

## Empirical Analysis of Farmers Household Food Security Levels in Salatiga, Indonesia

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### Abstract

This study aims to analyze the conditions of farm household food security levels and analyze the magnitude of the influence of factors such as farmer income, farmer education, farmer age, and number of family members on the level of food security of farm households in Sidorejo District, Salatiga City. This study uses data taken by survey methods and interviews with farmers as respondents. The number of samples used was 90 respondents, taken using the simple random sampling method in Pulutan Village, Kauman Kidul Village, and Blangkas Village as the areas where surveys and interviews were conducted with the largest number of farmer households registered in the Farmer Members Group in Sidorejo District. Data were analyzed using qualitative descriptive analysis, multiple linear regression analysis with the Ordinary Least Square (OLS) method, and the use of a proportion of food expenditure as an indicator for the level of food security of farm households. The analysis showed that statistically the factors of farmer income, farmer education, and the number of family members of the farmer had a significant effect on the level of food security of the household of the farmer, while the age factor of the farmer had no significant effect. Many as 55.56% of households have a proportion of food expenditure  $\geq 60\%$  or food insecurity. The rest, as much as 44.44% of households have food expenditure  $<60\%$  or food security. Based on these results, the advice given is to increase farmers' incomes by providing skills and training, as well as dissemination of policies on Sustainable Food Home Areas (KRPL).

### Keywords

Household food security, proportion of food expenditure, household farmers

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## 1. Introduction

The large population in Indonesia poses a complex challenge in meeting the food needs of its population. The growth of food demand which is faster than its supply becomes the main problem in realizing food security in Indonesia. The rapidly increasing demand for food is the result of increased population growth, economic growth, and changes in tastes in society. However, national food production capacity growth is slow even stagnant (Sianipar et al., 2012). The cause of the slow national food production is because more and more agricultural land is turning into industry and housing.

In supporting the food security program, the government issued a policy on food as stipulated in Law no. 8 of 2012 concerning food. The law generally states that food must always be sufficiently available, safe, quality, nutritious, and diverse at prices that are affordable by people's purchasing power. In essence, the policies issued by the government aim to improve the welfare of the community, especially in ensuring the availability of food for the entire population.

Arifin (2007) states that there are three interrelated dimensions in the concept of food security, namely, food availability, people's accessibility to food, and food price stability. If one of these dimensions cannot be fulfilled, then food security cannot be said to be good. Even though food is sufficient at the national and regional levels, community access to meet food needs is uneven, food security is still said to be fragile. Likewise, if food availability and community accessibility are sufficiently tight, but price stability cannot be maintained properly which will result in availability and accessibility.

Based on the 2013 SPM Report on Defense, Central Java is one of the national food buffer provinces. Geographically, the area of Central Java is 3,254,412 Ha or 25.04% of the total area of Java Island, which is administratively divided into 29 districts and 6 cities with an area of 992,000 ha of paddy land, and 2.26 million ha of non-paddy land area, able to contribute to meeting regional and other provincial food needs (Windiani, 2012).

Based on data from the Central Statistics Agency (BPS) in Central Java, the harvested area, production and productivity of rice from 2009-2013 shows fluctuating figures. In 2009 rice harvested area in Central Java was 1,725,034 ha, with rice production of 9,600,415 tons, and productivity of 55.65 ku/ha. In 2010 the harvested area increased to 1,801,397 ha, with rice production of 10,110,830 tons, and productivity of 56.13 ku/ha. The largest harvested area and rice production occurred in 2013, the rice harvested area which reached 1,845,447 ha was able to produce 10,334,816 tons of rice (Arifin et al., 2004).

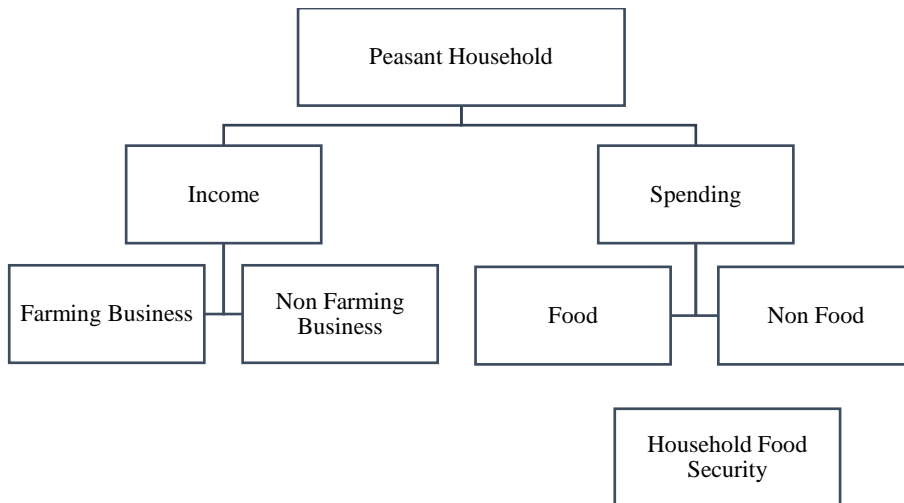
The effort to increase the production of food crops is expected to improve the quality of life of farmers, namely increasing farmers' income in line with increased production. Good selling prices also support the increase in farmers' income. According to Darwanto (2005), the higher the price of rice relative to the price of other goods, the less the number of products sold to the market because it is able to buy other goods by only selling that amount of rice (Suryana & Mardianto, 2001). Conversely, the lower the price of rice relative to other goods, the greater the farmer will sell rice to the market to be able to meet household needs by buying other items

needed. Thus, if the price of rice is relatively lower than the price of other goods, then the ability of households to buy other necessities decreases, which also means that their welfare level is decreasing (Purwaningsih et al., 2015).

## 2. Literature Review

Expenditures for food and non-food will affect the food security of farmers households. Food security at the household level can be determined by looking at the proportion of food expenditure. The proportion of food expenditure is the ratio of expenditure for food expenditure and total expenditure for a month. If the proportion of food expenditure  $< 60\%$  then household food security can be said to be food security. Households are said to be food insecure if the proportion of food expenditure  $> 60\%$  of total household expenditure.

The schematic framework for approaching the problem of this research is as follows:



**Figure 1.** Research Thinking Framework

The hypothesis in this study is used to determine the provisional estimates of the factors that influence the level of food security of farm households in Sidorejo District. The hypothesis is:

H1: Farmer's income has a significant effect on the level of food security of farmers households in Sidorejo District.

H2: The level of education has a significant effect on the level of food security of farm households in Sidorejo District.

H3: Farmer's age has a significant effect on the level of food security of farm households in Sidorejo District.

H4: The number of family members has a significant influence on the level of food security of farm households in Sidorejo District.

### 3. Methods

The research methodology here uses multiple linear regression analysis to find out how much influence the independent variable in this case farmer income, education, farming experience, and the number of family members influence on the dependent variable namely food security which is proxied by the share of food expenditure.

The models in this study that will be estimated are as follows:

$$KP = a + b_1PP + b_2PEND + b_3USIA + b_4JAK + e$$

Information:

KP	= food security which is proxied by the share of food expenditure (%)
PP	= Farmer's income (IDR)
PEND	= Education (year)
AGE	= Farmer's age (years)
JAK	= Number of family members (soul)
a	= intercept
b	= coefficient
e	= interference factor

### 4. Results

Based on the characteristics of farmer households, the average farmer income ranges from IDR. 1,286,010 to IDR. 2,144,030, the average age of the farmer is in the productive phase, which is between 40 - 50 years, the average farmer education is high school graduates, the average number of farm family members ranges from 4 - 5 people, and the average farming experience is between 21-30 years.

The analysis results showed the level of food security of farm households in Sidorejo District Salatiga City. Primary data obtained are processed using the Eviews 6 program, which produces the output shown in Table 1.

Based on the regression results in table 1, the following equation can be arranged as follows:

$$KP = 60.26255 - 0.0000228 PP - 0.890545 PEND + 0.155866 AGE + 10.58369 JAK$$

Regarding the effect of farmer's income on farmer's household food security level, farmer income variable has a regression coefficient of -0.0000228 with a probability of 0.0000 and significant at the 5% significance level. The income of farmers used has a significant negative effect on the share of food expenditure that is used as an indicator in the level of food security of farmers households. Each increase in farmer income of IDR. 1, will reduce the share of household food expenditure to -0.0000228%, assuming the other variables are constant.

The analysis results obtained from the estimation results are in accordance with the initial hypothesis of the study. The initial hypothesis explains that farmers' income has a negative and significant effect on the share of food expenditure that is used as an indicator of the level of household food security.

**Table 1.** Results of multiple linear regression

<i>Dependent Variable: KP</i>				
<i>Method: Least Squares</i>				
<i>Sample: 1 90</i>				
<i>Included observations: 90</i>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	60.26255	7.752419	7.773386	0.0000
PP	-2.28E-05	2.51E-06	-9.087856	0.0000
PEND	-0.890545	0.398589	-2.234247	0.0281
USIA	0.155866	0.122529	1.272069	0.2068
JAK	10.58369	1.094111	9.673321	0.0000
R-squared	0.590332	Mean dependent var		62.05000
Adjusted R-squared	0.571054	S.D. dependent var		15.16946
S.E. of regression	9.935085	Akaike info criterion		7.483975
Sum squared resid	8390.002	Schwarz criterion		7.622853
Log likelihood	-331.7789	Hannan-Quinn criter.		7.539978
F-statistic	30.62133	Durbin-Watson stat		2.086752
Prob(F-statistic)	0.000000			

*Source: Results of Primary Data Analysis with Eviews 6*

#### **4.1 Effect of Farmer Education Level on Farmer’s Household Food Security Level**

The education level variable has a regression coefficient of -0.890545 with a probability of 0.0281 and is significant at the 5% significance level. The level of education used has a significant negative effect on the share of food expenditure that is used as an indicator in the level of food security of farm households. Every single year increase in education level will reduce the share of household expenditure by -0.890545% assuming the other variables are constant.

The analysis results obtained from these estimates are in accordance with the initial hypothesis of the study. The initial hypothesis explains that the farmer’s education level has a negative and significant effect on the share of food expenditure that is used as an indicator of the level of household food security.

In term of the effect of farmer’s age on farmer’s household food security level, the farming experience variable has a regression coefficient of 0.155866 with a probability of 0.2068 and is not significant at the 5% significance. The age of the farmer used has a non-significant positive effect on the share of household food expenditure. The insignificant coefficient is because in terms of farmer’s household expenditure it is not necessary to consider the age of the farmer.

The analysis results obtained from the estimation results are in accordance with the initial hypothesis of the study. The initial hypothesis explains that the age of the farmer does not significantly influence the share of food expenditure that is used as an indicator of the level of household food security.

Related to the effect of number of family members on farmers household food security level, the variable number of family members has a coefficient value of 10.58369 with a probability of 0.0000 and significant at the 5% significance level. The variable number of family members used has a significant positive effect on the share of household food expenditure. Each increase in the number of family members by 1 person will increase the share of food expenditure by 10.58369%.

One indicator that can be used to measure the level of household food security is to use the proportion of household food expenditure. There is a negative relationship between the proportion of food expenditure and the level of household food security (Pakpahan et al., 1993; Rosyadi & Purnomo, 2012). The greater the proportion of food expenditure in the household, then access to food is low. The high proportion of food expenditure also shows the low ownership of other assets that can be exchanged for food, and vice versa. If the proportion of food expenditure is greater than 60% then the household is said to be food vulnerable, on the contrary, if the proportion of food expenditure is less than 60% then the household is included in food security. The proportion of food expenditure can be calculated using the following formula:

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

Information:

- PF: Proportion of food expenditure (%)
- PP: Household food expenditure (IDR /month)
- TP: Total household expenditure (IDR /month)

Conditions for the level of food security of farm households can be seen in Table 2:

**Table 2.** Proportion of Food Expenditures in Salatiga City

No	Proportion of Food Expenditure	Amount	Percentage
1	<60%	40	44.44%
2	≥60%	50	55.56%
<b>Total</b>			100%

Source: Results of Primary Data Analysis

Based on table 2, it is known that the number of farm households with a proportion of food expenditure is less than 60% or included in the category of food security as many as 40 households with a percentage of 44.44%. Farmer households with a proportion of food expenditure greater than 60% or included in the food insecurity category were 50 households with a percentage of 55.56%. This shows that the majority of farm households are still experiencing food insecurity conditions.

Farmer income has a significant negative relationship to the level of household food security. The higher farmer's income can cause the proportion of food expenditure to decrease so that the level of household food security will increase (Soedomo, 2015). Farmers' income in Salatiga City, which is still relatively low, is the cause of the decreasing level of household food security. Low-income farmers will put food needs first before other needs as the main need to survive and as energy for work (Pambudy, 2006).

Farmer education also has a significant negative relationship to the level of household food security. Higher farmer education will lead to a low proportion of food expenditure. This is because the high education of farmers will make farmers able to improve the quality of food and tend to choose foods that are healthier both in terms of food selection, quantity, and nutrition. The level of education of farmers in Salatiga is still relatively low, the average farmer being an

elementary school graduate has an influence on the level of household food security (Damanik, 2008).

## **5. Conclusion**

Based on the results of multiple linear regression analysis variables of farmer income, farmer education, farming experience, and the number of family members together affect the level of food security of farm households in Salatiga City. In more detailed results from the estimation of the model can be explained as follows: a). Farmer income variable has a significant negative effect on the significance level of 5%. The higher the level of income of farmers, the level of household food security will decrease. b). Farmer education variable has a significant negative effect on the significance level of 5%. The higher the education level of farmers, the level of household food security will decrease. c). The farming experience variable has no significant effect on the significance level of 5%. This is presumably because farmers do not consider farming experience in household expenditure. d). The variable number of family members has a significant influence on the significance level of 5%. The more the number of family members, the greater the food expenditure in the household, this will affect the level of household food security.

The level of food security of farmers households in Salatiga City is still classified in the vulnerable category. This condition can be seen from the proportion of food expenditure every month. Based on the results of the analysis, it is known that as many as 55.56% of farm households have a share of expenditure above 60%, and the remaining 44.44% have a share of food expenditure under 60%.

Most farm households belong to the food insecurity category. This condition is caused by the low income of farmers and farmers' income is not always the same every month. Therefore, there needs to be assistance from various parties, such as NGOs and the government for efforts to increase farmers' incomes, both through the provision of skills and through training. It is hoped that the provision of skills and training will increase farmers' incomes.

There is a need for further development and outreach about Sustainable Food Houses (RPL). Sustainable Food Houses, namely the use of house yards, whether narrow, medium, or broad, for the cultivation of food crops, horticulture, various medicinal plants, livestock, fish and others. This is intended so that farmers can save more on household food expenditure, because the food they need can be harvested directly without spending. In addition, the Sustainable Food House can develop productive economic activities and thus be able to improve family welfare.

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