Analysis of value added of Arabica Coffee in Central Aceh Regency (case of Indi Gayo Coffee business unit)

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Abstract. This study aims to compare the value added of Arabica Coffee in the Indi Gayo Coffee business unit in Central Aceh Regency based on post-harvest product variants such as the post-specialty wet hulled variant, honey process variant, natural process variant, premium variant. The results of this study indicate that the value added of the natural process variant in the Indi Gayo Coffee business unit is greater than the specialty wet hulled variant, honey process and premium with value added of 56,371 IDR. However, the biggest profit in the Indi Gayo Coffee business unit is obtained from a premium variant with a total profit of 4,787,698 IDR. The scale of business support that still exists using third parties in production is a factor that influences the value added of processing coffee fruit into ground coffee in the business unit of Indi Gayo Coffee.

1. Introduction
In 2017 Aceh Province was the third largest coffee producing region in Indonesia. BPS data in 2018 shows that Central Aceh Regency is the largest coffee production centre in Aceh Province. Plant area, production and coffee productivity show an increasing trend in Central Aceh Regency. In 2017 coffee plants in Central Aceh Regency were 49,251 Ha, which meant that there was always an increase in planting area which directly increased coffee production in Central Aceh District. Indonesia of course has to compete with coffee producing countries that put their coffee into the world market, especially the Brazilian country which has been the largest coffee supplier in the world.

The growth of coffee production in Central Aceh Regency is not supported by the development of agro-industries that can provide value added to coffee products. One way to increase value added can be done by processing coffee beans into ground coffee but over the past two years the ground coffee production capacity in this area has not increased significantly. Only semi-finished processing with products in the form of green bean coffee is growing rapidly. Therefore, researchers are interested in analysing the value added and feasibility of the business of processing coffee fruit into ground coffee in Central Aceh Regency.

2. Research methods
Value added analysis in the Indi Gayo Coffee business unit uses the Hayami Method [1]. There are several variables related to this added value analysis. Conversion factor, shows the number of processed products produced from one kilogram of raw materials. The coefficient of labour, shows the amount of direct labour needed to process one input unit. While the product value shows the value of
output produced from one input unit. Other input values include the value of all expenses other than raw materials and direct labour used during production [2].

In the analysis to test the difference in value added between variants is done by using mathematical calculations, namely by comparing the value added of a product variant with other product variants. In analysing the total profit of the product variant, it is done by using mathematical calculations, namely the input multiplied by the profit variant of a product.

### Table 1. Hayami Method procedure

| Variable                        | Unit                              | Notation |
|---------------------------------|-----------------------------------|----------|
| Output/ Total product           | Kg/Production Process             | A        |
| Raw Material Input              | Kg/Production Process             | B        |
| Labour                          | Working day people /Production Process | C       |
| Conversion Factor               | Kg Output/Kg Raw Material         | D = a/b  |
| Labour Coefficient              | Working day people/Kg Raw Material| E = c/b  |
| Output Price                    | IDR/Kg                            | F        |
| Labour Wage                     | IDR/Production Process            | G        |
| Revenue and Profit              |                                   |          |
| Raw Material Price              | IDR/Kg                            | H        |
| Another Input Contribution      | IDR/Kg                            | I        |
| Output Value                    | IDR/Kg                            | J = d×f  |
| Value Added                     | IDR/Kg                            | K = j−h−i |
| Value Added Ratio               | %                                 | L = k/j×100% |
| Direct Labour Income            | IDR/Kg                            | M = e x g |
| Labour Contribution             | %                                 | N = m/k×00% |
| Profit                          | IDR/Kg                            | O = k−m  |
| Percentage of Profit            | %                                 | P = o/j×100% |
| Reply Services to Owners of Factors of Production | | |
| Margin                          | IDR /Kg                           | Q = j−h  |
| a. Direct Labour Income         | %                                 | R= m/q×100% |
| b. Another Input Contribution   | %                                 | S = i/q×100% |
| c. Profit                       | %                                 | T = o/q×100% |

Source: [3]

### 3. Results and discussion

The value added in this study is that the value added of 4 processed variants in the production unit at Indi Gayo Coffee includes special wed hulled, honey processes, natural processes and premium. The measured value added is the value added generated from the business of processing coffee fruit to become ground coffee. This value added is the value added of each processed variant in one production. In this study value added was calculated by using Hayami's calculation model which can be seen in Table 2.

Based on the results of the analysis in Table 2 the Indi Gayo Coffee business unit in the specialty wed hulled variant has an input value of 65 kg, in the honey process variant has an input value of 65 kg, in natural variants the input value is 65 kg, and the premium variant has the biggest input value than other variants with an input value of 320 kg.

Workers who are directly involved in the Indi Gayo Coffee Business Unit are workers in the family and outside the family. At premium quality, the workforce consists of 11 people consisting of 1 person in the family and 10 people outside the family. In specialty, honey and natural qualities the use of labour is 3 people consisting of 1 person in the family and 2 people outside the family. In the Indi
Gayo Coffee business unit, the use of labour from outside the family is only used in the sorting process, namely in the process of producing green beans.

**Table 2. Value added of Indi Gayo Coffee Business Units (Hayami Method)**

| Variable                               | Specialty Wet Hullled | Honey Process | Natural | Premium |
|----------------------------------------|-----------------------|---------------|---------|---------|
| Output/Total product                   | 7.96                  | 8.08          | 8.10    | 40.53   |
| Raw Material Input                     | 65                    | 65            | 65      | 320     |
| Labour                                 | 3                     | 3             | 3       | 11      |
| Conversion Factor                      | 0.123                 | 0.124         | 0.125   | 0.127   |
| Labour Coefficient                     | 0.05                  | 0.05          | 0.05    | 0.03    |
| Output Price                           | 350,000 IDR           | 600,000 IDR   | 600,000 IDR | 250,000 IDR |
| Labour Wage                            | 31,000 IDR            | 31,000 IDR    | 31,000 IDR | 31,000 IDR |

**Revenue and Profit**

| Variable                               | Specialty Wet Hullled | Honey Process | Natural | Premium |
|----------------------------------------|-----------------------|---------------|---------|---------|
| Raw Material Price                     | 10,900 IDR            | 10,900 IDR    | 10,900 IDR | 10,900 IDR |
| Another Input Contribution             | 7,288 IDR             | 7,529 IDR     | 7,529 IDR | 4,739 IDR |
| Output Value                           | 42,879 IDR            | 74,615 IDR    | 74,800 IDR | 31,667 IDR |
| Value Added                            | 24,691 IDR            | 56,187 IDR    | 56,371 IDR | 16,027 IDR |
| Value Added Ratio                      | 57.58%                | 75.30%        | 75.36%   | 50.61%   |
| Direct Labour Income                   | 1,431 IDR             | 1,431 IDR     | 1,431 IDR | 1,066 IDR |
| Labour Contribution                    | 5.79%                 | 2.55%         | 2.54%    | 6.65%    |
| Profit                                 | 23,261 IDR            | 54,756 IDR    | 54,941 IDR | 14,962 IDR |
| Percentage of Profit                   | 54.25%                | 73.38%        | 73.45%   | 47.25%   |

**Reply Services to Owners of Factors of Production**

| Margin                                | Specialty Wet Hullled | Honey Process | Natural | Premium |
|---------------------------------------|-----------------------|---------------|---------|---------|
| a. Direct Labour Income               | 4.47%                 | 2.25%         | 2.24%   | 5.13%   |
| b. Another Input Contribution         | 22.79%                | 11.82%        | 11.78%  | 22.82%  |
| c. Profit                             | 72.74%                | 85.94%        | 85.98%  | 72.05%  |

In the Indi Gayo Coffee business unit, the premium variant has the largest conversion factor of the specialty wet hulled, honey and natural variants with a conversion factor of 0.127. This means that every 1 kg of coffee fruit can produce 0.127 kg of ground coffee.

Prices on each Agro-industry depend on the post-harvest processed variants. The price of ground coffee in the Indi Gayo Coffee production unit is 350,000 IDR in the specialty wet hulled variant, 600,000 IDR in the natural variant, 600,000 IDR in the honey variant, and 250,000 IDR in the premium variant. The average wage for labour in the specialty wet hulled, honey, natural and premium variants is 31,000 IDR.

Production in the Indi Gayo Coffee business unit uses the same raw materials in each product variant. The price of coffee fruit in the specialty wet hulled variant, honey process, natural and premium is equal to 10,900 IDR/Kg. The same raw material input prices are due to each variant process using the same type, quality and standard in each process variant.

Other input contributions in the production process consist of depreciation of buildings, equipment and third-party assistance. In the Indi Gayo Coffee business units in the honey and natural variants has the biggest contribution of other inputs when compared to the specialty wet hulled and premium variants of 7,529 IDR.

Natural variants have the largest output values, value added and value-added ratio when compared to specialty wet hulled, honey and premium variants with an output value of 74,800 IDR, value added of 56,371 IDR and the ratio of value added is 75.36%.
The largest labour income and labour portion is found in the specialty wet hulled variant with a labour income value of 1,431 IDR with a labour portion of 5.79%. The natural variant has the biggest profit of 54,941 IDR with a share of profit of 73.45%.

Natural variants have the largest margin compared to the specialty wet hulled, honey and premium variants with a margin value of 63,900 IDR where 2.24% is labour income, 11.78% is contributed by other inputs and 85.95% is profit. The test results of different value added and total product variant profits from the Indi Gayo Coffee business unit can be seen in Table 3 and Table 4 below:

| Variation           | Value Added  | Value added difference |
|---------------------|--------------|------------------------|
|                     |              | Specialty Wet Hulled   | Honey Process | Natural |
| Premium             | 16,027 IDR   | 8,664 IDR              | 40,160 IDR    | 40,344 IDR |
| Specialty Wet Hulled| 24,691 IDR   |                        | 31,495 IDR    | 31,680 IDR |
| Honey Process       | 56,18 IDR    |                        | 185 IDR       |           |
| Natural             | 56,371 IDR   |                        |              |           |

| Variation           | Input | Profit  | Total Profit  |
|---------------------|-------|---------|---------------|
| Premium             | 320   | 14,962 IDR | 4,787,698 IDR |
| Specialty Wet Hulled| 65    | 23,261 IDR  | 1,511,939 IDR |
| Honey Process       | 65    | 54,756 IDR  | 3,559,139 IDR |
| Natural             | 65    | 54,941 IDR  | 3,571,139 IDR |

Table 3 shows that the value added of natural variants in the Indi Gayo Coffee business unit is greater than the specialty wet hulled, honey and premium variants with value added of 56,371 IDR, but the biggest advantage in the Indi Gayo Coffee business unit is obtained from premium variants with total profit of 4,787,698 IDR.

4. Conclusions
Value added obtained from the natural process variants is greater than the honey, premium and specialty variant. The larger the scale of business is, the smaller and more efficient the average cost of component will be. In addition to the business scale, the factors that influence the value added of processing coffee fruit into ground coffee in the Indi Gayo Coffee business unit are influenced by the price of raw materials and components which still use third parties in their production. The profit obtained from the premium variants is greater than the natural, honey and specialties variants. The demand for a variant greatly affects the profit of a business unit.

References
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