The analysis of supply chain of Gayo Arabica Coffee (case study: Atu Lintang District, Central Aceh Regency)

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Abstract. The largest production for Gayo Arabica coffee in Aceh province is in Central Aceh District. There are variety of varieties and types of coffee planted, because it needs to be analysis the supply chain performance. The method of determining the sample used is snowball sampling and the data analysis method used descriptive and quantitative analysis. The result showed that there were two Gayo Arabica coffee supply chain models. First, for specialty processed coffee, there are five supply chains, namely farmers, rural traders, red cherry traders, specialty processors, and coffee shop. The farmer’s share value is 5.15%, the share of collecting traders is 5.25%, the share of red cherry traders is 6.25%, the share of specialty processing is 7.25%, and the coffee shop’s share is 80%. Second, for premium or conventional coffee, there are 5 (five) chains, namely farmers, rural traders, hard skin coffee traders, district traders, regency trader (cooperatives and exporters). The share margin farmer’s is 15%, collecting trader’s share is 47%, hard skin coffee trader’s share is 76%, regency trader’s share is 86%, the share of cooperatives and exporters is 100%. The supply chain performance of Gayo Arabica coffee has not been optimally profitable, and the marketing margin has not been profitable for supply chain actors.

1. Introduction
The largest Arabica coffee production centre for the Aceh Province is in the Central Aceh Regency. Central Aceh regency itself has wide coffee area that varies both from varieties and types of coffee grown, namely Arabica and Robusta coffee. At this time the increasing demand for Arabica and Robusta coffee has caused several strategic districts in the regency to try to increase their production. The area of Arabica coffee in Central Aceh Regency is 49,250 Ha, production is 31,398 tons/year, productivity is 747 kg/ha/year, with the number of farmers is 37,280 people. 70% of the coffee production is exported [1].

Atu Lintang district has elevation 1400-1900 meters above sea level. Atu Lintang district is one of the regions that produces the best coffee in Central Aceh Regency. In this area the coffee supply chain is longer than the other regions. The processed specialty coffee is sent directly to coffee shop. The raw material is mostly taken by merchants from Atu Lintang district, Central Aceh regency [1].

The length of the Gayo Arabica coffee supply chain is thought to be one of the causes of low income at the farm level. This supply chain causes coffee products to pass through many parties to reach the end consumers. This income is only enjoyed by coffee traders. While at the farm level, farmers only get income from prices that are usually sold in the form of red cherry [1].

A supply chain is a channel that runs from raw materials to components until the final product is delivered to the final consumer. Each company only reaches a certain percentage of the total value
generated by the supply chain value delivery system. When a company gets a competitor or expands its business upstream or downstream, the goal is to achieve a higher percentage of the supply chain value [2].

Farmer’s Share analysis is used to see the percentage of parts received by farmers by comparing prices at the farm level with prices at the consumer level. Farmer’s share is an analytical tool used to determine marketing efficiency in terms of farmer income [3].

Marketing margins describe market conditions at different levels of institutions, at least there are two levels of the market, namely the market at the farm level and the market at the final consumer level. In addition, marketing margins are used to determine the differences in income received by each marketing agency involved. The size of the margin is basically the difference between the price purchased at the price sold by each marketing agency [3].

Profit ratio analysis and cost is the percentage comparison between marketing benefits against marketing costs incurred. The level of marketing system efficiency can be seen from the profit ratio to marketing costs. If the value of the ratio is greater than zero (> 0) then marketing activities can be said to be profitable. However, in the profit ratio analysis of marketing costs, it is seen that the distribution of profits is evenly distributed to each institution involved in accordance with the costs incurred. The more even the value of the profit ratio to marketing costs, the more technically efficient the marketing system is. Mathematically the profit ratio to marketing costs can be formulated as follows [3].

2. Research methods
This research was conducted purposively with the basis that Atu Lintang district was a potential area for growth of Gayo Arabica coffee where the coffee was planted at elevation 1,200-1,900 meters above sea level [1]. Special coffee and buyers from all chains are in Atu Lintang district, Central Aceh regency. This study used qualitative research methods. Qualitative research explains the flow of supply chains for Gayo Arabica coffee supply in Atu Lintang district.

The population in this study were farmers, traders and cooperatives or exporters of Gayo Arabica coffee in Atu Lintang district, Central Aceh regency. Sampling is done purposively, for the sample of farmers there were 11 farmer groups from 11 villages with a total of 50 farmers, 11 rural traders and 1 district trader Cooperative or Exporter.

The analytical method uses descriptive qualitative analysis. This method describes the flow of supply chain for Gayo Arabica coffee in Atu Lintang district. Whereas for quantitative analysis uses analysis of famer’s share, marketing margin analysis, and profit and cost ratio analysis.

3. Results and discussion
Cost benefit ratio is used to analyse the benefits derived from costs incurred in a business activity. Ratio analysis and cost advantages can see a comparison of the amount of costs and benefits obtained by each member of the supply chain. The higher the value of profits and costs, the better. The results of farmer's analysis, marketing margins and profit costs can be seen in Table 1.

Based on the results of the analysis, the average price of red cherries at the farmer level is 10,500 IDR/kg. The price of red cherry depends on the final destination of the coffee processing. If the red cherry will be processed into specialty coffee, it will be sorted so that it must be completely red and then processed. In the process it will require fee. The price of red cherry at the specialty processing level is 14,500 IDR/Kg. For premium or conventional coffee, no sorting is done so the price is 10,500 IDR/Kg.

The highest marketing chain costs for Gayo Arabica coffee are specialty because they require special treatment, labour, equipment and a longer time. While the highest marketing costs are in hard skin coffee traders, this is because coffee purchased from rural traders requires a drying process and then huller and drying process again. The hard skin coffee traders require high costs and require labour and equipment to process hard skin coffee.

The highest margin for specialty coffee preparations is in specialty processors at a price of 196,500 IDR/Kg. In premium and conventional coffee, the highest margins are at regency traders with value of 72,000 IDR/Kg. Margin value is influenced by the amount of the costs.
The highest profit is obtained from the specialty processing, namely in the specialty processor, 145,500 IDR/Kg. The profit of district traders in premium and conventional coffee is 8,750 IDR/Kg. Exporters get other benefits, namely premiums and certifications from exporters' destination countries in accordance with a collective agreement which will usually be paid at the end of the year after the contract ends.

Table 1. Analysis of farmer's share, marketing margin, and cost of profit for supply chain of Gayo Arabica coffee in Atu Lintang District, Central Aceh Regency

| Traders            | Purchasing Price (IDR/Kg) | Selling Price (IDR/Kg) | Cost (IDR/Kg) | Profit (IDR/Kg) | Margin (IDR/Kg) | Ratio B/C | Farmer's Share (%) |
|--------------------|---------------------------|------------------------|--------------|----------------|----------------|-----------|-------------------|
|                    | 10,500                    | 12,500                 | 750          | 2,000          | 2,750          | -         | 5.25              |
| Rural Traders      | 12,500                    | 14,500                 | 800          | 2,000          | 2,800          | 2.67      | 5.25              |
| Red Cherry Traders | 14,500                    | 160,000                | 51,000       | 145,500        | 196,500        | 2.50      | 6.25              |
| Special processor  | 160,000                   |                        |              |                |                |           | 7.25              |
| Coffee Shop        |                            |                        |              |                |                |           | 80                |

The profit ratio of Arabica Gayo coffee in Atu Lintang district is the highest for specialty coffee processing, namely in specialty processors (2.85) and rural traders is (2.67), while premium coffee processing and conventional profit ratio value for district traders is (0.14).

Analysis of the farmer's share shows the part the farmer gets in final consumption with the highest share value in the coffee shop with a value of 80% and a specialty processor with a value of 7.25. The highest value of share in premium and conventional coffee is for exporters with a value of 100% and district traders with a value of 86%.

4. Conclusion
From the results of the discussion, the supply chain has not been profitable because of the length of the supply chain with the distribution pattern: 1. Patterns of supply chain distribution for specialty processed Gayo Arabica coffee; Farmers, rural traders, coffee cherry traders, specialty coffee shop processors. With farmer value of 5.15%, rural traders 5.25%, red cherry traders 6.25%, specialty processors 7.25%, and coffee shops 80%. 2. Pattern of premium or conventional Gayo Arabica coffee supply chain distribution; Farmers, rural traders, hard skin coffee traders, district traders, regency traders (cooperatives and exporters). With farmer's share value 15%, rural traders 47%, hard skin coffee traders 76%, district traders 76%, cooperatives and exporters 100%. Measurement of supply chain performance
has not worked optimally. Each channel has a value for marketing margins, the value of the share value of the profit per unexpected cost which affects the supply chain performance.

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