Research Article

Determinants of Household Food Expenditure in a Cassava Growing Village in Southeast Sulawesi

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Abstract

The study aimed to analyze the factors affecting food consumption expenditure among cassava growing households in Southeast Sulawesi Province, Indonesia. The study was carried out in Lapodi village, Pasarwajo subdistrict, Buton district, from April to July 2018. The primary data were collected from 32 respondents selected using a random sampling method. The data were analyzed using descriptive statistics and the multiple regression method. The study results showed that households spent a very high percentage of food expenditure (89.84 percent) compared to nonfood expenditure (10.16 percent). The food expenditure was dominated by starchy staple foods, fish, and eggs while spending on vegetables, fruits, and milk was low. Most cassava growing households had low levels of well-being, and their food consumption lacked dietary diversity and quality. The household income, education level of heads of household, fish price, family size, and cassava yield had positive and significant influences on the food consumption expenditure. The government should adopt policies and programs to increase household income and provide nutrition education for households to incorporate balanced and diversified diets for a more healthy and active life.

Keywords: *determinants, food consumption, cassava, expenditure, households, Sulawesi*

1. Introduction

As a country with a large population, Indonesia faces complex challenges in meeting the food needs for its people. Food self-sufficiency has long been set as an essential objective of agricultural and rural development in Indonesia, with priority given to rice production to attain food security (Saediman, Aisa, Zani, Limi, & Yusria, 2019). According to Food and Agriculture Organization (FAO), as cited in World Food Programme (WFP) (2018), there has been an improvement in the food security situation in Indonesia as seen from the substantial reduction in the prevalence of undernourishment from 19.7 percent in 1990–1992 to 7.6 percent in 2014–2016. However, The United Nations-WFP estimates that 13 percent of all districts in Indonesia are food insecure, with a

higher level of food insecurity being found in eastern Indonesia (World Bank, 2012). Moreover, sufficient food supply at the national and regional level does not guarantee food security at the household level. Excessive dependence of the population of Indonesia on rice as a staple food is also another challenge for achieving and maintaining food security status.

The definition of food security adopted during the World Food Summit in 1996 states that food security exists when "all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 2017). According to this definition, food security consists of four pillars, namely, availability, accessibility, utilization, and stability. These four pillars should be realized to achieve or maintain food security (Reincke et al., 2018). Food availability means the physical presence of food through production, import, food reserves and food aid (FAO, 2017). Food access refers to physical and economic access to available food through the ability to purchase food provided by income, market access, or safety nets (Reincke et al., 2018). Food utilization focuses on the role of the food consumed to provide balanced diets (Oyekale, Ayegbokiki, & Adebayo, 2017). Food stability occurs when the conditions of the previous three dimensions can be maintained from one period to another (Betty, 2015).

Among the many factors that contribute to the attainment of food security or the occurrence of food insecurity, poverty and income are highly predictive factors, as they directly relate to the household's ability to acquire nutritionally adequate food. Poverty can lead to various conditions, such as low nutritional status, reduced spending on social services, low level of investment and savings, and a high percentage of food consumption expenditure (Babalola and Isitor, 2014). According to Engel's Law, the proportion of income that is spent on food will decrease as income increases (Sekhampu, 2012). Engel noted that due to a generally low demand elasticity of food, households whose consumption has reached a saturation point would use the increase in income to meet nonfood or savings need (Badan Pusat Statistik, 2018). In Indonesia, low-income families spend two-thirds to three-quarters of all expenditures on food (World Bank, 2012). Households in the lowest expenditure quintile spent 66.2 percent of total expenditures on food (Badan Pusat Statistik, 2018). In this respect, food expenditure is related to poverty, food security, welfare, and household resources. Therefore, understanding the determinants of food expenditure is useful in the efforts to increase food security and alleviate poverty.

Based on the results of Social Economic Survey in March 2018, in terms of the percentage of per capita monthly average expenditure, the five highest food groups in rural areas are prepared food and beverages (27.35 percent), cereals (15.51 percent), cigarettes and tobacco (13.84 percent), fish and seafood (8.18 percent) and meat (3.47 percent). Rice continues to be the main staple food, as it is consumed by 97.0 percent of households (Badan Pusat Statistik, 2018) with per capita consumption of 100.57 kg/year (Kementerian Pertanian, 2017). Households in the lowest quintiles are more likely to consume large amounts of staple foods (Humphries *et al.,* 2014), especially rice. However, depending on the area, people might also consume traditional or local foods. In Southeast Sulawesi, in addition to rice as the main staple food (Saediman, 2015), people also consume sago, maize, and cassava (Saediman, Limi, Rosmawaty, Arimbawa, & Indarsyih, 2016; Saediman et al., 2019) as the main staples or co-staples.

Cassava is the main staple food in the districts of Buton, South Buton, and Wakatobi and is consumed mainly in the form of *kasoami* (the steamed food made from cassava) (Saediman, Amini, Basiru, & Nafiu, 2015). Cassava is the most important food crop in Buton district (BPS Kabupaten Buton, 2016). Being acquired mainly through the household's own production, cassava was the most consumed staple food followed by rice. Therefore, despite their low-income status, most households in cassava growing villages are food secure (Saediman et al., 2016; Zani, Rosmawaty, & Yusria, 2018; Saediman et al., 2019). Similar findings of poor households with high food security status were also reported by Widayaningsih (2012). This observation is contrary to the commonly accepted belief that income is the critical determinant of food security as confirmed in numerous studies (Ihab et al., 2012; Bashir, Schilizzi, & Pandit, 2013; Loopstra and Tarasuk, 2013; Owolade, Oyesola, Yekinni, & Popoola, 2013; Oyekale et al., 2017). Given these different results, it is important to determine whether food expenditures also account for a relatively large share of household income among cassava growing households and what factors are affecting food

consumption expenditures.

There have been many studies (Akpan, Patrick, Udoka, & Okon, 2013; Badari, Arcot, & Sulaiman, 2013; Othman, Karim, Karim, Adzhan, & Halim, 2013; Babalola and Isitor, 2014; Betty, 2015; Prasetyoningrum, Rahayu, & Marwanti, 2016; Kearney, 2019;) undertaken to ascertain the factors that affect household food expenditures. However, there is a lack of information regarding the food expenditure among cassava growing households. This study aimed to fill the gap to understand the determinants of food expenditures among cassava growing households in a cassava growing village in Southeast Sulawesi. Information regarding household food expenditure is useful for development planning purposes to shed light on food-related nutritional policies.

2. Materials and Methods

The study was undertaken from April to July 2018 in Lapodi village, Pasar Wajo subdistrict, Buton district, in Southeast Sulawesi Province. The study location was selected based on the fact that the majority of households in the village relied on cassava farming as their main livelihood.

The study employed a survey method. Data and information on household food expenditure were collected using questionnaire-based, face-to-face interviews with both the heads of households and homemakers. Respondents were selected using simple random sampling method. The number of respondents was 32 cassava growing households, which was 15 percent of the population of 213 cassava growing households in the village. The data were analyzed using descriptive statistics and a multiple regression model. Multiple regression analysis was used to examine factors affecting food expenditure based on the following model:

$Y = f (X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, U)$

where:

Y = Household food expenditure (Rp/year)
X_1 = Household income (Rp/year)
X_2= Education of head of households (year)
X_3 = Rice price (Rp/kg)
X_4 = Sugar price (Rp/kg)
X_5 = Cooking oil price (Rp/liter)
X_6 = Kerosene price (Rp/liter)
X_7 = Fish price (Rp/kg)
X_8= Cassava price (Rp/kg)
X_9 = Family size (persons)
X_{10} = Cassava yield (kg/year)
U = error term

Different functions, namely, linear, semi-log, double-log and exponential were tried, and the double log was selected for the analysis on the basis of the goodness of fit (economic, econometric and statistical criteria) (Babalola and Isitor, 2014; Aminu, Bello, & Adebanjo, 2017). The model was expressed as follows:

$$ln\ Y = ln\ a + b_1 ln\ X_1 + b_2 ln\ X_2 + b_3 ln\ X_3 + b_4 ln\ X_4 + b_5 ln\ X_5 + b_6 ln\ X_6 + b_7 ln\ X_7 + b_8 ln\ X_8 + b_9 ln\ X_9 + b_{10} ln\ X_{10} + e$$

where

a = Constant term
$b_1 ... b_{10}$ = Regression coefficient to be estimated

Household expenditures were divided into two main categories, namely, food and nonfood expenditures. Household expenditures are the value of the flow of all consumption of households, which include purchased goods/products and in-kind and household production. Expenditures on each food item and the total nonfood expenditure of each household were converted from monthly expenditures to annual expenditures.

3. Results and Discussion

3.1 Socioeconomic Characteristics of Farmers

All households interviewed were farmers who grew cassava as one source of household income. The average age of farmers was 46 years. This finding agrees with that of farmers reported in Saleh and Mustafa (2018) and Saediman et al. (2019), implying that most respondents were in their productive age. Concerning formal education that respondents had completed, respondents who had never attended school accounted for 15.6 percent, respondents who had attended elementary school accounted for 12.5 percent, respondents who had attended junior high school accounted for 28.1 percent, and respondents who had attended senior high school accounted for 48.3 percent. This result indicated that the majority of respondents (71.9 percent) had experienced formal education at least until junior high school. This result indicated that respondents were literates to accept improved agricultural technologies as noted by Nwaobiala (2018).

Table 1. Characteristics of cassava farmers' respondents

Characteristics	Number	Percentage
Age (year)		
15 – 54	28	75.0
> 54	4	25.0
Education		
Never attended school	5	15.6
Elementary School	4	12.5
Junior High School	9	28.1
Senior High School	14	43.8
Number of family members (persons)		
< 4	5	15.6
4 – 6	18	56.3
> 6	9	28.1
Experience in cassava farming (year)		
< 5	5	15.6
5 – 10	11	34,4
> 10	16	50,0

Table 1 reveals that the majority of respondents (56.3 percent) had family sizes of 4-6 persons, with an average of 5 persons. Respondents with fewer than four family members accounted for 15.6 percent of the respondents, and those with more than six members amounted to 28.1 percent. A large number of household members provide sufficient family labor for farm work, but at the same time put pressure on household expenditure due to the increase in need of various commodities. Further, half of the respondents (50 percent) had farming experience of more than ten years, and the average length of farming experience was 16.5 years. This fact indicated that respondents had sufficient experience in cassava farming.

3.2 Household Food Expenditure

Table 2 presents the average annual expenditure of cassava growing households. On average, the highest expenditure was for food, which accounted for 89.84 percent. The remaining 10.16 percent was for nonfood. In the food category, the highest food expenditure was for cereals and roots (rice and cassava), accounting for 42.8 percent, followed by spending on animal-based foods (fish and eggs) at 27.1 percent.

Expenditure for cigarettes and tobacco was the third highest in the food category, amounting to 16.3 percent. Cigarette expenditure was higher than that for (i) cooking oil and spices, (ii) sugar, coffee and drinking, and (iii) vegetables and fruit, which accounted for 2.5 percent, 7.3 percent, and 4.1 percent, respectively. From study results, it was revealed that each head of the household in Lapodi village consumed, on average, 1-2 packets of cigarettes per day.

In the nonfood category, the highest expenditure was for electricity and other energy sources, which covered costs for the electricity bill, kerosene, and gasoline for motorbikes (51.4 percent). The second highest expenditure was for health and education (16.3 percent), followed by costs for mobile communication, clothes, and taxes (property and bikes), amounting to 13.7 percent, 11.1 percent, and 5.4 percent, respectively. The least expenditure in the nonfood category was housing, which was only 2.1 percent of the total household expenditure.

Table 2. The average expenditure of cassava growing households

No	Category	Expenditure Group	Amount (Rp/year)	Percentage (%)
1	Food	Rice and cassava	13,211,667	42.8
		Fish and egg	8,360,000	27.1
		Cooking oil and spices	784,000	2.5
		Sugar, coffee, and drinking	2,240,000	7.3
		Vegetables and fruit	1,260,000	4.1
		Tobacco	5,029,500	16.3
		Total	30,885,167	100.0
2	Nonfood	Electricity and other energy sources	1,793,438	51.4
		Housing	74,063	2.1
		Health and education	567,313	16.3
		Telephone and electronic goods	477,000	13.7
		Clothes	389,063	11.1
		Tax and other	190,094	5.4
		Total	3,490,969	100.0
Total Household Expenditure			34,376,135	

Food consumption can be used to understand the living standards of households. In the study village, a high percentage of food share confirms that most cassava growing households had low levels of well-being (Saediman et al., 2019). The findings are consistent with Engel's law that families with lower income spend more on food than those with higher income (Betty, 2015). The highest portion of their food budgets is spent on staple foods, namely, rice and cassava, due to the palatability, availability, and affordability of these items. A high share of all staple foods in the total budget is also reported in Badari et al. (2013) and Qaim (2019). This result implies the importance of energy foods for rural households.

Fish and eggs are the primary sources of protein in the household diets and occupy the second highest place in terms of food expenditure. Fish is consumed with staple foods, namely, *kasoami* and rice and plays a significant role in the household diets. Fish is healthy food, as it contains protein, health-friendly oils, and micronutrients (Mohanty et al., 2017). High consumption of fish in the study area is related to its availability and accessibility.

Given the similarity in geographical settings, food production system and ethnicity, the consumption pattern of rice and cassava is highly similar to that described in Saediman et al. (2016) and Saediman et al. (2019) in which cassava is the most consumed staple followed by rice. The percentage of food secure households in the study area is 62.3 percent (Zani et al., 2018). While the existence of cassava as the main staple obtained from household production helps improve the food security of households, there is a strong need to complement cassava with nutrition-rich meals for more balanced food diets. The survey results show that staple foods are often consumed only with fish or egg as the primary source of protein. Green leafy vegetables and fruits are the primary sources of vitamins and minerals, but their consumption is low. Red meat, poultry, and other favorite sources of protein, such as *tempe* (fermented soybean) and tofu, are rarely part of daily meals. Expenditure on milk, milk products, *tempe*, and tofu is negligible despite their status as healthy foods. These findings are consistent with study results reported in Ihab et al. (2012) that inadequate dietary intake in low-income households might be due to availability and accessibility of food, or cultural practices and beliefs that limit the choices of food for household members.

The third largest expenditure on food is for cigarettes. This result implies that smoking is

widespread in the study area. It was revealed from the survey that adults could smoke 10-20 cigarettes a day. This result agrees with the findings of Balitbang Kesehatan as cited in Usfar and Fahmida (2011) that approximately one-third of the population from all age groups smoke 10-20 cigarettes a day. Because of the adverse health consequences, there is a need to convey messages not to smoke. These messages can be conveyed through written materials (pamphlets or website), campaigns, socialization, and education (formal or nonformal).

3.3 Determinants of Household Food Expenditure

A multiple regression equation was used to analyze the data on the determinants of household food expenditure. The food consumption expenditure was the dependent variable, and the independent variables consisted of household income, education of household head, rice price, sugar price, cooking oil price, kerosene price, fish price, cassava price, household size, and cassava yield. The result of the analysis is presented in Table 3.

Table 3. Results of regression of factors affecting household food expenditure

Variables	Coefficient	t-value	Sig
Household income	0.864	2.220	0.043*
Education of head of household	-0.398	-2.436	0.024*
Rice price	-0.097	-0.701	0.491^{ns}
Sugar price	0.802	1.357	0.189^{ns}
Cooking oil price	1.156	1.545	0.137^{ns}
Kerosene price	-0.442	-0.640	0.529^{ns}
Fish price	1.490	2.484	0.022*
Cassava price	0.001	1.430	0.524^{ns}
Household size	0.283	2.715	0.013*
Cassava yield	-0.121	-2.515	0.018*
(Constant)	12.925	2.133	0.045
R^2 = 0.669			
F-ratio= 0.003			

Notes: * significant at 5 percent
^{ns}nonsignificant at 5 percent

The regression results in Table 3 show that the adjusted R^2 was 0.669, meaning that 66.9 percent of the variation in the dependent variables could be explained by factors in the model (independent variables), whereas other variables beyond the model explained the remaining 33.1 percent. The F-ratio, which provided an overall test of significance of the whole function of the regression line, was significant at 5 percent ($p < 0.05$). This result shows that, overall, all independent variables had a statistically significant effect on food expenditure of cassava growing households at 5 percent.

Based on the t-value, the variables of household income, education of household heads, fish price, family size, and cassava yield each had a significant effect on household food expenditure at 5 percent. For the model under consideration, rice price, sugar price, cooking oil price, and cassava price were not found to be significant predictors of the household food expenditure. Variables with nonsignificance effect meant that an increase or decrease in those variables would not significantly affect household food expenditure.

Household income has a positive and significant impact on food consumption expenditure at the 1 percent level. This result implies that spending on food will increase when the level of income increases. This result is supported by findings from many studies (Akpan et al., 2013; Babalola and Isitor, 2014; Betty, 2015; Habib, Malik, Ali, & Khan, 2016; Umar, Aliero, & Gatawa, 2018; Venn, Dixon, Banwell, & Strazdins, 2018; Qaim, 2019). Food is essential for households, so there is pressure not to purchase nonfood items when income decreases.

The household size has a positive and significant effect on food expenditure. This result indicates that households with more members spend more money on food than households with a smaller size. Each member of the family requires food, so a larger family size will directly lead to

increased food consumption expenditure. This result is in line with the findings of many studies (Akpan et al.,2013; Babalola and Isitor, 2014; Betty, 2015; Prasetyoningrum et al., 2016; Umar et al., 2018; Kearney, 2019). According to Dankwa et al. as cited in Babalola and Isitor (2014), the total effect of household size on expenditure is a combination of both specific effect and income. The specific effect is a result of the increase in need of various commodities as household size becomes larger. At the same time, an increase in family size makes household members relatively poorer, which is known as the income effect.

The educational level had a negative and significant relationship with food consumption expenditure. This result implies that households whose heads have a higher educational level spend less on food than their less educated counterparts. The level of education reflects the level of knowledge required for more efficiency in food purchasing and processing. Cassava growers with a high education level will be able to improve the quality of their diets and tend to choose foodstuffs that are healthier in terms of types, amount and nutrition content. Additionally, these individuals might spend more on nonfood items. This result supports the empirical findings of Akpan et al. (2013) and Adewale (2015). However, this result disagrees with the findings of Betty (2015) and Umar et al. (2018), who reported a positive and significant effect of education on food consumption expenditure.

Table 3 reveals that the increase in cassava production leads to lower food expenditure. This result is because cassava availability reduces the portion of income spent on the food staple. Higher yield of cassava reduces the expenditure for staples, as cassava is a key staple food in the study area and a primary source (along with rice) of carbohydrates.

Fish price has a positive and significant influence on food consumption expenditure. This result implies that an increase in fish price leads to increased spending on food, as the households have to purchase fish. In the study village, there are a large number of marine fish species available from capture fisheries, and they vary significantly in price. Fish is popularly consumed as the primary source of protein because for the villagers, *kasoami* tastes better when consumed with fish soup or grilled fish. Moreover, fish has no substitute. Therefore, the increase in fish price does not result in the decreased demand for fish.

4. Conclusion and Recommendations

Study results showed that the ratio of food expenditure from the total household expenditure was very high. Such a high percentage of food expenditure indicated that most cassava growing households had low levels of well-being. The highest portion of their food budgets was spent on staple foods, namely rice and cassava. This result implied the importance of energy foods for households. Due to their availability and accessibility, fish and eggs were consumed as the primary source of protein. The proportion of food budget spent on other types of protein (meat, milk, and beans) was negligible. Likewise, the budget proportion for the consumption of fruit and vegetables was low. There is, therefore, the need for proper education of households on a balanced diet in order to have active and healthy life.

Household income, education of heads of household, fish price, family size, and cassava yield had a significant effect on household food expenditure. Food is commonly regarded as a normal good and basic necessity; thus food expenditure follows the pattern suggested by Engel's law. The government should adopt policies and programs to increase household income through improvement in cassava production, processing, and marketing, and provide nutrition education so that households might have more balanced and diversified diets.

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