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Analysis of value added agro industry arabica export coffee processing in Aceh Tengah case study at Oro Coffee Gayo

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Abstract. This study aims to determine the value added of export Arabica coffee and the efficiency of export Arabica coffee marketing at Oro Coffee Gayo in Aceh Tengah Regency. Determination of the location of this study determined intentionally (purposive). The analytical method used in this research is the value-added analysis method of the Hayami model and the marketing efficiency analysis method. The analysis shows the value added of export Arabica coffee green bean grade 1 (special) on Oro Coffee Gayo is moderate, and green bean grade 2 (premium) is also moderate. Based on the value of marketing efficiency of green bean grade 1 and green bean grade 2 Oro Coffee Gayo marketing is assessed as efficient which is equal to (EP 0-50% efficient marketing).

1. Introduction

Coffee has an important role in increasing the income of farmers spread in various regions in Indonesia and as a source of foreign exchange earnings. In recent years the volume of Indonesian coffee exports in recent years has tended to increase with an average growth of 4.39% per year and [1] recorded that in 2017, it grew 12.56%. [2] informed that in 2010 Indonesia's coffee export volume was 432.7 thousand tons with an export value of US \$ 812.4 million, then in 2017, the export volume increased to 464.2 thousand tons or US \$ 1.2 million.

One of the producers of Arabica coffee in Indonesia is the Gayo highland. Gayo Coffee has a strong international market position, the amount of Arabica coffee exported from Aceh Tengah Regency to foreign countries from January to September 2015 reached more than 7,000 tons with a value of 39.9 million US dollars or around Rp 486 billion in the form of green beans [3].

According to [20], the development of industries that process primary agricultural products into processed products, semi-finished products, and final products, will provide value added to the products produced. In the Gayo highlands, Arabica coffee is traded as raw material in the form of green beans [3]. Green beans which are produced for export coffee, have a very good opportunity in the market if there is an increase in the value chain that adds value to the business. On the other ways, increasing coffee demand is an opportunity to increase coffee supply, which will develop the company's market by practicing value-added products as a corporate strategy [4].

One of the agro-industries in the Gayo highlands, which conducts export coffee processing is Oro Coffee Gayo, which was established in 2009. The Oro Coffee Gayo business starts from processing non-sorting green beans into green bean specialty or grade 1 green bean products and green bean grade 2 (premium).



The purpose of this study was 1) Analyzing how much agroindustry of Oro Coffee Gayo export Arabica coffee can create value added for coffee, and 2) Determine whether the efficiency level of marketing of export Arabica coffee at Oro Coffee Gayo.

2. Material and Method

This research was conducted at Oro Coffee Gayo, which is located on Jl. Bireun Takengon KM. 100, Kampung Mongal, Kec. Bebesen, Bebesen, Aceh Tengah Regency. The choice of location and sample is determined by the Purposive Sampling technique (deliberate sample selection) with consideration because this is a case study in one of the export coffee processing industries that consistently produces. The time of the study was conducted from October to November 2017.

The object of this research is the Oro Gayo coffee processing agro-industry. The scope of the research is limited to the analysis of value added and marketing efficiency of export Arabica coffee at Oro Coffee Gayo. The method in this research is to use a case study approach because this method emphasizes the depth of analysis in certain more specific cases. The analysis technique used in this study is the Hayami Method and the marketing efficiency analysis method.

The type of data used in this study are primary and secondary data. The primary data collection method is done by direct interview and observation. In the direct interview, the sources interviewed were various parties who had an important role in the export Arabica coffee agro-industry in Oro Coffee Gayo using a prepared research questionnaire. While secondary data is obtained from literature, reports, and from other relevant agencies related to research.

2.1 Measurement of Value Added Using the Hayami Method

Value-added analysis of the Hayami method is a method that estimates changes in the value of raw materials after getting treatment. The formula used can be formulated as follows [5].

Table 1. Analysis of Inputs, Outputs, and Prices Value Added Analysis of the One Time Hayami Model of Coffee Production Processes at the Gayo Oro Coffee in Aceh Tengah Regency.

	Variable	Unit	Notation
I	Input, Output, Price		
1.	Input *	Kg/period	The raw material used to produce coffee in one production process
2.	Output	Kg/period	Total Arabica coffee production produced by Arabica coffee agro-industry
3.	Labor	HOK/period	The raw material used to produce coffee in one production process
4.	Conversion Factor	Kg/period	Per Worker's Day in an analysis period
5.	Labor Coefficient	HOK/kg	Conversion Factor = Output / Input
6.	Output Price	Rp/kg	Labor Coefficient = Labor / Input
7.	Average Labor Wages	Rp/period	Product prices that apply in one analysis period
			The average amount of wages received by workers in each production period is calculated on a per Workers' Day basis

Source: [5]

Information: * One time production process

** Other inputs = packaging (sacks), threads, needles, driving the processing machine

*** Benefits are valued on operating costs (raw materials, other inputs, and labor)

Table 2. Analysis of Income and Benefits of Value Added Analysis of the Hayami Model in One Production Process at Oro Coffee Gayo in Aceh Tengah Regency.

	Variable	Unit	Notation
II	Revenue and Benefits		
8.	Raw material prices	Rp/Kg	The input price of the main raw material is coffee fruit per kilogram during the analysis period
9.	Other Input Donations **	Rp/Kg	Donations or other input costs consisting of costs of auxiliary raw materials, depreciation costs
10.	Output Value	Rp/Kg	Output Value = Conversion Factor x Output Price
11.	a. Value-added	Rp/Kg	Value Added = Output Value - Price of Raw Material - Other Input Contribution
	b. Value Added Ratio	%	Percentage of Value Added Ratio = Value added / output value x 100%
12.	a. Labor Income	Rp/Kg	Labor Income = Labor Coefficient x Average Labor Wages
	b. Percentage of Labor Contribution	%	Percentage of Labor Contribution = Labor Revenue / Value Added x 100%
13.	a. Processing Advantages ***	Rp/Kg	Processing Benefits = Value Added - Labor Income
	b. Profit rate	%	Profit Level = Processing Profit / Output Value x 100%

Source:[5]

Information: * One time production process

** Other inputs = packaging (sacks), threads, needles, driving the processing machine

*** Benefits are valued on operating costs (raw materials, other inputs, and labor)

Table 3. Analysis of Service Factor, Analysis of Production Value Added, Analysis of the Hayami Model in One Production Process at Oro Coffee Gayo in Aceh Tengah Regency.

	Variable	Unit	Notation
III	Repayment for Production Factor Services		
14.	Profit Margin	Rp/Kg	Profit Margin = Output Value - Price of Raw Materials
	a. Labor Income	(%)	Percentage of Labor Income = Labor Income / Profit Margin x 100%
	b. Other Input Contributions	(%)	Percentage of other Input Contribution = Other Input Contribution / Profit Margin x 100%
	c. The advantage	(%)	Percentage of Profits = Processing Profits / Profit Margins x 100%

Source:[5]

Information : * One time production process

** Other inputs = packaging (sacks), threads, needles, driving the processing machine

*** Benefits are valued on operating costs (raw materials, other inputs, and labor)

There are three indicators of the value added ratio of [6], namely:

- If the value added ratio is <15%, then the value added is low.
- If the value added ratio is 15% - 40%, then the value added is moderate.
- If the value added ratio is > 40%, then the value added is high.

2.2 Measurement of Marketing Efficiency

To find out whether marketing is efficient. This test is carried out using the concept of marketing efficiency, where marketing efficiency according to [7] is a comparison between total marketing costs and the total value of products marketed. with the following formula:

$$EP = TB / TNP \times 100\%$$

Note: EP = marketing efficiency (percent)

TB = total marketing costs (Rupiah)

TNP = total product value (Rupiah)

Decision-making criteria:

- EP of 0-50%, then marketing is said to be efficient.
- EP is greater than 50%, so marketing is inefficient.

3. Results and Discussion

The Oro Gayo coffee company is an agro-industry in Aceh Tengah Regency which exports coffee in the form of green bean grade 1 (specialty) and green bean grade 2 (premium). The workforce used in this agro-industry is 10 permanent employees, while the employees needed in the production process are 40 coffee sorters. These products are directly exported to several countries abroad such as the United States, Japan, Sweden, Taiwan, the Netherlands, Germany and Russia.

3.1 Analysis of Input, Output and Value Added Prices Using the Hayami Green Bean Grade 1 Method

Calculation of value added analysis on green bean grade 1 seen from the input, output and price can be seen in Table 4. Based on Table 4, it can be seen that the volume of raw material purchases from August to September 2017 was 198,000 kg. The raw materials supplied by Oro Coffee Gayo are original green beans (non-Sorting Green Coffee) obtained from partner farmers through collectors [8]. The volume of the company's raw materials is also very dependent on current market conditions with a number of determinants, included: (a) the availability of production at each collector, (b) the quota of the signed contract, (c) security of the stock, and (d) factor in estimated price changes. There is a difference in output issued from the amount of raw material used in agro-industry, because if more quality coffee raw materials have export criteria for grade 1 green beans (specialty), the greater the output produced. 40 people are employed in the processing of green bean grade 1. The conversion factor in Oro Coffee Gayo is 0.87, which means that each processing of 1 kg of green bean random will produce 0.87 kg of green bean specialty (grade 1). At Oro Coffee Gayo the labor coefficient is 0.000202 HOK per kg of raw material. Likewise with the output price depends on the agreement value of the contract with the buyer order. In this study, workers' wages are assumed to be in accordance with the average received by a coffee sorter is Rp. 600, - per kg, each production period is calculated based on working days per person, with the total input of raw materials processed into grade 1 green beans in one production period.

Table 4. Input, Output, and Price Value Added Analysis of the Hayami Model Green Bean Grade 1 (specialty) at Oro Coffee Gayo in Aceh Tengah Regency.

	Variable	Unit	Oro Coffee Gayo
I	Input, Output, Price		
1.	The default green bean Input	Kg/period	198.000
2.	Green bean grade 1 output	Kg/period	172.800
3.	Labor	HOK/period	40
4.	Conversion factor	Kg/period	0,87
5.	Labor coefficient	HOK/kg	0,000202
6.	Output Price	Rp/Kg	95.000
7.	Average wages for labor	Rp /period	2.970.000

Source : Primary Data, (processed) 2017

3.2 Analysis of Value Added Revenues and Benefits of Green Bean Grade 1

The amount of income and profit from the analysis of the Hayami model [5] in Oro Coffee Gayo can be seen in Table 5. Based on Table 5, the price of raw material inputs depends on the quality of the green beans obtained from the target farmers and also the agreement on the purchase of green beans between farmers with agro-industries. This input contribution calculation is based on the cost and work capacity. Value output represents how capable coffee processing management conducted in this organization. To be exact, as good as handling practices for coffee cherries, that is the quality of the obtained product. Value added indicates that the output value is less than the value of the input raw material price and less than the value of other input contributions. The agro-industry value-added ratio is 15-40% which means the value added is moderate, this is in accordance with the three indicators of value added ratio according to Hubeis theory [6]. This labor income is the income obtained by processing laborers, ie laborers sorting rupiah per kg. labor contribution of 2.16 percent at Oro Coffee Gayo. The results showed that the Oro Coffee Gayo agro-industry contributed a profit of Rp. 27,150 per kg. This happens because the value added is reduced by the income of green bean workers in grade 1 (specialty).

Table 5. Revenue and Benefits of Value Added Analysis of the Hayami Model Green Bean Grade 1 (Special) at Oro Coffee Gayo in Aceh Tengah Regency.

	Variable	Unit	Oro Coffee Gayo
II	Revenue and Benefits		
8.	Price of raw material inputs	Rp /Kg	54.000
9.	Other input contributions	Rp /Kg	900
10.	Output Value	Rp /Kg	82.650
11.	a. Value-added	Rp /Kg	27.750
	b. Value added ratio	%	33,58
12.	a. Labor income	Rp /Kg	600
	b. Percentage of labor contribution	%	2,16
13.	a. Processing Advantages	Rp /Kg	27.150
	b. Profit level	%	32,85

Source: Primary Data (processed) 2017.

3.3 Analysis of Service Reward Factors for Value Added Production of Green Bean Grade 1

The calculation of value added analysis also looks at the remuneration of factors of production consisting of labor income, contribution of other inputs, and processing profits can be seen in Table 6. The amount of remuneration for the factor of production value-added analysis of the [5] green bean grade 1 model is obtained from a comparison of the contribution of production factors with the value-output value of raw materials. The results showed the value of service fees centered on the benefits of green bean grade 1 (special) products on Oro Coffee Gayo which contributed retribution to a profit of Rp 28,650 per kg.

Table 6. Repayment for Production Factors Value Added Analysis of the Hayami Model [5] Green Bean Grade 1 (Special) at Oro Coffee Gayo in Aceh Tengah Regency.

	Variable	Unit	Oro Coffee Gayo
III	Repayment for Production Factor Services		
14	Profit Margin	Rp/Kg	28.650
	a. Labor income	%	2,09
	b. Other input contributions	%	3,14
	c. The advantage	%	94,76

Source: Primary Data (processed) 2017.

3.4 Analysis of Input, Output, and Value Added Prices in the Asalan Green Bean System to become Green Bean Grade 2

Calculation of value added analysis on green bean grade 2 seen from input, output and price can be seen in Table 7. Based on Table 7, it can be seen, the volume of raw material purchases in this agro-industry is also very dependent on current market conditions with several determinants, including: (a) the availability of production at each collector, (b) the contract quota that has been signed handle, (c) stock security, and (d) factor in estimated price changes. There is a difference in output issued by the amount of raw material used, this happens if the more quality coffee raw materials that have export criteria for green bean grade 2 (premium), the greater the output produced. The conversion factor on Oro Coffee Gayo is 0.92 which means that each processing of 1 kg of green bean origin will produce 0.92 kg of premium green bean (grade 2). In Oro Coffee Gayo the coefficient of green bean grade 2 labor is 0,00038 HOK per kg of raw material. Likewise with the variation in output prices for different types of green bean grade 1 and green bean grade 2, this difference also depends on the agreement value of the contract with the buyers. In this study, the worker's wage is assumed to be in accordance with the average received by coffee sorters off workers Rp. 600, - per kg, each production period is calculated on a per person work day basis, with the total number of inputs processed in a single production period.

Table 7. Inputs, Outputs, and Prices Value Added Analysis of the Green Bean Grade 2 (premium) Hayami Model [5] in the Gayo Oro Coffee in Aceh Tengah Regency.

	Variable	Unit	Oro Coffee Gayo
I	Input, Output, Price		
1.	Default Green bean input	Kg/period	68.400
2.	Output <i>Green bean grade 2</i>	Kg/period	62.600
3.	Labor input	HOK/period	26
4.	Conversion factor	Kg/period	0.92
5.	Labor coefficient	HOK/Kg	0,00038
6.	Output Price	Rp /Kg	70.000
7.	Average wages for labor	Rp /period	1.578.462

Source: Primary Data (processed) 2017.

3.5 Analysis of Value Added Income and Benefits of Green Bean Grade 2

The amount of income and profit from the analysis of the Hayami model [5] in Oro Coffee Gayo can be seen in Table 8. Based on Table 8, the price of raw material inputs depends on the quality of the green beans obtained from the target farmers and also the agreement on the purchase of green beans between the two farmers and agro-industries. The calculation of the contribution of other inputs is based on the cost and work capacity. The output value illustrates the ability to manage the processing of coffee products. The better the preparation of raw materials is managed the better the quality of output. Value added indicates that the value of output is less the value of input raw material prices less than the value of other input contributions. The value-added ratio of green bean grade 2 agroindustry Oro Coffee Gayo is 15-40% which means the value added is moderate. This labor income is the income obtained by processing laborers, ie laborers sorting rupiah per kg. 6.19 percent of labor contribution to Oro Coffee Gayo. The results showed that the Oro Coffee Gayo green bean grade 2 agro-industry contributed a profit of Rp 9,100 per kg.

Table 8. Revenue and Benefits of Value Added Analysis of the Hayami[5] Green Bean Grade 2 (premium) Model at Oro Coffee Gayo in Aceh Tengah Regency.

	Variable	Unit	Oro Coffee Gayo
II	Revenue and Benefits		
8.	Price of raw material inputs	Rp /Kg	54.000
9.	Other input contributions	Rp /Kg	700
10.	Output Value	Rp /Kg	64.400
11.	a. Value-added	Rp /Kg	9.700
	b. Value added ratio	%	15,06
12.	a. Labor income	Rp /Kg	600
	b. Percentage of labor contribution	%	6,19
13.	a. Processing Advantages	Rp /Kg	9.100
	b. Profit level	%	14,13

Source: Primary Data (processed) 2017.

3.6 Analysis of Service Reward Factors for Value Added Production of Green Bean Grade 2

The calculation of value-added analysis also looks at the remuneration of factors of production consisting of labor income, contributions of other inputs, and processing profits can be seen in Table 9. Based on Table 9, the amount of remuneration for the factor of production value-added analysis of the Hayami green bean grade 2 model is obtained from the comparison of the contribution of production factors with the value-output value of raw materials. The results showed that the value of compensation centered on the benefits of green bean grade 2 (premium) products at Oro Coffee Gayo, which contributed compensation to a profit of Rp 10,400 per kg.

Table 9. Repayment for Production Factors Value Added Analysis of Green Bean Grade 2 (premium) at Oro Coffee Gayo in Aceh Tengah Regency.

	Variable	Unit	Oro Coffee Gayo
III	Repayment for Production Factor Services		
14.	Profit Margin	Rp /Kg	10.400
	a. Labor income	%	5,77
	b. Other input contributions	%	6,73
	c. The advantage	%	87,5

Source: Primary Data, (processed) 2017

3.7 Value Added Ratio Comparison

This value-added ratio shows the percentage of value-added from product value, meaning that if the value-added ratio <15%, the value added is low, 15-40% value added is moderate, whereas if the value-added ratio > 40%, then the value added is high. The magnitude of the value-added ratio at Oro Coffee Gayo can be seen in the following Table 10. Based on Table 10, that the ratio of value added exports of green bean coffee grade 1 and green bean grade 2 obtained medium value. In accordance with [6] that the percentage of value added ratio is of medium value if the value added ratio is 15-40%. This table also explains that the biggest value added is obtained by green bean grade 1 (specialty) products, which is 33.58%. Field results show that good quality non-grade green beans will have less impact on damaged coffee beans so that more grade 1 beans are produced. On the other hand, [9] explains that specialty processed products have the highest value added because they are in demand by buyers.

Table 10. Value Added Ratio of Export Coffee Processing Agroindustry in Aceh Tengah Regency.

Arabica Coffee Production Export	Value Added Ratio (%)
	Oro Coffee Gayo
<i>Green bean grade 1 (Specialty)</i>	33.58 %
<i>Green bean grade 2 (premium)</i>	15.06 %

Source: Primary Data (processed) 2017.

3.8 Marketing Efficiency Analysis

Marketing activities are one of the important factors in agriculture. If marketing activities run well, then the parties involved will benefit. Marketing efficiency is an indicator used to determine the marketing performance of a product. Then the level of efficiency can be calculated by comparing the total marketing costs with the total value of export Arabica coffee production in Oro Coffee Gayo, Aceh Tengah District. If the EP value is 0-50%, then the coffee marketing system is said to be efficient and if the EP value is greater than 50%, then the export Arabica coffee marketing system is inefficient. The value of marketing efficiency in Oro Coffee Gayo can be seen in Table 11. Based on Table 11, the export of Oro Gayo Arabica coffee is efficient. This condition can be known because the marketing efficiency of green bean grade 1 and grade 2 get an efficient percentage in the efficiency range, namely EP: 0-50%, this is in accordance with marketing efficiency Soekartiwi [7]. The value of each analysis results obtained 4.21% and 5.71% (EP 0-50%) then the marketing is considered efficient. Efficiency is formed by increasing the value of green bean output processed by Oro Coffee Gayo. On the other hand, explained by [10] that by increasing marketing output, it can reduce marketing costs that can be achieved.

Table 11. Value of Efficient Marketing of Export Coffee in Aceh Tengah Regency.

Arabica Coffee Production Export	Marketing Efficiency (%)
	Oro Coffee Gayo
<i>Green bean grade 1 (spesialty)</i>	4.21 %
<i>Green bean grade 2 (premium)</i>	5.71 %

Source: Primary Data (processed) 2017.

4. Conclusions and Recommendations

The level of value added analysis of Arabica coffee exports green bean grade 1 (special) on Oro Coffee Gayo the value added is moderate, and the value added of green bean grade 2 (premium) Oro Coffee Gayo is also moderate. Marketing efficiency of green bean grade 1 (specialty) and grade 2 (premium) green bean coffee in the Oro Coffee Gayo agro-industry is efficient, and marketing of grade 2 green beans is also efficient. This value qualifies where the EP is 0-50%. To get good value added, it is hoped that the suppliers of Oro Coffee Gayo will be able to maintain the quality of coffee that is expected by the buyer. Oro Coffee Gayo company is expected to provide better Agricultural Practice and Good Harvesting Practice to farmers (partners), so that they are able to produce the best quality coffee beans.

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