CASSAVA PRODUCTION AND FOOD SECURITY OF CASSAVA FARMERS' HOUSEHOLD, LAMPUNG, INDONESIA

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Abstract

Cassava is one of staple food as a substitute of rice that can be consumed by society, in order to increase food diversification especially in reducing people dependence on rice. The purpose of this study is to analyze the performance of cassava farming, and the level of farmer's household food security of cassava farming. The research was conducted in Terusan Nunyai Sub-district, Central Lampung Regency. The location is chosen purposively because the area is the center of cassava production in Lampung Province. Respondents in this study were 66 cassava farmers selected by simple random sampling. Data were analyzed descriptively using profit analysis, R/C ratio, and cross tabulation analysis between food expenditure share and energy consumption to see food security level. The results showed that cassava farming was profitable with the R / C ratio of total cost of 1.15. The contribution of cassava farming to total farmers household income was 70.38%. The share of household food expenditure is relatively high (59.25%) and the share of non-food expenditure is low (40.75%) to total expenditure. The majority of food security level of cassava farmers household were categorized as vulnerable (31.82%), food insecure (24.24%), less secure (25.76%), and only 18.18% households are in food secure category .
Keyword: Cassava, farm performance, food security, production

Introduction

Lampung Province is the largest province of cassava producers in Indonesia, in the last five years, in 2011 until 2016, Lampung cassava production has always ranked first-second of 33 provinces in Indonesia and the average production for five years is 8,266,265 tons or 35.21% of the national total. The high production of cassava in Lampung Province can indicate that cassava agriculture is the backbone of many farmers in Lampung Province, because cassava is generally cultivated by farmers with relatively limited scale of exploitation.

Cassava in Indonesia is the third staple food after rice and corn. However, currently, cassava farming is also aimed at producing agroindustries raw materials, such as tapioca flour products, fermentation industry and various food industries (Corrêa *et al.,* 2018). The problem faced in cassava farming is its low productivity caused by not yet applied cassava cultivation technology (Adekunle *et al.,* 2016) and the use of improper input (Akinpelu *et al.,* 2011). In addition, the price of cassava products always fluctuates. The productivity and price of cassava will greatly affect the income of the farmers and the income of the farmers will affect the level of household food security, which will ultimately affect the level of welfare of farmers. Internet Usage in Agricultural Extension Activities in Lampung Province (Listiana *et al.,* 2019a, b)

The need for staple food, especially rice, is predicted to increase in line with population growth. Rice is one of the main ingredients for most of the Indonesian population and its demand will always increase from time to time. The rice consumption in Indonesia accounts for 60 percent of world consumption (Timmer, 2010) and the level of food consumption is strongly associated with household income (Yimer, 2011; Kostakis, 2013). The increasing number of population it will be more severe fulfillment of food needs if only rely on rice commodities. Therefore, efforts to meet food needs through food diversification in addition to rice is

pursued through various efforts, among others, the utilization of dryland resources with cassava cultivation is quite large potential is available in Indonesia (Imelda *et al.,* 2017). On the other hand, the question arises whether a profitable cassava cultivation can enable cassava growers to have good food / resilience levels. Therefore it needs to be studied deeply about the performance of cassava farming in relation to household food security of cassava farmers in Lampung Province. The purpose of this study was to analyze the performance of cassava farming, and to analyze the level of household food security of cassava farmers in Lampung Province

Material and Methods

The research was conducted in Terusan Nunyai Sub-District, Central Lampung Regency, Lampung Province. Research location was determined purposively, considering that the area is the central production of cassava in Lampung Province. Sampling method was simple random sampling summing homogeneous groups population.

Research method was survey method. The data used in this study were primary data and secondary data. The primary data obtained through direct interviews with cassava farmer households respondents. Secondary data were obtained from the department or agency related to the study and previous reports.

Data were analyzed descriptively using profit analysis, R/C ratio, and cross tabulation analysis between food expenditure share and energy consumption to see food security level.

Results and Discussion

Performance of Cassava Farming

Research respondents are generally still young (42 years old) and still very productive. With the age that is still productive, then the opportunity to do more productive business is still wide open. Formal education achieved on average reaches advanced secondary school. The increasing

level of formal education for the rural population will have a very positive impact, especially if it is associated with the technology transfer process in order to improve the productivity of its farm. Improved rural community education, also shows that the government's mandatory education program has shown positive results. In addition to formal education, many respondents also have experience of non-formal education, especially related to agriculture, with a relatively moderate frequency (2 times). Non-formal education related to agriculture will greatly assist farmers in developing and improving their knowledge and skills in improving their productivity, and of course in the long run it can increase the production, income and welfare of the farmers themselves

Average number of family dependents of cassava household were 4 people per household. The decreasing number of dependents of the family is also a very important factor if it is associated with the level of food security and farmers' welfare. Agriculture is the main occupation of the respondents. In addition there are quite a lot of farmers who have side jobs other than the main job as farmers, such as farm laborers (21.21%), entrepreneurs (1.51%) and motorcycle taxi (3.03).

The total area of cassava farming in Terusan Nunyai has wide area with an average of 1.42 hectares. The crop varieties used by farmers will greatly determine the level of productivity to be achieved in a farm. In cassava farming farmers generally plant using superior seeds obtained by buying it to companies that provide seeds of cassava. The cassava varieties used by farmers are Cassesat, and according to the explanation of the respondents this variety is good enough and much favored by farmers because of its relatively short age

The use of labor in cassava farming at Terusan Nunyai Sub-district, Centra Lampung Regency comes from within the family and from outside the family as wage labor (paid). The pattern of planting applied by the respondent is very dependent on various conditions, especially the natural condition and supporting the existing production. Cassava farming was generally planted once a year. The majority of planting time of cassava commodities between September and October.

The use of production facilities in cassava farming tends to be intensive. Intensification of the use of production facilities in a farm will certainly determine the level of productivity and production achieved and will further affect the amount of income and income farms will be accepted by farmers. In detail the level of use of production facilities in cassava commodity farming in Lampung Province can be seen in Table 1.

Table 1: The use of production facilities of cassava farming in Lampung Province

No	Input Type	Amount	
		2015	2016
1	Land Area (ha)	1,00	1,00
2	Cassava seeds (cuttings))	12.444.06	12.147.55
3	Urea fertilizer(kg)	131.51	131,51
4	SP36 fertilizer (kg)	37.62	37,58
5	KCL fertilizer (kg)	61.99	63.48
6	TSP fertilizer (kg)	9.85	9.85
7	Ponska fertilizer (kg)	6.89	6.99
8	NPK fertilizer (kg)	104.10	105.16
9	Pesticides (l)	1.10	1
10	Herbicides (l)	1.92	1
11	Organic fertilizer (kg)	136.94	128.20
12	Manure fertilizer (kg)	112.26	112.79
13	Family labor (dw)	8.95	8.94
14	Outside family labor (dw)	10.31	10.31
15	Labor Total (dw)	19.26	19.25

The farm income is a summary of income and expenses that occurred during a specified accounting period. The result of data analysis shows that cassava farming done by farmers of respondents already have profitable which is indicated by R/C ratio which is bigger than one. This phenomenon can indicate that cassava farming has been directed to commercial effort. In detail the income of cassava farming can be seen in Table 2.

Table 2: Cassava farming income per hectare

No	Description	2015	2016
1	Total Production (kg)	20.063.36	20.324.03
2	Product Price (IDR/kg)	752.27	852.58
3	Total Value of Production (IDR)	15,091,581,90	17.327.835,92
4	Cost of Cassava Seedlings (IDR)	7.466.624.29	7.288.620,47
5	Urea Fertilizer Cost (Rp) (IDR)	244.427.85	244.427,85
6	SP36 Fertilizer Cost (Rp) (IDR)	380.769.23	396.678,32
7	Fertilizer Cost KCL(Rp) (IDR)	430.876.82	459.924,48
8	TSP Fertilizer Cost (Rp) (IDR)	156.177.15	156.177,15
9	Ponska Fertilizer Cost (Rp) (IDR)	447.552.45	524.475,52
0	NPK Fertilizer Cost (Rp) (IDR)	366.550.12	374.358,97

1	Fertilizer Cost (Rp) (IDR)	163.388.69	177.170,75
2	Herbicide Cost (Rp) (IDR)	171.236.66	199.944,79
3	Cost of Organic Fertilizer (IDR)	89.099.50	91.945,78
4	Cost of Fertilizer (IDR)	72.872.41	83.876,50
5	Family Labor Costs (IDR)	568.227.55	568.227,55
6	Outside family Labor Cost (IDR)	461.952.24	461.952,24
7	Labor Total Cost (IDR)	1.030.179.79	1.030.179,79
8	Harvesting Cost (IDR)	114.642.93	120.523,41
9	Land Rent Cost (IDR)	3.994.490.36	3.994.490,36
0	Land Tax /PBB(IDR)	80.852.27	80.852.27
1	Depreciation Cost (IDR)	156.994.50	156.994,50
2	Value Remaining (IDR)	130.121.21	130.121,21
3	Total Cash Cost (IDR)	14.641.512,96	14.655.418,86
4	Total Costs Taken into account (IDR)	15.209.740,51	15.117.371,10
	Cash Income (IDR)	7.221.983,60	2.672.443,08
	Income on Total Cost (IDR)	6.653.756,05	2.210.490,84
	R/C of cash cost	1,49	1,18
	R/C of total cost	1,44	1,15

Level of Household food security of Cassava Farmer

The essence of food security at the household level shows the ability of households to meet the adequacy of food availability (Ngema *et al.,* 2018), food access (Leroy *et al.,* 2015) and good food utilization (Kirkland *et al.,* 2013). That means the ability is linked with household food purchasing power. Finally, the consumer value of food relates to its nutritional and health attributes (Jisha *et al.,* 2010).

The number of budget allocations for food expenditures will have an impact on changes in budget allocations to non-food expenditures and vice versa. The size of the change in budget allocation of food expenditure will determine the size of the fulfillment of food and the adequacy of energy by household which will subsequently affect the nutritional state and changes in other expenditure will also impact on changes in the adequacy of energy or other nutrients. How much food expenditure will encourage an increase in nutritional adequacy or energy, were also influenced by interactions of other factors, namely preference, food and nutrition knowledge, household structure and characteristics.

The amount of household food expenditure will be strongly related to the total household expenditure. In other words, the proportion or share of household food expenditure on total expenditure will determine the level of sufficiency of energy or nutrients that can be fulfilled by the household.

Smith and Subandoro (2007) stated that one of the indicators of household food security is the share of food expenditure on total expenditure.

The share of food expenditure is used in Maxwell *et al.* (2000) concept of food security measures, through cross-classification of the share of food expenditure and household energy adequacy. Cutting point proportion of energy consumption was 80% of the requirement of energy sufficiency while cutting point for food expenditure was 60% of total household expenditure. Based on the concept of food security proposed by Maxwell *et al*. (2000), it is known that the household of cassava farmers in Lampung Province, especially in Central Lampung Regency, mostly located in the category of food vulnerable (31.82%), food less secure (25, 76%) and food insecure 16 households (24, 24%), whereas in food secure category only exist in 12 households (18,18%). This condition indicates that the influence of expenditure on the fulfillment of household energy sufficiency of cassava farmers.

This can be seen from the number of farm households in the category of food vulnerable and food insecure to 56.06% compared to those in the condition of food secure and food lees insecure. (43.94%). In detail the level of food security of household cassava farmers are presented in Table 3.

Table 3: Household food security level of cassava farmers

Energy consumption	Food Expenditure Share	
	Low (< 60% total expenditure)	Height (≥ 60% total expenditure)
Enough (>80% energy sufficiency)	Food Secure 12 (18, 18%)	Food Vulnerable 21 (31, 82 %)
Less (≤80% energy sufficiency)	Less Secure 17(25, 76%)	Food insecure 16 (24, 24%)

The high number of households of cassava farmers in the food vulnerable and food insecure category was caused by the majority of households of cassava farmers (56.06%) having high food expenditure (≥ 60%.). This means that the high share of household cassava expenditure reveals that there is still a low total expenditure on food or in other words that cassava farmers are still in the low income category. In addition, household of cassava share expenditures show that

they have low food security levels (Table 3). This was in line with the stated by (Sekhampu, 2012) that the share of food expenditure was negatively related to household expenditure, while food security was negatively related with the share of food expenditure.

The average cassava farmer in Central Lampung Regency was in the prosperous category with average of food expenditure 857.330,00 IDR / capita / month (Table 4).

Table 4: Distribution of cassava based on food expenditure

Food expenditure	Number of farmers (persons)	Percentage
Low (< 60% total expenditure)	29	43,94
Height (≥ 60% total expenditure)	37	56,06
Average	857.330 IDR	
Minimum	256.900 IDR	

Although the condition of cassava farmers was in the prosperous category, it does not necessarily affect the fulfillment and utilization of good food consumption. It; this can be seen in the fulfillment of energy consumption by the average household of cassava farmers who still do not meet the recommended energy adequacy by Widya Karya National Food and Nutrition /WNPG (2012) that is equal to 2150 Kcal where there are still half of the household cassava farmers (50 , 00%) have sufficient energy <80% (Table 5). Still not fulfilled the average energy sufficiency by the household of cassava farmers was caused by several factors, both internal and external, such as the level of knowledge of nutrition, education level, the number of family members and income level. Food expenditure will encourage an increase in the adequacy of nutrition or energy, is also influenced by the interaction of other factors namely preference factors, food quality, food safety, structure and household characterization and nutrition have implications for human welfare (Chavas, 2013; Chavas, 2016). Household food consumption pattern was influenced by the number of household members, the age of housewife and the level of nutritional knowledge of housewife (Maghsoodi, 2016).

Achievement of household energy consumption of cassava farmers in Central Lampung Regency were 1863,745 Kcal or just reached 86.69% of the amount of energy sufficiency recommended by WKNPG 2012. In general, the achievement of energy consumption is already good because it is more than 80% rate of energy adequacy recommended WKNPG 2102 and included in good category. Achievement of household energy consumption of cassava farmers in Central Lampung regency of 1863,745 Kkal or just reached 86.69% of the amount of energy sufficiency recommended by WKNPG 2012. In general, the achievement of energy consumption is already good because it is more than 80% AKE recommended WKNPG 2102 and included in either category.

Table 5: Distribution of cassava based on energy consumption

Energy consumption	Number of farmers (people)	Percentage (%)
Enough (> 80-%))	33	50,00
Low (≤ 80%))	333	50,00
Average	1863,745 kkal	
Minimum	1,034,525 kcal	
Maximum	3,834,360 kcal	

Conclusion

Cassava farming conducted by farmers in Central Lampung, Lampung Province was relatively intensive, but productivity is still relatively low. The results of profitability analysis on cash and total cost was included in the profitable category. The share of household food expenditure is relatively high and the share of non-food expenditure is low to total expenditure. The majority of food security level of cassava farmers' household were categorized as vulnerable.

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