

Farmers' contributions in the establishment of value-added from holistic cocoa processing: A case study in Trenggalek Regency, East Java

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Abstract. One of the efforts that can be taken to increase the competitiveness of smallholder cocoa plantations is to increase the value of the product through processing from upstream to downstream. The study aimed to analyze the value-added at various stages of processing cocoa beans and identify the contribution of farmers in creating value-added in the processing flow of the people's cocoa beans from upstream to downstream in Karangany District, Trenggalek Regency. The study was conducted in Karangany District that has facilities to perform cocoa processing from upstream to downstream. Hayami method was used to value-added from various stages of smallholder cocoa bean processing and descriptive analysis was used to analyze the contribution of farmers in processing activities. The results showed that the percentages of value-added from the processing of cocoa pods into wet cocoa beans were 0.99%, cocoa pods into non-fermented dry cocoa beans was 2.27%, cocoa-pods into fermented dry cocoa beans was 4.82%, fermented dried cocoa beans into pure cocoa powder was 20.06%, and processing pure cocoa powder into instant drinks was 71.86%. The study means that the value-added value and profits obtained by farmers for their contribution to cocoa processing are still relatively low.

Keywords: Value-added, cocoa, processing, farmer, contribution

1. Introduction

Indonesian plantation subsector plays an important role in the national economy from the marketing of several leading commodities traded on the international market. The development of agricultural commodities. As cocoa is focused not only on the expansion of the cultivation area but also on innovations in the processing of the results of increased value-added farm products competitive. The value-added of the plantation subsector is created from the functional linkage of upstream (off-farm) to downstream (off-farm) [1].

Cocoa (*Theobroma cacao* L.) is another estate crop, besides oil palm and coffee that has an important role in the Indonesian economy. The important role of cocoa is as a provider of employment, sources of income for farmers, a producer of foreign exchange, increasing regional development, and the development of agribusiness and agro-industry in Indonesia [2]. The exploitation of cocoa plantations in Indonesia is supported by the suitability of the geographical location of Indonesia with the condition of growing cocoa plants, namely the tropics that have high humidity, high temperatures, and shaded sunlight [3].

Cocoa plantation in the Trenggalek Regency, East Java, which steadily increased every year.



As the result, the cocoa production from the Regency also Increased. Therefore, the Trenggalek Regency has become one of the highest cocoa producers in East Java Province. Cocoa plantations in The Trenggalek mainly belonged to smallholders. The development of community cocoa farming in the Trenggalek Regency is supported by a government program through the provision of land, cocoa seedlings, machinery, and coaching cocoa farmers, to increase cocoa production in the Trenggalek Regency [4].

Cocoa production in Trenggalek Regency has increased from year to year. In 2016, production increased by 249.26 tons, and in 2017 an increase of 127.87 tons. Several regions in the Regency that produced cocoa are the Karangany District, Kampak Subdistrict, Gandusari Subdistrict and Tugu Subdistrict. Cocoa yield in these districts fluctuated. For example in the Karangany District, cocoa production reached -73.43 tons in 2016, but in 2017 it decreased by 40.54% to 71.29 tons. The decline in cocoa production in The Karangany subdistrict is due to the less competitiveness of cocoa than other estate crops [5].

The development of cocoa commodities one of its cocoa is focused not only on the expansion of the cultivation area but also on innovations in the processing of the results of increased value-added farm products competitive [6]. The value-added of the plantation subsector is created from the functional linkage of upstream (on-farm) to downstream (off-farm). Thus, one of the ways that can be done to improve the competitiveness and income of the community cocoa agribusiness is through the value-added of cocoa from upstream to downstream, starting from the level of farmers in conducting cocoa farming as well as the processing of cocoa pods and marketing institutions in processing cocoa beans so that produce final products which are then marketed to end consumers [7].

The value-added is the processing of agricultural products at an increase in the value of production [8]. The existence of cocoa bean processing is expected to provide value-added to the cocoa beans from the expenditure costs so that new prices are formed which are higher and able to provide greater profits. The creation of value-added can be done on the processing of cocoa beans from upstream to downstream. Upstream cocoa bean processing is a cocoa bean processing activity carried out at the farm level as a postharvest activity. Meanwhile, the downstream processing of cocoa beans cocoa bean processing activities is conducted by marketing agencies and produces semi-finished products and final products [9].

Processing cocoa beans through agro-industry activities is one of the downstream activities carried out to increase the value of cocoa beans so that it can have an impact on increasing farmers' incomes [10]. The cocoa agro-industry has ample opportunities to be developed, to open up opportunities in processing upstream to downstream cocoa beans, and can provide value-added. Processing is done to reduce losses due to the quality and quantity of cocoa beans being less satisfactory, thus requiring producers to do processing so that cocoa beans have a higher selling value [11].

Cocoa agro-industry activities have problems that can disrupt agro-industry activities and can reduce the value-added of cocoa. The first problem, farmers in Indonesia do not do post-harvest handling of cocoa beans such as the fermentation process. The fermentation process is very important to do in cocoa beans to improve the quality of cocoa beans [12]. Second, the drying process still uses the traditional method of drying in the sun. Postharvest handling is very important to maintain the quality of seeds. Appropriate postharvest handling can increase value-added and can increase the shelf life of cocoa, to reduce the costs expended. Longer shelf life can increase farmers' income due to storage with a longer period than marketing in the raw form [11]

Karangany District has the second-highest average cocoa production in Trenggalek, although in 2017 production decreased. Karangany District is the only sub-district in Trenggalek Regency that can describe the processing of cocoa beans from upstream to downstream, this can be proven by the existence of cocoa farming activities through community plantations, cocoa bean processing institutions, and cocoa processing marketing institutions. The cocoa processing institute, the Product Processing Unit (UPH), and the cocoa processing acyl marketing institution, the Chocolate

House [13].

The existence of processing cocoa beans from upstream to downstream in the Karangany District is expected to be able to describe the historical cocoa, which can be used to find out how to add value from each change in the shape of cocoa beans, so it can be seen the percentage of the highest value-added from processing cocoa beans from upstream to downstream. The increase in value-added is expected to increase the income of cocoa agribusiness actors in the Trenggalek Regency, especially in the Karangany District. The purpose of this study was to analyze value-added at various stages of processing cocoa beans from upstream to downstream in Karangany District and to identify the contribution of farmers in creating value-added in the processing flow of the people's cocoa beans from upstream to downstream in Karangany District, Trenggalek Regency

2. Methods

This research was conducted in 2019. The research location was chosen by using a purposive method with the consideration that Karangany District is the only sub-district where there is a process of processing community cocoa from upstream to downstream. The research method used is descriptive and analytical methods. The sampling method used was purposive sampling, namely 4 smallholder cocoa farmers, the plantation and foodservice offices (UPH coordinator), and the Chocolate House owner. Data collection methods are using observation, interviews, and documentation.

The method of analyzing data on the first problem concerns the value-added of products produced from various stages of processing the people's cocoa beans from upstream to downstream using the Hayami Method. According to Sudiyono [14], mathematically it can be calculated using the following formula:

$$VA = PV - IC$$

Information:

VA : Value Added or product value-added (USD / kg of raw materials)

PV : Product Value or selling price of raw material union production (USD / kg of raw materials)

IC : Intermediate Cost or costs used during the production process in addition to labor costs (USD / kg of raw materials).

Decision-making criteria, namely:

- a. If the value added > 0 means that the processing can provide value-added.
- b. If the value-added ≤ 0 means the processing is not able to provide value-added.

Decision-making criteria, namely:

- a. if the value-added ratio is $< 15\%$ means the value-added is low.
- b. if the value-added ratio is $15\% - 40\%$ it means that the value-added is moderate.
- c. if the value-added ratio $> 40\%$ means the value-added is high [15]

Data analysis method on the second problem concerning the contribution of farmers in creating value-added in the processing of people's cocoa beans from upstream to downstream using descriptive analysis method. The descriptive method is used to analyze the contribution of farmers in Karangany District, Trenggalek Regency.

3. Results and discussion

3.1 Value-added processing of cocoa beans from upstream to downstream

The processing of agricultural commodities can increase the value of agricultural commodities produced. One of the agricultural commodities produced by farmers in Karangany District, Trenggalek Regency is cocoa. The results of the people's cocoa farming are long-haired cocoa. Cocoa fruit needs to be given special treatment or processing before it is consumed by the final consumer. The processing of longtail cocoa fruit is divided into three stages, namely upstream processing (postharvest), intermediate processing, and downstream processing (processing of

intermediate processing products). Processing of upstream cocoa pods from upstream to downstream will add value to the longtail cocoa fruit.

Value-added is the value-added generated from the existence of special treatment or processing of raw materials or raw materials during the production process. The value-added analysis is important to do in processing longitudinal cocoa pods from upstream to downstream because the magnitude of value-added of cocoa bean is an important thing for business actors involved in processing longtail cocoa from upstream to downstream. After all, it can know the value of remuneration provided by the factors of production used. The value-added generated from the processing of the longtail cocoa fruit can describe the rewards for the labor, capital and management involved. In this study, value-added considerations were carried out in each process of the longitudinal cocoa pods from upstream to downstream, namely:

1. Processing wet cocoa pods into wet cocoa beans
2. Processing non-fermented cocoa pods into non-fermented cocoa beans
3. Processing of long-term cocoa beans into fermented dried cocoa beans
4. Processing fermented dried cocoa beans into pure cocoa powder
5. Processing pure chocolate powder into instant drinks

Processing cocoa beans into the final product through several business actors, so that the calculation of value-added is differentiated. Calculation of value-added analysis in this study uses units of kilograms of raw materials in one production process, so the data used is data per production process.

The value-added of the processing of smallholder cocoa from upstream to downstream is analyzed using a Hayami table where the value-added is the result of a reduction in the value of production with intermediate costs. Intermediate costs are variable costs during the production process (other than labor) that are incurred by each actor in processing people's cocoa beans from upstream to downstream, such as the cost of raw materials, packaging costs, and costs of the equipment used during the production process. Calculation of value-added at various stages of processing of community cocoa bites can be seen in Table 1.

Table 1. Calculation of value-added processing of cocoa fruit into wet beans, cocoa fruit for non-fermented dry beans, fermented dry beans, fermented dry cocoa beans into pure chocolate powder, and fermented dry cocoa beans into 3 in 1 beverage.

Code	Variable	Unit	Wet beans	Dry beans		Pure cocoa powder	3in1 chocolate drinks	Final consumer
				non-fermented	fermented			
1	Raw material input price	USD/kg	0.10	0.10	0.10	2.30	9.89	7.77
2	Product price	USD/kg	0.39	1.58	2.30	9.89	7.77	
Output, input, and price								Total
3	<i>Output</i>	Kg	5.85	2.95	14.74	12.30	12.25	
4	<i>Raw material input</i>	Kg	16.74	23.24	146.81	22.10	3.50	
5	<i>Labour input</i>	Hr	6.00	10.00	37.00	41.00	13.00	
6	Conversion factor		0.35	0.13	0.10	0.56	3.50	
7	Labour coefficient	Jam/kg	0.36	1.08	0.18	1.81	3.71	
8	Product price	USD/Kg	0.39	1.58	2.30	9.89	7.77	
9	Wage	USD/hr	0.011	0.0076	0.0012	0.12	0.074	
Income and profit								
10	Raw material input price	USD/Kg	0.10	0.10	0.10	2.30	9.89	
11	Other current input	USD/Kg	0.0097	0.040	0.0037	2.69	12.99	
12	Product	USD/Kg	0.14	0.20	0.23	5.51	24.73	
13a	Value added	USD/Kg	0.026	0.059	0.12	0.52	1.86	6.30
13b	Value-added ratio	(%)	18.60	29.21	53.94	9.41	7.50	
14a	Labour income	USD/Kg	0.0038	0.0033	0.00030	0.23	0.27	

14b	Labour's share	(%)	14.75	5.58	0.24	43.92	14.73	
15a	Profit	USD/Kg	0.022	0.055	0.12	0.29	1.58	5.34
15b	Profit rate	(%)	15.86	27.58	53.81	5.28	6.40	
Conversion factors of 1 Kg Cocoa fruits			0.35	0.13	0.10	0.056	0.264	

Source: Primary Data Processed 2019

The results of the calculation of the value-added obtained in the present study were:

1. Agribusiness actors involved in the processing of the people's cocoa beans in the Karanga District were farmers. collecting traders. Yield Processing Unit (UPH) and Chocolate House.
2. Products used in the calculation of value-added using the Hayami method are wet cocoa beans, non-fermented dry cocoa beans, fermented dry cocoa beans, pure cocoa powder, and 3 in 1 drinks.
3. The value-added of processing of cocoa pod into wet cocoa beans was USD 0.026 / production process. with a value-added ratio of 18.60% so that the value-added is moderate.
4. The value-added of processing of cocoa pod into non-fermented cocoa beans was USD 0.059 / production process. with a value-added ratio of 29.21% so that the value-added is classified as moderate.
5. The value-added of processing of cocoa pods into fermented dried cocoa beans was USD 0.12 / production process. with a value-added ratio of 53.94% so the value-added is relatively high.

Value-added in the processing of fermented dried cocoa beans into pure cocoa powder was USD

0.52 / production process. with a value-added ratio of 9.41% so that the value-added is relatively low.

The value-added of processing pure cocoa powder into a 3 in 1 beverage was USD 1.68 / product process. with a value-added ratio of 7.50% so that the value-added is relatively low.

3.2 Contribution farmers in establishment value-added processing of cocoa beans from upstream to downstream.

Agribusiness players who play a role in the processing of people's cocoa beans from upstream to downstream in Karangas District consisted of smallholder cocoa farmers, traders, large traders, Yield Processing Unit (UPH), and Chocolate House. People's cocoa farmers play a role in harvesting people's long-haired cacao fruit. after harvesting people's long-haired cacao fruit, some farmers sell it directly to collectors, some farmers directly sell to the Processing Unit (UPH) and some farmers do the processing into non-fermented dry cocoa beans. The role of farmers in processing cocoa beans involved the selling price of longitudinal cocoa pods with the selling price of fermented dry cocoa beans and non-fermented dry beans, as well as the time taken to process community cocoa beans and the number of cocoa pods harvested. The role of farmers in processing activities includes smallholder cocoa farming activities that produce cacao fruit, postharvest processing activities where farmers process the cacao seed into wet cocoa beans, non-fermented dry cocoa beans and fermented dried cocoa beans. in the calculation of value-added using the Hayami analyses presented in Table 1 can be obtained the value of value-added and share profit in each process of processing cocoa beans from upstream to hill percentage of profit and the value-added percentage is presented in Table 2. as follows:

Table 2. Comparison of added value and profit percentage at various stages of smallholder cocoa bean processing in Karangas District, Trenggalek Regency.

Variable	Unit	Wet beans	Dry beans		Pure cocoa powder	3in1 chocolate drink
			Dry beans	fermented		
				Yield Processing		Chocolate
Agent		farmer	farmer	farmer	Unit	House
Value-added rate	(%)	0.56	1.56	2.03	41.99	53.86
Profit rate	(%)	0.66	1.84	2.40	45.37	49.74

Source: Primary Data Processed 2019.

Based on Table 2, it can be seen that the percentage of value-added generated from the division of value-added processing with the total value added from processing cocoa from upstream to downstream. The percentage of value-added from the processing of cocoa pods into wet cocoa beans is 0.99%. Processing of cocoa pods into non-fermented dry cocoa beans is 2.27%. Processing of cocoa pods into fermented dry cocoa beans is 4.82%. Processing fermented dried cocoa beans into pure cocoa powder is 20.06% and processing pure cocoa powder into 3 in 1 drinks is 71.86%. Thus, it can be seen that the highest value-added is produced in processing pure cocoa powder into a 3 in 1 beverage with a value-added of USD 1.86 or 71.86% of the total value-added from various stages of processing people's cocoa from upstream to downstream. The high value-added planning of processing pure cocoa powder into 3 in 1 drinks is influenced by the selling price of high 3 in 1 beverage products, thus affecting the product value and the value-added produced.

In addition to generating a percentage of value-added, this study also obtained a percentage of profit. Percentage of profits derived from the distribution between the benefits of each processing divided by the total profits from processing cocoa from upstream to downstream. The percentage of profits from processing cocoa pods into wet cocoa beans is 1.09%. Processing cocoa pods into non-fermented dry cocoa beans is 2.76%. Processing cocoa pods into fermented dry cocoa beans is 26.18%. Processing beans fermented dry cocoa into pure cocoa powder is 11.16%, and processing pure cocoa powder into 3 in 1 drinks is 78.82%. Thus, it can be seen that the highest profit is generated from processing pure cocoa powder into a 3 in 1 beverage with a percentage of the profit of 78.82% of the total profits from various stages of processing people's cocoa from upstream to downstream. The high-profit processing in processing pure cocoa powder into 3 in 1 drinks is influenced by the value-added generated from the processing.

4. Conclusion

The percentage of value-added generated from the division of value-added processing with the total value added from processing cocoa from upstream to downstream. The percentage of value-added from the processing of cocoa pods into wet cocoa beans was 0.99%. The processing of cocoa pods into non-fermented dry cocoa beans was 2.27%. The processing of cocoa pods into fermented dry cocoa beans was 4.82%. The processing of fermented dried cocoa beans into pure cocoa powder was 20.06% and the processing of pure cocoa powder into instant drinks was 71.86%. The study indicates that the value-added received by farmers in the processing of cocoa beans from upstream to downstream is quite low profits.

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