Determinants of Household Food Security in Tamalate District Makassar City

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Abstract. This study examines the food security dynamics among farmer and non-farmer households in Barombong Village, Tamalate District, Makassar City, focusing on determinants that influence household food security. Employing purposive sampling, 40 respondents were selected, and multiple linear regression alongside quantitative descriptive statistics were utilized for analysis. Results indicate significant disparities in food and non-food expenditures between the two groups. While both had high expenditures on side dishes, cigarettes, and rice, farmer households additionally faced significant costs for education, celebration donations, and fuel oil, compared to non-farmer households’ education, electricity, and fuel expenses. Food expenditure constituted 72% of farmer household budgets, whereas it was 65.26% for non-farmer households. Strikingly, only 10% of farmer households were food-secure, compared to 40% of non-farmer households. Crucially, household food security was notably influenced by income, family size, formal education, and sugar prices. Higher income and educational levels correlated with increased food security, while larger families and elevated sugar prices were linked to diminished food security. This research underscores the paradoxical vulnerability of farmer households in food security issues and stresses the need for targeted agricultural and social interventions in the region.

Keywords: Food Security, Farmer Households, Non-farmer Households, Determinants, Makassar City, Indonesia

1 Introduction

Goal number two, essentially zero hunger, contains the Sustainable Development Goal relating to food. The Sustainable Development Goals (SDGs) aim to end hunger, improve food security and nutrition, and promote sustainable agriculture. Based on these objectives, agriculture is an important strategy for attaining food security. The SDGs also include several agriculture targets, which are as follows: (1) Ensure sustainable food production systems and implement agriculture, which increases productivity, helps to maintain...
ecosystems, strengthens adaptation abilities to climate change, extreme weather, droughts, floods, and other disasters, and improves soil and land quality; (3) Increase investment in rural infrastructure, agricultural assessment and expansion services, and technology development to increase productivity [1].

Food is a strategic commodity since it is a basic human requirement. Food is defined as anything derived from biological sources of agriculture, plantation, forestry, fishery, animal husbandry, water, and water products, whether processed or unprocessed, that is intended as food and drink for human consumption, including ingredients, food additives, food raw materials, and other materials used in the process of preparing, processing, and/or producing food and beverages. According to the law, food security is a condition of fulfilling food needs for the state down to individuals, which is reflected in the availability of sufficient food, both in quantity and quality, that is safe, diverse, nutritious, equitable, and affordable, and that does not conflict with religion, beliefs, or community culture, to live a healthy, active, and productive life in a sustainable manner.

Food availability, affordability, and usage are the three subsystems of the food security system. Availability and affordability facilitate a stable and equitable supply of food throughout the region and also strengthen food insecurity to reduce the number of poor and hungry people. The usage or consumption subsystem allows each household to obtain enough food and use it properly in order to meet the nutritional needs of all its members [2].

The proportion of food expenditure approach can be used to assess household food security. The proportion of food expenditure is the total amount of food expenditure in a household expressed as a percentage of total expenditure. The value of the proportion of food expenditure is computed as a percentage by comparing food expenditure to total household expenditure. Previous research has found that numerous factors influence household food security, including age, gender, education, remittances, unemployment, inflation, assets, income, number of household members, agricultural land area, and education [3].

Makassar is the capital of South Sulawesi Province, which retains 2,035 hectares of paddy fields. Tamalate District is one of the sub-districts directly adjacent to the Gowa Regency area, and still has 394 hectares of paddy fields [4]. Because regions between village and city boundaries have considerable mobility, a study on the households food security of farmer and non-farmer is required. The primary focus of this study is the expenditure food and non-food on household. The purpose of this study is to examine the households food security of farmer and non-farmer as well as the factors influencing household food security.

2 Research Methods

This study was carried out at Barombong Village, Tamalate District, Makassar City. The study's location was chosen on purpose, as it lies on the boundary of Makassar City and Gowa Regency, which still have comparably larger paddy fields. The population in this study was divided into two, namely farmer households and non-farmer households living in the area. The sample was determined using a purposive sampling strategy, which involved purposefully selecting heads of families whose primary source earnings is not from the farming sector and deliberately selecting heads of households whose main source of income is not from the farming sector. The samples obtained for each of these households were 20 respondents, so that the total sample was 40 respondents.
The household expenditure share approach, which is essentially the following equation, can be utilized to determine indices of food security in households [5]:

\[ SFE = \frac{\text{Household Food Expenditure}}{\text{Total Household Expenditures}} \times 100\% \]  

(1)

Description:
SFE = Share of food expenditure (%)

To find out indicators of food security levels in household, it can be approached with the following criteria:
- A food secure household has a food spending share of 60% of total expenditure.
- A food insecure household spends more than 60% of total expenditure on food [6].

The influence of household income, family size covered, length of formal schooling, price of rice, price of sugar, and price of seafood on household food security is estimated using multiple linear regression analysis. Multiple linear regression equation is as follows:

\[ \ln Y = a + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + e \]  

(2)

Description:
Y = family food security/share of food spending (%)
X1 = household income (Rp/month)
X2 = family size covered (person)
X3 = length of formal schooling (years)
X4 = price of rice (Rp/kg)
X5 = price of sugar (Rp/kg)
X6 = price of sea fish (Rp/kg)
D1 = dummy (farmer =1, non-farmer =0)
a = intercept
b1 - b6 = coefficient
e = error terms

3 Results and Discussion

3.1 Household Expenditure

3.1.1 Food Expenditures

The pattern of food consumption expenditure describes the composition and proportion of income allocated for consumption expenditure for both food and non-food. Expenditure on consumption made by households includes (1) expenditure on food consumption and (2) expenditure on non-food consumption. By looking at the proportion of food consumption expenditure and non-food consumption, it will be able to know whether welfare increases or vice versa. In developed countries, the percentage of a population's consumption expenditure on food to total expenditure is usually below 50 percent. Whereas in developing countries it is quite the opposite, namely the percentage of consumption expenditure of the population for food is much greater than the percentage of non-food expenditure [7].
The highest food expenditure in farmer households is the purchase of side dishes (chicken, beef, eggs, fish, tofu, tempeh, and so on) which reaches 28.73 percent of total food expenditure. However, expenditure that is also relatively high is for cigarette purchases which reached 25.62 percent. Although cigarettes are not a food needed, but most heads of households, usually fathers and adult sons tend to require spending on cigarettes. Rice for farming households is mostly met from their own crops, but in this study the expenditure is still taken into account. Rice ranks third (17.94%) as a mandatory expenditure for energy or carbohydrate consumption. The expenditure that has the smallest contribution to total food expenditure is the purchase of granulated sugar (Figure 1).

In line with the results of previous studies that the proportion of tobacco expenditure at each level of household food security is the proportion with the fourth order (7.69 percent for food insecure households; 8.69 percent for food insecure households; 9.84 percent for food insecure households and 10.40 percent for food insecure households) after food and beverage is finished, side dishes, animal food, and rice. This proportion of tobacco exceeds the proportion of fruit, beverage ingredients, noodles, and cassava (less than 6 percent each). The data shows that the more food insecure a household is, the higher the proportion of expenditure on tobacco, or with other states food insecure households have the most tobacco expenditure allocation compared to other household groups [8].

![Fig.1. Percentage of Food Expenditure of Farmer and Non-Farmer Households](image-url)

In Figure 1, it is visible that non-farmer families have a relatively similar pattern of food expenditure, namely spending on side dishes (32.62%), cigarettes (27.72%), and rice (14.38%) of total food expenditure. Expenditure on the purchase of granulated sugar is relatively the lowest, which is only 1.25 percent of total food expenditure. This shows that people in the study area attach great importance to protein needs compared to vegetables and others, which of course is in line with most residents of Makassar City who like to
consume sea fish. On the other hand, the high expenditure on side dishes is also supported by the high price of food, so the costs incurred are also relatively high.

### 3.1.2 Non-Food Expenditure

Non-food expenditures for both farmer and non-farmer households consist of electricity, LPG gas, fuel oil, soap/cleaning, education, taxes, clothing, credit/internet, socio-religious donations, and celebration donations (marriage, circumcision, birth, etc.). Figure 2 demonstrates that the greatest non-food expenditure for farming families is education costs (37.33%), celebration donations (19.64%), and fuel oil (11.71%), while the lowest expenditure is for taxes at only 2.7 percent. Non-food expenditure in non-farmer households has a slight difference from farmer households, the highest non-food expenditure is education costs (22.69%), followed by electricity costs (19.55%), fuel costs (19.01%), and celebration donation costs (13.77%).

Fig. 2. Percentage of Non-Food Spending of Farmer and Non-Farmer Households

Expenditure on education is the highest of total non-food spending, indicating that the level of public awareness is relatively high on the importance of improving the quality of human resources through education. This is supported by the environmental conditions of urban areas that tend to attach more importance to the level of education. Donations for celebrations such as weddings, births, circumcisions, etc. have a fairly high contribution to total non-food expenditure, in farmer households the portion of expenditure reaches 19.64 percent, while in non-farmer households it is relatively lower at 13.77 percent. This illustrates that most farming communities have relatively higher social sensitivity.

### 3.2 Family Food Security (Share of Food Spending)

Food security, according to the Food Security Law of the Republic of Indonesia Number 18 of 2012, is a condition for the fulfillment of food for the state up to individuals, which is
reflected in the availability of sufficient food, both in quantity and quality, that is safe, diverse, nutritious, equitable, and affordable and does not conflict with the community's religion, beliefs, or culture, to be able to live healthy, active, and productive lives in a sustainable manner. The share of food spending is one indicator of household food security. The share of food spending is the monthly ratio of food expenditure to total household expenditure [9].

**Fig.3.** Percentage of Farmer and Non-Farmer Household Expenditure

Figure 3 shows that the proportion of food spending in farming households is higher than the proportion of non-food spending. Food security and food spending share have a negative relationship. This suggests that a household with a higher proportion of their food budget spent on food has a lower level of food security. Meanwhile, the higher the welfare of a household, the lower its share of household food expenditure [9]. Non-farmer families spend 65.26 percent of their income on food, compared to farmer families, which spend 65.26 percent of their income on food. This shows that nonfarmer families have higher levels of food security.

**Fig.4.** Farmer and Non-Farmer Household Food Expenditures

Farming households are mostly (90%) categorized as food insecure. This circumstance demonstrates that the majority of farmer households’ incomes are spent on food purchases.
The average farmer's household income reaches Rp 3,454,250.00 per month, most of which is allocated to meet food needs. In non-farmer households, the vast majority (60%) are still categorized as food insecure. This circumstance demonstrates that the majority of non-farmer households' income is spent on food purchases. The average income of non-farmer households reaches Rp 3,650,000.00 per month, and most of it is allocated to meet food needs (Figure 4).

Previous research has shown that increased welfare will increase individual food consumption because the purchasing power of food increases. In other words, a decrease in terms of the proportion of food spending will increase food security. In welfare theory, the indifference curve of individuals can be raised to the indifference curve of society, so that if individual welfare increases then the welfare of society (local, regional and national) will also increase. As a result, there is a correlation between the proportion of food spending and food security [10].

3.2.1 Determinants of Household Food Security

Several factors can influence the share of food spending, including income, the number of household dependents, housewife education, rice staple pricing, nutritional understanding, consumption of livestock protein, and dummy daily consumption of veggie and livestock protein [9]. Household income, number of family dependents, length of formal schooling, price of rice, price of sugar, price of sea fish, and dummies (farmers & non-farmers) are all predicted to influence the share of household food spending in this study. Table 1 presents an analysis of the factors influencing household food security using the indicator proportion of food spending.

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Coefficient</th>
<th>t-statistic</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings families (X1)</td>
<td>-0.042255**</td>
<td>-3.195448</td>
<td>0.0031</td>
</tr>
<tr>
<td>Family size covered (X2)</td>
<td>0.101105***</td>
<td>7.363987</td>
<td>0.0000</td>
</tr>
<tr>
<td>Formal education (X3)</td>
<td>-0.022101**</td>
<td>-2.477507</td>
<td>0.0187</td>
</tr>
<tr>
<td>Rice price (X4)</td>
<td>-0.086403ns</td>
<td>-0.676279</td>
<td>0.5037</td>
</tr>
<tr>
<td>Sugar price (X5)</td>
<td>0.173813***</td>
<td>4.760510</td>
<td>0.0000</td>
</tr>
<tr>
<td>Sea fish price (X6)</td>
<td>-0.040308ns</td>
<td>-0.816921</td>
<td>0.4200</td>
</tr>
<tr>
<td>Dummy Farmer (D1)</td>
<td>0.060242***</td>
<td>7.389004</td>
<td>0.0000</td>
</tr>
<tr>
<td>Constant</td>
<td>= 7.638368***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The coefficient of determination ($R^2$) of 0.977122 implies that all of the factors of household income, family size covered, length of formal schooling, price of rice, price of sugar, price of sea fish, and dummy (farmers and non-farmers) influence family food security (proportion of food spending) by 97.71 percent. According to the results of the regression analysis, family earning, family size covered, length of formal schooling, price of sugar, and dummy farmers and non-farmers had an important influence on the proportion of food spending (Table 1).

Household income has a negative impact on the share of the proportion of food spending; for every one percent rise in family earnings, the proportion of food spending decreases by 0.0423 percent. Thus, a drop in the proportion of food expenditure suggests an
improvement in families food security because a lower the share of the proportion of food spending indicates greater food security. According to prior research, increasing income might entail a decrease in food spending, resulting in increased household food security. Farmers' income rise shows that revenue is not entirely spent on food but rather on non-food spending [11].

The covered family size has a positive effect on the proportion of household food spending, which indicates that if covered family size grows by one percent, the proportion of food spending increases by 0.101 percent. Thus, the increasing share of food spending indicates that the level of household food security decreases as the covered family size increases. Previous research has also found that increasing the covered family size has a negative impact on the food security of farmer families [12].

The proportion of household food spending is negatively affected by the level of formal education, which means that if the level of formal education increases by one percent, the proportion of family food expenditure decreases by 0.022 percent. This illustrates that the more advanced the level of formal education, higher the level of food security in the household. According to previous research, the higher the level of education of farmers, the smaller their percentage of food spending. This is because more knowledge enables farmers to improve the quality of food consumed and to choose healthier meals in terms of food choices, quantity, and nutrition. The farmer's tiny portion of food spending suggests an elevated degree of food security [11].

Sugar prices have a positive effect on the portion of the family's food spending, which suggests that if the price of sugar increases by 1%, the portion of food spending increases by 0.1738%. As sugar prices rise, the increased proportion of food spending suggests that household food security is deteriorating.

The farmer dummy variable exhibits a significant effect with a confidence level of 99 percent, indicating that there is a difference in the percentage of food spending among farmer and non-farmer families. The farmer dummy variable has a correlation coefficient of 0.0602, meaning that households with basic jobs as farmers will see a 0.0602 percent increase in food spending. As a result, households with basic jobs like farmers will have lower levels of food security than non-farmer households. In other words, nonfarmer households are more food secure than agricultural households.

4 Conclusion

High food expenditure in both farmer and non-farmer households are side dishes, cigarettes, and rice. Farmer households have high levels of non-food expenditure including education fees, celebration donations, and fuel oil, while non-farmer households include education, electricity, and fuel oil costs. Food expenditure of farmer households amounted to 72 percent, while non-farmer households amounted to 65.26 percent. Food-secure farming households account for only 10 percent, while non-farmer households account for 40 percent. Household income, covered family size, formal schooling length, and sugar prices all have significant effects on household food security. The higher the level of household income and formal education, the better the household's food security. The higher the price of sugar and the larger the number of family members, the lower the level of food security in the household. Non-farmer families have a higher level of food security than farmer families.
References


