.11%). Households that are classified as food secure are 66.67%. Factors thataffect the share of farm household food expenditure in the district of Wanasari are household income, number of family members, price of rice, and tempeh price.

Keywords: consumption energy sufficiency, food security, shallots, the share of food expenditure

INTRODUCTION

Food security is an essential part of fulfilling human rights when all households can obtain sufficient food both in quantity and quality to live a healthy, active, and productive life. Food security focuses not only on regional level food provision but also on food supply and consumption at the regional and household level and even for individuals.

Brebes Regency is one of the largest shallot production centers in Central Java. The shallot commodity itself is a characteristic and mainstay product for Brebes Regency, considering its position as the largest producer on a national scale. According to Nurasa's research (2007), it shows that shallot farmers in Brebes Regency can reach production of 11.1 tonnes/ha. Based on several districts used as shallot planting areas in Brebes Regency, Wanasari District is the largest shallot production center area (Central Statistics Agency, 2016).

Ilham and Sinaga (2007) use the share of food expenditure approach as an indicator to examine food security in a region. The share of food expenditure has a close relationship with various food security measures, namely the level of consumption, food diversity, and income. The share of food expenditure can be measured in numbers, is quite simple to obtain and interpret, and is responsive to changes resulting from economic conditions, development policies, and programs.

The Food Security Council (2015) maps the level of food security and food vulnerability in Indonesia. The level of food insecurity in the Brebes Regency is a priority five district or is classified as food resistant. Things that need to be done to improve food security are increasing economic access or financial access to food, improving nutrition for households, and reducing climate change risks. Rachmah (2017), in her research, that the average farmer household in Suruh Subdistrict,Semarang Regency, has a low share value of food expenditure so that it can be categorized as a food-resistant household. Factors that affect the share value of household food expenditure for farmers in Suruh District are income, family dependents, education for housewives, and nutrition knowledge.

Purwaningsih (2010) states that in total households, the average share of household food expenditures in urban areas is smaller (53.54%) than households in rural areas (59.96%). The most significant food expenditure is side-dishes and finished food or drinks. The average household energy consumption in Central Java is 1,978 kcal/capita/day or about 89.92% of the energy adequacy requirement.

METHOD

The primary method used in this research is descriptive analysis. This research was conducted in three villages in Wanasari District, Brebes Regency, namely Jagalempeni, Sidamulya, and

Sisalam Villages. The selection of the research location was made by purposive sampling. The selection of the sample of respondents was completed employing proportional random sampling. The respondents' sample was chosen randomly with the proportion of each of the three villages that had been selected. The population in this study were farmers who carried out shallot farming. The sample in this study was taken as many as 60 farming households. The data used in this study are primary data and secondary data.

The data analysis methods used in this study are as follows:

1. Share of Food Expenditure

The share of food expenditure is the ratio of expenditure on food expenditure and total household expenditure. According to Ilham and Sinaga (2007), the equation that can be used to determine the share of household food expenditure is as follows:

$$PPP = \frac{PP}{TP} \times 100\%$$

.....(1)

in which:
PPP = Share of food expenditure (%)
PP = Expenditures for food spending (Rp)
TP = Total expenditure (Rp)

The criteria for the level of share of food expenditure are as follows:

a. The share of food expenditure <60% is classified as low.
b. The share of food expenditure ≥60% is classified as high.

2. Energy Adequacy Rate

The consumption of each household member can be firstly calculated, and then the energy sufficiency value for one year can be calculated. According to the Regulation of the Minister of Health of the Republic of Indonesia Number 75 of 2013, the recommended energy adequacy figure is 2150 kcal. Then the percentage of energy sufficiency can be measured with the following formula:

$$PKE = \frac{KED}{2150} \times 100\%$$

.....(2)

in which:
PKE = The percentage of sufficient energy (%)
KED = Consumption of energy and protein per adult equivalent

Energy adequacy level criteria are as follows:

a. Energy adequacy level ≤ 80% is classified as less.
b. Energy adequacy level > 80% is considered sufficient.

3. Food Security

The indicators used to measure food security in Greater Accra by Maxwell et al. (2000), who adopted the Jonsson and Toole (1991) indicators, measure food expenditure and household nutritional consumption shown in Table 1 below.

Table 1. Degree of Household Food Security

Energy consumption per adult equivalent unit	Food Market Share	
	Low (<60% of total expenditure)	High (≥60% of total expenditure)
Enough (> 80% energy sufficiency)	Food resistant	Food vulnerable
Less (≤80% energy sufficiency)	Food less-secure	Food insecurity

Source: Jonsson and Toole (1991) cit Maxwell et al. (2000)

4. Factors Affecting Share of Food Expenditure

a. Normality test

According to Winarno (2017), one of the statistical analysis assumptions is that the residuals must be normally distributed, so this normality test is needed to find out whether the residuals are normally distributed or not. The normality test (Jarque-Bera probability value) were compared with α (5%). The hypothesis in this test is as follows:

H0: there is no abnormality
H1: there is a disorder of normality

The criteria for normality test decision making are as follows:

1) If the Jarque-Bera probability value> α (5%), then H0 fails to be rejected, meaning that the residual follows a normal distribution or no abnormality.
2) If the Jarque-Bera probability value <α (5%), H0 is rejected, meaning that the residual follows another distribution or a normality disorder.

b. Multicollinearity Test

The multicollinearity test is a test used to determine whether there is a linear relationship

between independent variables. The test criteria for the multicollinearity test are as follows:

a) If the correlation value between independent variables is ≥ 0.8, then H0 is rejected, meaning that multicollinearity is detected.
b) If the correlation value between the independent variables is <0.8, then H0 fails to be rejected, meaning that multicollinearity is not detected.

c. Heteroscedasticity Test

According to Gujarati (2015), heteroscedasticity is the inequality of variants of the residuals for all regression models' observations. The results of the heteroscedasticity test were compared with α (5%). The testing criteria for the heteroscedasticity test are as follows:

1) If the probability value of Chi square> α(5%), then H0 fails to be rejected, meaning no heteroscedasticity problem or the variance is constant.
2) If the Jarque-Bera Chi-square probability value <α (5%), H0 is rejected, meaning that heteroscedasticity or variance is not constant.

d. Multiple Linear Regression Analysis

After testing the classical assumptions and if there are no problems, then an Ordinary Least Square (OLS) analysis can be carried out with the following equation:

Ln Y = C + β1 lnX1 + β2 lnX2 + β3 lnX3 + β4 lnX4 + β5 lnX5 + β6 lnX6 + β7 lnX7 +μ… .....(3)

in which:
Y : Share of Food Expenditure
C : Constant
β1- β7 : Regression coefficient
μ *: Error term* (residual)
X1 : Farmers household income (Rp)
X2 : Number of family members (people)
X3 : Land area (m^2)
X4 : Price of rice (Rp/kg)
X5 : Tempe price (Rp/kg)
X6 : Sugar prices (Rp/kg)
X7 : Price of cooking oil (Rp/liter)

e. Determination Test

The determination test is a measure of the goodness of fit that can determine how well a sample regression fits the data. In research that uses multiple linear regression, the adjusted R^2 is used. The formula used to calculate Adjusted R^2 is as follows:

$$Adjusted\ R^2 = 1 - (1 - R^2)\frac{N-1}{N-k} \quad \text{..... (4)}$$

in which:
N= The number of observations
K= Number of variables (free and bound)

f. F-test

According to Purwoto (2007), the F-test is a test used to test the significance of the effect of the independent variable X simultaneously on the dependent variable Y. The calculated F-value can be determined through the following formula (Purwoto, 2007):

$$\text{F-value.} = \frac{\frac{R^2}{k}}{\frac{(1-R^2)}{(n-1)}} \quad \text{.....(5)}$$

F-table = [(α/2); (k-1); (n-k)]

in which:
R^2 : coefficient of determination
k : the number of independent variables
n : the number of samples
The F-test (F-value) is compared with the F table or α (5%). The test criteria for the F-test are as follows:

a) If F-value > F-table or probability F-value <α (5%), H0 is rejected, meaning that the independent variable simultaneously affects the dependent variable.
b) If F-value ≤ F-table or probability F-value> α (5%), then H0 fails to be rejected, meaning that the independent variables simultaneously do not affect the dependent variable.

g. t-test

According to Purwoto (2007), the t-test is a test used to test the significance of the independent variable X's effect partially on the dependent variable Y. The t value can be determined through the following formula (Purwoto, 2007):

$$t_{value} = \frac{\beta_i}{S\beta_i} \text{.....(6)}$$

t_{-table} = [(α/2); (n-k)]

in which:
βi : Regression coefficient
Sβi : *Standard error* βi
n : number of samples
k : the number of independent variables

The results of the t-test (t-value) are compared with t-table or α (5%). The test criteria of the t-test are as follows:

a) If t-value> t-table or the probability t-value <α (5%), H0 is rejected, meaning that the independent variable partially affects the dependent variable.

b) If t-value ≤ t-table or probability t-value> α (5%), then H0 is accepted, meaning that the independent variable partially does not affect the dependent variable.

RESULTS AND DISCUSSION

1. Shallot Farmer Household Food Security

a. Share of Food Expenditure

The share of food expenditure is the ratiobetween food expenditure and the total expenditure of a household. The share value of shallot farminghousehold food expenditure in the WanasariDistrict is 43.13%. The share value of food expenditure is less than 60%. It can be said that theshare of shallot farming household food expenditure in the Wanasari District is low. The distribution of household food expenditure in the Wanasari District can be seen in Table 2.

Table 2. Distribution of Share of Household Food Expenditure in Wanasari District in 2017

Share of Food Expenditure	Total	Percentage (%)
Low (<60% of Total Expenditure)	49	81.67
High (≥60% of Total Expenditure)	11	18.33
Total	60	100.00

Source: Primary Data of Wanasari District Analyzed in 2018

Based on Table 2, it can be seen that 82% of shallot farming households have a low share of food expenditure. Only about 18% of shallot farming households have a high-value share of the expenditure. The share value of food expenditure will affect the level of food security of a household. A household with a low share of food expenditure (<60% of total expenditure) will have a relatively high food security level. According to January (2014), the smaller the share value of food expenditure from a household, the higher the food security level.

2. Energy Adequacy Rate

The energy adequacy figure is the energy intake consumed by each individual per day in a household. The energy adequacy rate (AKE) of shallot farming households in the Wanasari District is 96.11%. The value of the energy sufficiency level is higher than 80%. It can be said that the energy sufficiency level of shallot farming households in the Wanasari District is quite sufficient. The distribution of household energy sufficiency levels in the Wanasari District can be seen in Table 3.

Table 3. Distribution of Household Energy Adequacy Level in Wanasari District in 2017

Energy Adequacy Level	Total	Percent (%)
Enough (> 80% Energy Adequacy)	49	81.67
Less (≤80% Energy Sufficiency)	11	18.33
Total	60	100.00

Source: Primary Data of Wanasari District Analyzed in 2018

Based on Table 3, it can be seen that there are 49 households or around 82% of shallot farming households that have sufficient energy levels, which are classified as sufficient (> 80% energy adequacy). Only about 11 people or 18% of shallot farming households have a relatively low energy sufficiency (≤80% energy adequacy).

3. Food Security

The level of food security is obtained by cross-classifying the share of food expenditure and energy adequacy. The level of household foodsecurity in the Wanasari District can be seen in Table 4.

Table 4. Wanasari District Household Food Security Level 2017

Energy Consumption per Adult Equivalent Unit	Share of Food Expenditure	
	Low (<60% of total expenditure)	High (≥60% of total expenditure)
Enough (>80% energy sufficiency)	66.67% (Food resistant)	15.00% (Food vulnerable)
Less (≤80% energy sufficiency)	13.33% (Food less secure)	5.00% (Food insecurity)

Source: Primary Data of Wanasari District Analyzed in 2018

Based on Table 4, it can be seen that most of the shallot farming households in the Wanasari District are food resistant. Approximately 66.67% of farming households are food resistant, 13.33% of households are food insecure, 15% of households are food vulnerable, and only 5% of

shallot farming households are food insecure. A household with food resistant status has a lowshare of food expenditure (<60% of total expenditure and has a sufficient energy consumption per unit of adult equivalent (≤80% ofenergy adequacy)—only three households. The cause of this food-insecure household is that household income is not too high and has a reasonably high number of family members. According to January (2014), income and number of family members can affect food security.

4. Factors Affecting Shallot Farmers' Household Food Expenditure Share

Factors that affect the share of food expenditure can be determined by performing multiple linear regression analyses in the Ordinary Least Square (OLS method.)

a. Normality test

Based on the results of the normality test, it can be seen that the Jarque-Bera probability value is 0.9835 or 98.35%. The probability value is greater than α = 5%. It means that Ho failed to be rejected and shows that the regression residuals on this study's data are normally distributed.

b. Multicollinearity Test

Based on the results of the multicollinearity test, it can be seen that all independent variables have a correlation coefficient value that is smaller than 0.8. It means that there is no multicollinearity problem in the model.

c. Heteroscedasticity Test

Based on the results of the heteroscedasticity test, it can be seen that the probability value of Obs * R-squared is 0.1506 or 15.06%. The probability value is greater than α = 5%. It can be interpreted that Ho failed to be rejected and showed that the model tested had no heteroscedasticity problems.

d. Multiple Linear Regression Analysis

The results of multiple linear regression analysis of the factors that affect household food expenditure on shallot farmers in the Wanasari District can be seen in Table 5.

Table 5. Results of Multiple Linear Regression Analysis of Factors Affecting the Share of Household Food Expenditure of Shallot Farmers in Wanasari District in 2017

Variable	Coefficient	t-value	Prob.
Constant (C)	-3.913570	-0.536757	0.5937
Ln(Household_ Income)	-0.461570***	-6.597146	0.0000
Ln(Total_Member_Family)	0.178558**	2.437476	0.0182
Ln(Land_Area)	-0.027502ns	-0.638212	0.5261
Ln(Price_of_Rice)	0.629602***	2.831695	0.0066
Ln(Price_of_Tempe)	0.631100***	3.552304	0.0008
Ln(Price_of_Sugar)	0.549226ns	0.903533	0.3704
Ln(Price_of_Cooking_Oil)	0.344493ns	1.335121	0.1877
R^2	0.642837	t-table (α=0.01)	2.391
Adjusted R^2	0.594757	t-table (α=0.05)	1.671
F-value	13.37025	t-table (α=0.10)	1.296
F-table	2.26		
Prob. (F-statistic)	0.000000		

Source: Primary Data of Wanasari District Analyzed in 2018

In which: *** = significant at the 99% confidence level (α=0.01)
** = significant at 95% confidence level (α=0.05)
* = significant at 90% confidence level
(α=0.10)ns = not significant

1) Determination Test

The determination test is a measure of the goodness of fit that can determine how well a sample regression fits the data. If the adjusted R2 results are closer to 1, the better the regression model will be (Gujarati, 2015). Based on Table 5, it can be seen that the adjusted R2 value is 0.594757. It means that 59.47% of the dependent variable variation, namely the share of food expenditure, can be explained by independent variables consisting of household income, family members, land area, rice price, tempeh price, sugar, and oil price. The remaining 40.53% isexplained by other variables outside the model studied.

2) F-test

Based on Table 5, it can be seen that the results of multiple linear regression analyses show that the calculated F value is 13.37025, with a probability of 0.000000. The value of Fcount> Ftable (13.37025> 2.26) and the probability value

is smaller than α = 5% so that Ho is rejected. It means that the independent variables, including household income, number of family members, land area, rice price, tempeh price, sugar price, and oil price jointly affect the dependent variable, namely the share of food expenditure.

3) The t-test

The factors that partially influence household food expenditure on shallot farmers in the Wanasari District are income, family members, rice prices, and tempeh prices.

- Household income

Based on Table 5, it can be seen that the coefficient value of the household income variable is -0.461570. Every 1% increase in shallot farmer household income will reduce food expenditure by 0.461570%. The coefficient of household income is negative. It shows that household income and the share of food expenditure have an inverse relationship. The higher the farm household's income, the lower the share of food expenditure, and a higher level of food security. Households with high incomes will allocate expenditure for non-food because the need for food has been met.

- Number of family members

Based on Table 5, it can be seen that the coefficient value of the variable number of family members is 0.178558. Each 1% increase in the number of family members will increase food expenditure by 0.178558%. The coefficient on the number of household members is positive. It shows that the number of family members and the share of food expenditure is directly proportional. The higher the number of family members in a household, the more food intake is required for activities.

c. Price of rice

Based on Table 5, it can be seen that the coefficient value of the rice price variable is 0.629602. Each 1% increase in rice prices will increase the share of food expenditure by 0.629602%. The coefficient on the rice price is positive. It shows that the price of rice and the share of food expenditure is directly proportional. Rice is the staple food for shallot farming households, so that rice prices will affect the share of shallot farming household expenditures.

d. Tempeh price

Based on Table 5, it can be seen that the coefficient value of the tempeh price variable is 0.631100. Every 1% increase in rice price will increase the share of food expenditure by 0.631100%. The coefficient on the tempeh price is positive. It shows that the price of tempeh and the share of food expenditure has a directly proportional relationship. The higher the tempeh price, the higher the share of food expenditure will be. Tempeh is used as the primary food, so that the price of tempeh will affect the share of household expenditure on shallot farmers.

CONCLUSIONS

1. The share of household food expenditure on shallot farming in the Wanasari District is in a low category.
2. The energy adequacy rate for shallot farming households in Wanasari District is in the sufficient category.
3. Shallot farming households in Wanasari District, which are classified as food resistant, are around 66.67%.
4. The factors that affect household food expenditure on shallot farming in the Wanasari District are household income, number of family members, rice price, and tempeh price. The factors that positively affect the share of food expenditure are the number of family members, the price of rice, and the price of tempeh, while the factor that harms the share of food expenditure is household income.
5. Foodstuffs that have a significant contribution to energy sufficiency in shallot farming households are:
   1) Rice for the carbohydrate group
   2) Tempe and tofu for the protein group
   3) Cooking oil for the fat group

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