

## Portrait of Household Food Security of Rice Farmers in Indonesia



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**ABSTRACT:** The status of Tulungagung Regency as a food buffer area in East Java Province does not guarantee the food security of its farmer households. This study was aimed to determine the characteristics of rice farming households, analyzed the food security of rice farmers' households, and the factors that influence the food security of rice farming households in the Tulungagung Regency. The results showed that 1) the characteristics of the rice farming household on average consisted of 5 family members, the farmer's land area was classified as narrow, the income structure came from the non-agricultural sector, and the expenditure structure was dominated by food consumption. 2) Food security is classified as food insecure. 3) Partially, the number of family members, household expenditure, and education level are variables that affect the food security of rice farming households in Tulungagung.

**KEYWORDS:** Food Security, Households, Farmers

### INTRODUCTION

Based on the Law of the Republic of Indonesia Number 18 of 2012, food security is a condition of fulfilling food for the State to individuals, which is reflected in the availability of sufficient food, both in quantity and quality, safe, diverse, nutritious, equitable and affordable and does not conflict with religion, belief and culture of the community, to be able to live a healthy, active and productive life in a sustainable manner. If food production is increased, food is distributed smoothly, and food consumption is safe and nutritious for the whole community, a region will thrive in building its regional food security [1].

Food security is a critical condition to prioritize. The need for food is increasing due to the higher population growth. This condition causes high food consumption but is not matched by increased food production. The food production results are the government's primary concern in developing countries, including Indonesia. Indonesia has made various efforts to improve food security, such as subsidized fertilizers, construction of irrigation infrastructure, provision of seeds, credit, and various other inputs [2].

The results show that Indonesia's food security status based on data from the Global Food Security Index (GFSI) has increased in ranking in three years, from 71st to 62nd in 2019. This is indeed inseparable from the efforts of the Government and the Ministry of Agriculture, which continue to improve agriculture from upstream to downstream, including in terms of distribution and food availability.

A different situation was experienced in the last two years. The condition of the Covid-19 pandemic that has hit the world has worsened the condition of world food security. The Food Agriculture Organization (FAO) has warned that the world is on the verge of a food crisis during a pandemic. This condition was caused by the disruption of the food logistics system due to limited activities during the pandemic. It is also feared that the uneven distribution of food will cause an excess or shortage of food commodities in some regions.

Naturally, the warning from FAO requires an anticipatory, cooperative, participatory, and responsive response. East Java Province is the area where the condition of the agricultural sector is safest from the impact of the pandemic [3]. East Java is currently one of the regions with a national food barn status. Ecologically, it has a harvested area of 1,120,153 hectares in the first semester of 2020, an estimated production of 4,066,348 tons of rice, and an estimated consumption potential of 2,133,143 tons of rice. So that in Semester I 2020, the surplus of rice in East Java reached 1,933,205 tons of rice, which means that the condition of food security for rice commodities is relatively safe.

Tulungagung Regency is a food buffer area in East Java Province. Based on Tulungagung Statistic [4], it has a total rice production

## Portrait of Household Food Security of Rice Farmers In Indonesia

of 315,776.01 tons or contributes 7.77% of total production in East Java. Favorable weather conditions and good yields drive the high number of harvests in there. Every year it has a surplus of rice reaching 77,306 tons.

Unfortunately, Tulungagung, a rice barn in East Java, does not guarantee the food security status of its farmers' households. Tulungagung Regency is an area that is classified as Priority 2, or in other words, it is a vulnerable food area [5]. Considering that food is a basic need for every human being, its availability must be sufficient, both in quantity and quality, healthily and safely and sustainable manner. Food security is included in the condition of meeting sufficient food for the community in terms of quality and quantity [6].

Generally, farmers in Tulungagung are farmers with narrow land, so the return obtained is also tiny, which impacts the household life of farmers. This shows that production yields are a determinant of farmers' income which influences the behavior of farmers in realizing household food security. However, the limited land owned will be directly proportional to the yields obtained. The narrower the agricultural land, the smaller the production results obtained. This situation makes farmers always struggle to realize their family's food security. Based on the description above, it encourages researchers to describe the characteristics of rice farming households, analyze the food security of rice farmers' households, then relate it to the factors that affect the food security of rice farming households in Tulungagung Regency.

### RESEARCH METHODS

This research was conducted in October 2021 in Boyolangu District, Tulungagung Regency, which was chosen deliberately considering that there are still many people who work as farmers, both small farmers and rice farm laborers. The sampling method used purposive sampling technique with the following criteria: (1) rice farmers with a land area of 0.25ha, family consisting of father, mother, children, and grandchildren (if any), (2) rice farmers with land area < 0.25ha, a family consists of father, mother, children, and grandchildren (if any), (3) farm laborers with a family consisting of father, mother, children, and grandchildren (if any). The number of respondents who met the criteria was 32 farmers. Primary data collection through interviews assisted using a questionnaire.

The data analysis used to answer the first objective is descriptive qualitative analysis, while the second objective is to analyze household food security by calculating the share of food expenditure with the following formula:

$$SFE = \frac{TFE}{TE} \times 100\% \dots\dots\dots (1)$$

Description:

SFE = share of food expenditure (%)

TFE = food expenditure (IDR/day)

TE = total expenditure (IDR/day)

The third objective was tested by multiple linear regression analysis with the proposed regression formulation as follows:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5D_1 + b_6D_2 + e \dots\dots\dots (2)$$

Description:

Y = level of household food security (%)

b<sub>0</sub> = constant

X<sub>1</sub> = age of the head of the family (years)

X<sub>2</sub> = number of family members (persons)

X<sub>3</sub> = farm household expenditure (IDR/day)

X<sub>4</sub> = land area (ha)

b<sub>1</sub>...<sub>6</sub> = regression coefficient

D<sub>1</sub> = 1 (graduated from high school)

= 0 (other)

D<sub>2</sub> = 1 (graduated from junior high school)

= 0 (other)

e = error

### RESULTS AND DISCUSSION

#### Characteristics of Rice Farming Households

The characteristics of rice farming households are the number of family members, land area, and household income and expenditure structure. Based on the study results, it is known that the average number of members of the farmer's family is five people, including the head of the family. Farmer family members generally consist of husband, wife, children, and other family

## Portrait of Household Food Security of Rice Farmers In Indonesia

members, whose daily needs are borne by the farmer household concerned. The number of family members can affect agricultural production if used as labor. In addition, the number of family members will affect the food consumption needs of the family. According to Arida [7][7] the number of family members is related to an increase in income and the costs incurred in both expenditure and food consumption. The larger the family members who live in one house, the higher the costs incurred.

The average land area of farmers is 0.877 ha, small farmers are 0.167, and farm laborers are 0.458 ha. In general, it is assumed that the larger the land area, the greater the yield obtained. The harvest that is not sold can be used as food for the family. However, the increasing use of land has consequences for other production factors such as seeds, fertilizers, pesticides, and cash in larger quantities [8]. This is generally why some farmers sell their crops and do not use their harvests personally.

The income structure is an income generator that shows where the source of household income is obtained from both the head of the household and all family members during a specific period. In the source of family income, family members such as wife, adult children are involved in earning income. Such as being farm laborers, shop employees, trading, village officials, and so on. The farming family's income structure based on the study results is presented in Table 1.

**Table 1. Rice Farmer Household Income Structure in Boyolangu District**

No	Description	Amount (IDR/Month)	Percentage (%)
1	Head of Family		
	- Rice Farming	361,102	13.92
	- Other farms	10,753	0.41
	- Non-Farm	1,598,694	61.62
	Total	1,970,549	75.95
2	Family Members		
	- Agriculture Sector	187,553	7.23
	- Non-Farm	436,442	16.82
	Total	623,995	24.05
3	Total Family Income	2,594,544	100.00

Based on Table 1, it can be seen that the majority of farmers do not make agricultural activities the primary source of family income. It can be seen that 61.62% of farmers' average monthly household income comes from the non-agricultural sector. Income outside the agricultural sector aims to fulfill the needs of farmer households deemed unable to be fulfilled through the agricultural sector alone.

In contrast to the income structure, the household expenditure structure consists of food consumption and non-food expenditures. Generally, the higher the household's income, the expenditure will also increase. In addition, the number of family members can affect the amount of household expenditure. The farming family's expenditure structure based on the study results is presented in Table 2.

**Table 2. Rice Farmer Household Expenditure Structure in Boyolangu District**

No	Description	Amount (IDR/Month)	Percentage (%)
1	Food	1,290,170	54.11
2	Non-Food	1,094,058	45.89
	Total	1,970,549	100.00

Based on Table 2, it is known that the expenditure of farmer households in Boyolangu District is mainly spent on food consumption. This can be due to many family members, so the need for food consumption will also increase. The results showed that the allocation of expenditure for food consumption was more dominant in purchasing side dishes from protein and vegetables and cigarettes. Expenditure on cigarettes can reach 50% of total household food expenditure.

### Rice Farmer Household Food Security

The household food security of rice farmers is known by calculating the share of household food expenditure. The share of food expenditure is one indicator of food security. The larger the share of expenditure on food means that food security is decreasing. The higher the welfare of the people of a region, the share of food expenditure of the population is getting smaller, and vice versa. The distribution of households based on the share of food expenditure can be seen in Table 3.

## Portrait of Household Food Security of Rice Farmers In Indonesia

**Table 3. Household Distribution Based on Food Safety**

Adequacy of Availability	Number (Household)	Percentage (%)
Food insecure (>50%)	21	65.62
Break-even (=50%)	0	0.00
Food safety (<50%)	11	34.38
Total	32	100.00

Table 3 shows that rice farming households in Boyolangu District are classified as not food insecure households. This is indicated by 65.62% of households having a share of food expenditure of more than 50%, which indicates that the household is not food secure. This result follows Khoer's statement [9] that the comparison of household expenditure for food consumption in rural areas in East Java (55.25%) is higher than household expenditure for non-food consumption (44.75%). The share of expenditure for food consumption has a close relationship with various food security measures, namely the level of consumption, food diversity, and income, so it is feasible to be an indicator of food security. Ilham [10] stated that the larger the share of food expenditure, the lower the food security. While a large proportion of household income must be allocated to finance food expenditures, a slight disruption to household income or food prices will significantly affect a household's ability to access food. The results also found that the dominance of farmer households in Boyolangu District was unable to meet the food needs of their families from the production of their farms, so some farmers had to buy rice to meet their family's food needs. This condition causes the share of household food expenditure to increase. Apart from rice, household food consumption includes vegetables, fish, eggs, chicken, beef, tofu, tempeh, spices, oil, sugar, milk, cigarettes, etc. Khoer [9] states that there are about 20 food commodities that are widely consumed by the people of Indonesia, including rice, wheat flour, cassava, fish and shrimp, beef, chicken meat, eggs, milk, shallots, garlic, red chilies, cayenne pepper, tofu, tempeh, cooking oil, coconut, and sugar.

### Factors Affecting Rice Farmer Household Food Security

Analysis of factors affecting the household food security of rice farmers was carried out to find out what factors could affect the food security of a household using multiple linear regression analysis. The variables observed in the analysis include the age of the head of the family, the number of family members, the husband's education level, household expenses, and a dummy variable for the husband's education level. The observed results include the Adjusted R Square value, ANOVA test, partial test, and the regression equation results.

The analysis results show that the adjusted R square value is 0.826, meaning that all independent variables can explain the dependent variable by 82.6%, and other variables outside the analysis explain the rest. The coefficient of determination value shows the amount of information (diversity) on the dependent variable (Y) given by the regression model. The greater the value of the coefficient of determination, the better the regression model obtained [11]. ANOVA test results show the value of sig.  $0.006 \leq 0.05$ , meaning that simultaneously all independent variables significantly influence the dependent variable. This means that the variable of the age of the head of the family, the number of family members, the husband's education level, household expenses, and the dummy variable for the husband's education level are simultaneously significant explanations of the food security of rice farming households in Boyolangu District, Tulungagung.

**Table 4. Results of Multiple Linear Regression Analysis**

Variables	Coefficients	T	Sig.
(Constant)	14,871.245	2.062	0.085
Age	118.948	1.477	0.190
Number of Family Members	-803.533	-0.988	0.036
Household Expenditure	-0.130	-2.850	0.029
Land Area	-70.705	-1.279	0.248
dummy 1	-4,656.117	-2.663	0.037
dummy 2	9,667.737	3.295	0.017

The proposed regression equation based on the results of the regression analysis in Table 4 is presented as follows:

$$Y = 14,871.245 + 118.948 X_1 - 803.533 X_2 - 0.130 X_3 - 70.705 X_4 - 4,656.117 d_1 + 9,667.737 d_2$$

### The Effect of Age of the Head of the Family on Food Security

The t value of the age variable (X1) is equal to 1.477 with a significance of  $0.190 > 0.05$ , meaning that partially the age variable (X1) does not affect the food security variable (Y). The age of the head of the family does not affect the chances of farmer

## Portrait of Household Food Security of Rice Farmers In Indonesia

households to be food secure because most farmers are unproductive (>65 years). A person is said to be productive between 15-64 years [7]. The increasingly unproductive age causes the results obtained from work will also decrease, but not with the need for food consumption. Farmers still need energy intake with food consumption for their work. This shows that the fulfillment of energy through food does not look at the farmer's age. This study is in line with Damayanti [12] statement, which states that the age of the head of the family does not affect the level of food security of farmer households. This is because age is related to a person's productivity level. As a person's age increases, productivity increases, but a person's productive level will reach a maximum when he gets older.

### The Influence of Number of Family Members on Food Security

Table 4 shows that the t value of the variable number of family members (X2) is equal to -0.988 with a significance of  $0.036 \leq 0.05$ , meaning that partially the variable number of family members (X2) affects the food security variable (Y). This is because most of the respondents' families are families with many family members. In addition, children who are married and have children also live in the same house, thus increasing the number of members in the family. With the addition of one family member, household expenditure will increase. Of course, it will affect household food security. This condition is why the number of family members influences the food security of rice farming households in Boyolangu District. In line with the research results of Aliciafahlia [13], the number of family members influences household food security. This is because more and more family members are considered to increase the burden on the family in meeting household food needs.

### The Effect of Household Expenditure on Food Security

The calculated T value of the household expenditure variable (X3) is equal to -2.850 with a significance of  $0.029 \leq 0.05$ , meaning that partially the household expenditure variable (X3) affects the food security variable (Y). The expenditure has a negative effect because the allocation of expenditure for food consumption is higher than non-food expenditure. This condition confirms that the level of food security of rice farming households according to when spending on food consumption increases. The share of expenditure for food consumption has a close relationship with the measure of food security. The larger the share of food expenditure shows the lower food security [10]. Hernanda [14] revealed that food expenditure negatively correlates to food security, where the more significant the expenditure, the lower the level of household food security and vice versa.

### The Effect of Land Area on Food Security

The calculated T value of the land area variable (X4) is equal to -1.279 with a significance of  $0.248 > 0.05$ , meaning that partially the land area variable (X4) does not affect the food security variable (Y). This condition is caused by the fact that most farmers have limited land and are farm laborers. So that the fulfillment of household food needs cannot be entirely met from the harvest, this is why the land area is not a factor that can affect food security.

### Educational Level of the Head of Family on Food Security

At the level of education, the head of the family is divided into three categories, namely elementary school graduates, junior high school graduates, and high school graduates. In the T-test, the dummy variable 1, namely high school graduation (d1), is equal to -2.663 with a significance of  $0.037 < 0.05$ , meaning that partially the dummy variable after graduating from high school (d1) there is a difference between high school graduate education and junior high school graduation and elementary school graduation. The t-test for the dummy variable 2, namely graduating from junior high school (d2), is equal to 3.295 with a significance of  $0.017 < 0.05$ , meaning that partially the dummy variable graduating from junior high school (d2) there is a difference between graduating from junior high school and graduating from elementary school. This study is in line with research conducted by Damayanti [12] which states that there is an influence of the education of the head of the family on the food security of farmer households. In comparison, research by Hernanda [14] the husband's length of education has a positive correlation with food security, namely the higher the level of education, the higher the household food security.

## CONCLUSION

1. Characteristics of rice farming households consist of 5 family members, farmers' land area is classified as narrow because the average is less than 0.5 ha, the majority of the income structure comes from the non-agricultural sector, and the structure is still dominated by food consumption expenditure.
2. Food security of rice farmer households is still classified as food insecure.
3. The age of the head of the family, the number of family members, household expenditure, land area, and the education of the head of the family simultaneously affect household food security. Partially, the number of family members, household expenditure, and education level are variables that affect the food security of rice farming households in the Boyolangu sub-district, Tulungagung.

# Portrait of Household Food Security of Rice Farmers In Indonesia

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