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2 The economic role of cassava in farmers' households in Central Lampung Regency, Lampung Province

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Abstract. This study aimed to analyze the economic role of cassava in farm households in Central Lampung Regency in the span of 1998 to 2018. Data collection were using surveys and in-depth interviews and analyzed using tabulation method. The results showed that there had been a decline in the economic role of cassava in farm households from 86% to 43.39%. There had been an increase in the share of on-farm income outside cassava (sugar cane, poultry farming, and cattle, etc) and the share of off-farm income (farm laborers) and non-farm income (employees, drivers, and traders) in line with the growth of the sugar processing industry since the past 10 years. In 1998, the economic role of cassava on household income was 86% while it was 43.39% in 2018. Non-cassava income was 39.13%, off-farm income as farmer income was 8.52%, and non-farm income was 8.96%. The shift of the primary sector to the secondary and tertiary sectors occurred because in Terusan Nunyai Sub-district, sugar cane factories and pineapple factories had been established, so farmers preferred to become farm laborers, employees, drivers, and traders to increase their incomes.

1 Introduction

Cassava (*Manihot utilissima*) is a potential food crop commodity in Indonesia besides rice and corn [1]. In Indonesia, cassava is one of the foods that are used for diversification of food substitutes for rice [2]. Cassava (*Manihot utilisima*) is one of the agricultural products that contain carbohydrates and sources of calories are quite high [3,4]). Cassava can be used as raw material for intermediate products, namely cassava, tapioca, cassava flour, etc [5, 6, 7, 8, 9]. Inter-product products are raw materials for downstream industries in the food and pharmaceutical sectors [10,11].

Based on Ministry of Agriculture of Indonesia, Cassava is an excellent commodity that contributed the largest exports to the agricultural sector in Indonesia in 2010-2014 [12]. Cassava needs in the world are met by five producing countries namely Nigeria (32%), Congo (19%), Brazil (18%), Thailand (14%) and Indonesia (12%) [13]. The centers of

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cassava production in Indonesia are located in Lampung (37.39%), Central Java (16.89%), East Java (11.02%), West Java (9.07%) and North Sumatra [12]. Lampung Province is the number one cassava center in Indonesia. At the provincial level, Central Lampung Regency is the main cassava production center in Lampung Province. In 2017, cassava production in Central Lampung Regency was 3.37 million tons of wet tubers or equal to 40.20 percent of the total cassava production in Lampung Province [14].

In general there is a decrease in the area of cassava. In 2018 there has been a decrease in harvested area and cassava production in Indonesia from 2011 to 2017. In 2011 production was 24,044,025 tons and decreased to 19,046,000 tons. Thus the harvested area from 1,184,696 Ha to 778,664 Ha [14]. This condition illustrates that cassava agribusiness in Indonesia is facing a serious problem and if left unchecked it will threaten the sustainability of cassava agribusiness which mostly involves small farmers.

Cassava farming faces many problems. Price uncertainty factor is the main factor in cassava farming losses. In addition, the weak carrying capacity of the land causes cassava productivity to be lower. Decreased land fertility causes greater input and costs, harvest / post-harvest issues including yield processing, institutional, and marketing. The many obstacles faced cause increasing opportunities for transformation of cassava farmers into non-cassava farmers, off-farm and if this is allowed to affect the sustainability of cassava farming in the future.

Cassava farmers are often connoted as low-income and poor farmers. This is due to the low price of cassava in a few decades. Uncertainty in the price and economic condition of cassava has caused farmers to start looking for additional income outside of cassava farming to transfer the cassava commodity. This study will analyze the changing of economic role of cassava on farmer households in Central Lampung Regency in the last 20 years.

2 Research Methods

The study was conducted in August to October 2019. The location selection was determined purposively with the consideration that the Central Lampung Regency was the production center of cassava in Lampung Province. The area of research was Gunung Agung village, Terusan Nunyai Sub-District, Central Lampung Regency. Data were analyzed descriptively quantitatively including farming analysis, cassava farmer household income and welfare level. Data processing methods were carried out using tabulation and computational methods. The sample farmers were 78 cassava farmers. Sampling used purposive method, that is, sampling based on intentional, the selection of subject groups is based on certain traits or traits that are considered to have a close relationship with the traits or traits of populations that have been known previously [15].

Analysis of usahatani/farming (Partial Budget Analysis) cassava by calculating the income of cassava farmers in the planting season one is calculated by subtracting the value of commodity sales with the production costs incurred (explicit cost) [16]. In addition, income analysis will also be used to calculate other sources of income from non-cassava farming or non-agricultural businesses. In this study, the economic role of cassava will be compared with 20 years ago. The approach used is a qualitative approach with the historical approach method.

Household income is obtained by adding up family income from farming and family income from non-farming, with the following formula:

$$\text{Income of Household} = \text{Income from farming} + \text{Income from non-farming}$$

3 Results and Discussion

3.1 Overview of respondents

Respondents have an average age of 49 years. Distribution of respondent farmers is in the productive age and non-productive age group. In the productive age group (15 - 65 years) with a percentage of 92 percent. This shows that farmers in the study area have enough potential to carry out their business activities. Productive age can be interpreted economically that in general the level of willingness, enthusiasm, and ability to develop farming tends to be higher and have a great responsibility for their business, because in reality the fate of farmers is determined by themselves [17].

The education level of most farmers has an elementary school education. The number of dependents is 3-4 families. Some cassava farmers have side jobs outside their main job as cassava farmers, namely sugar cane, cattle, goat and chicken farmers, farm laborers, employees, drivers, traders, laborers. The area of land in Gunung Agung Village, Terusan Nunyai Subdistrict, Central Lampung Regency is mostly in the narrow strata of 1.5 ha. The average experience of cassava farming is 16 years. This shows that the respondent is sufficient in the experience of cassava farming farmers.

3.2 Income of cassava farmers

3.2.1 Income of cassava farming (On-farm)

Cassava farming income is analyzed by calculating R/C or a comparison between revenue and costs. Analysis of income in Gunung Agung Village, Terusan Nunyai Sub-District, Central Lampung Regency is presented in Table 1.

Table 1. The income of cassava farmers in Central Lampung Regency 2019

Description	Area 1,26 ha			Per hectare
	Production (kg)	Price (IDR/Kg)	Cost	Total cost/ha
Revenue	28,966.03	1,093.08	31,662,094.18	25,128,646.18
Cash Cost			10,087,624.93	8,006,051.53
Calculated Cost			5,321,138.92	4,223,126.13
Total Cost			15,408,763.85	2,229,177.66
R/C to cash cost			3,14	3,14
R/C to total cost			2,05	2,05

Source: Primary data processed (2019)

The average cassava production is 28,966.03 kg / ha with a selling price of IDR 1,093.08/ kg. Received IDR 25,128,646.18 / ha. R / C value is more than 1, meaning that cassava farming is profitable and feasible to be developed. This is in line with previous research which states that cassava farming that applies a partnership pattern or not, is a profitable and feasible farm business [18, 19, 20].

3.2.2 Non-cassava farming income (On-farm)

In addition to cassava farming, respondent farmers also carry out other farming activities in order to increase household income. The business includes sugar cane farming and animal

6 husbandry. The average income of respondent farmers from non-cassava farming activities can be seen in Figure 1.

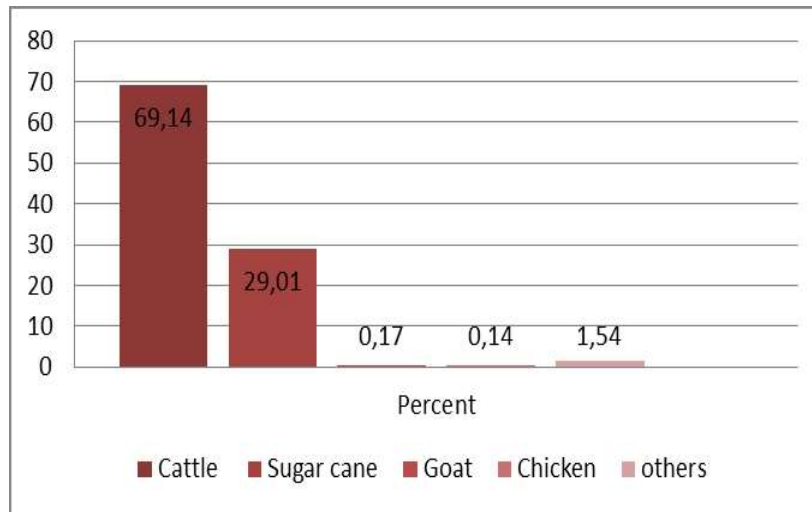


Figure 1. Farmers income from non-cassava farming in Central Lampung District

Figure 1 shows the results that the respondent farmers' income from non-cassava farming is IDR 22,666,029.33 per year with the largest contribution is income from cattle farming (69.14%). While other income came from sugarcane farming (29.01%), goat livestock (1.71%), and chicken livestock (0.14%).

3.2.3 Income outside of farming activities (Off-farm)

The increasing need causes cassava farmers to transform to look for other income. Some cassava farming households that have low incomes look for other activities outside of off-farm farming activities to fill spare time. The more often family members do off-farm activities, the more their household income will increase, generally working as a farm laborer is a side job of cassava farmers. The income of the respondent farmers from off farm activities is IDR 10,123,846.15 per year.

3.2.4 Non-farming income (Non-farm)

To increase household income, farmers generally do not only depend on on-farm and off-farm income but also earn income by conducting non-farm business activities. This non-agricultural business activity is an alternative livelihood for households, especially for workers who are relatively young and have sufficient education and skills. This non-agricultural business work is usually carried out by farmers, housewives, and other family members. Various non-farm business activities carried out by respondent farmers are employees, drivers, trading, and construction workers. Construction workers gave the largest contribution to household income 69.00% or IDR 9,498,461,53.00, while other contributions came from activities as traders (14.00%), as employees (16.00%) and driver (1%).

4 The level of household income affects the level of household welfare. Where if the income of a household is higher, then the expenditure of that household will also be higher and vice versa. So that households with greater incomes tend to be more prosperous compared to households with small incomes. Sources of household income come from farm income from cultivation activities (on farm), farming income outside of farming activities (off farm), and farmer income outside the agricultural sector (non-farm). Each revenue

sector contributes differently to the total income. Each income has a role that can describe the carrying capacity of natural and human resources.

3.3 The economic role of cassava in farmers' households: past and now

In 1998, the largest source of household income came from cassava farming activities, namely 86 percent, non-cassava income 3 percent, off-farm income 7 percent, and non-farm income 4 percent. In 2019, the economic contribution of cassava farming to farm households decreased to 43.39 percent, non-cassava income 39, 13 percent, off-farm income as farmer income by 8.52 percent, and non-farm income 8.96 percent.

The current shift in the economic role of cassava is due to the establishment of sugar cane factories and pineapple factories, so farmers prefer to become agricultural laborers, employees, drivers, coolies and traders to increase their incomes. Low income and productivity in the agricultural sector will cause farmers to switch to the non-agricultural sector. This is in line with Kuntoro research, which states that residents of the lower economic class who mostly work in the agricultural sector tend to have a small income because the agricultural sector has low productivity [21]. The industrial and service sectors are often the goal of shifting the work of agricultural sector workers to improve economic conditions [22, 23, 24].

Table 2. Change the role of cassava in farmer household economy in Central Lampung Regency in 2019

Source of Household Income	The role of cassave economics (in percent)	
	1998	2019
a. On-farm income (casavva)	86,00	43,39
b. Non-cassava	3,00	39,13
c. Off farm income (hodge)	7,00	8,52
d. Non-farm income (employees, drivers, coolies, traders)	4,00	8,96
Total (percent)	100,00	100,00

Source: Primary data processed (2019)

3.4 Cost Structure of Cassava Farming

Indicators of the economic role of cassava in farm households can be seen a change in the structure of farming costs. The production value of cassava farming in Lampung Province is IDR 18,593,746.10, with a production cost of IDR 11,179,499 and an R / C ratio of 1.66. In 2019 the value of cassava production, and production costs tend to increase. However, even though production costs have increased, the R / C Ratio of cassava farming is still worth more than 1, which means that cassava farming is still worth the effort.

In 2014 the largest proportion of cost components in cassava farming was land rent, labor, fertilizer and seeds. Changes occur in the structure of farming costs in 2019 where the proportion of land rent and labor has decreased while fertilizer, pesticides have increased. This decrease in labor is due to farmers shifting to sectors outside farming, increasingly narrow agricultural land and the use of technology. This can lead to lower cassava production. This is in line with previous research that cassava production is largely determined by land area [25], fertilizer use, and labor flows. Increasing farm income in the short term can be achieved through realignment of the use of production factors (sub-optimal scenarios), and in the medium term by increasing the area of planting, and the use

of essential production factors, the long term can be done by developing cultivation technology.

4 Conclusion

The results of the study illustrate that there has been a decline in the role of cassava in cassava farm households in Terusan Nunyai sub-District, Central Lampung Regency in the last 20 years. Changes the role of cassava in the household economy occurred gradually and are in the initial phase of economic transformation after going through a period of 20 years since 1998 characterized by a decline in the share of cassava farming income from 86 percent to 43.39 percent and an increase in the share of on-farm income outside of cassava (sugar cane, chicken, goat, and cattle) and off-farm income (farm laborers) and non-farm income (employees, drivers, coolies and traders) that are in line with the growth of the sugar processing industry in the last 10 years.

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