

## Analysis of Sugarcane Agroindustry Income: Case Study on Sugarcane Brown Sugar Agroindustry in Sungai Asam Village, Kayu Aro District, Kerinci Regency

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### ABSTRACT

*This study aims to: (1) Describe an overview of the sugar cane brown sugar processing agro-industry in Sungai Asam Village, Kayu Aro Barat Subdistrict, Kerinci Regency. (2) Analyze the income and acceptance of sugar cane brown sugar agro-industry in Sungai Asam Village, Kayu Aro Barat Subdistrict, Kerinci Regency. Data collection in this thesis was conducted using observation and interview methods. Interviews were conducted with 7 agro-industries located in Sungai Asam Village, West Kayu Aro Subdistrict, Kerinci Regency. The analysis method used is descriptive analysis analysis, income analysis. Based on the results of the study, there are 16 agro-industries that developed in Sungai Asam Village, West Kayu Aro Subdistrict, Kerinci Regency, spread across four hamlets. One of the hamlets that has the most agroindustry is Block C Hamlet with a total of 7 agroindustries (1) The Sugar Cane Agroindustry in Sungai Asam Village is still categorized as a small-scale industry which is founded on the background because the majority of the people of Sungai Asam Village plant sugar cane plants. (2) The average income received by the cane brown sugar agroindustry is greater than the UMP value of Kerinci Regency. From the results of these calculations, the average R / C Ratio value of agro-industry is 2.22, so agro-industry in Sungai Asam Village, Kayu Aro District, Kerinci Regency is feasible or profitable to continue.*

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### INTRODUCTION

The high demand for sugar tends to continue to increase due to the increasing population and the number of industries whose raw material is sugar. The rate of development of consumption which tends to be higher than the rate of domestic production will affect the fulfillment of sugar needs in Indonesia (BPS and Ministry of Industry, 2022). Efforts that can be made to support the ever-increasing domestic sugar demand are to spur sugarcane farming. The development of sugarcane plantations must always be considered by the government considering the increasing demand for sugar.

Jambi province is one of the provinces that cultivates sugar cane. The only district that has the potential to develop sugarcane farming in Jambi province is Kerinci Regency. Sugarcane is a raw material for producing cane brown sugar, the existence of sugarcane plantations can encourage welfare improvement as well as be relied upon in efforts to develop the potential of an area. The amount of sugarcane production can make sugarcane plants an opportunity to support the plantation economy in Kerinci Regency. Sugarcane farming can absorb around 1576 farmers, this means that there are around 1576 farmer families who depend on the sugarcane plantation (Jambi Province Plantation Office, 2023).

Sugarcane plantations in Kerinci Regency are spread across four districts, namely Gunung Kerinci District, Kayu Aro District, Siulak District, and Gunung Tujuh District. The plantation with the largest area is located in Kayu Aro Subdistrict with an area of 1,454 Ha, besides having the largest area, West Kayu Aro Subdistrict also has production and productivity, with a total production of 8,724 tons and productivity of 6.00 tons / ha (Kerinci Regency Plantation Office, 2023).

Sugarcane is spread across 5 villages in the Kayu Aro Barat sub-district, namely Sungai Asam Village, Kampung Baru Village, Lindung Jaya Village, Giri Mulyo Village and Sungai Dalam Village. The largest land area is in Sungai Asam Village. Judging from the area of sugarcane land, 83% is in Sungai Asam Village. So that it

occupies the first position for villages that cultivate sugar cane in West Kayu Aro Sub-district. With a total of 42% of the total farmers who cultivate sugarcane in Kayu Aro Sub-district (Agricultural Extension Officer of Kayu Aro Sub-district, 2023).

Sugarcane farmers in Sungai Asam Village will automatically become sugar cane brown sugar craftsmen because sugar cane is very rarely marketed in the form of fresh sugar cane. Sugarcane farmers in Sungai Asam Village work and incur their own costs from the beginning of farming to the process of processing sugar cane into sugar cane brown sugar. Farmers sell the processed sugar cane products tied to intermediary traders at different prices and relatively lower than the market price. Cane sugar production in Sungai Asam Village is currently still done by farmers in small industries. Farmers are directly involved in the sugarcane farming process from the production process to the processing process.

The purpose of sugarcane agribusiness carried out by farmers is to produce a product, namely cane sugar which is used as an ingredient for sweeteners and can meet household consumption needs. Sugar production is not carried out every day but only 2 times a week. The processed sugar cane is directly obtained from the farmer's garden so that the main raw material in processing cane sugar is always available. Based on interviews that have been conducted, the raw sugar cane market in Sungai Asam Village is not exciting, this is because it is rare to find sugar cane ice sellers considering that Sungai Asam Village has cold weather conditions, Sungai Asam Village is close to Mount Kerinci. The price of raw sugarcane ranges between 900-1000/kg.

Farmers utilize existing labor to process the sugar cane into a product, namely sugar plots, sugar shells with the aim of getting greater profits. However, large profits do not necessarily mean that the sugar industry is efficient to operate, because there is a possibility that farmers incur large costs in obtaining these large profits. The use of factors in the production process needs to be considered in the development of the cane sugar processing industry to see whether the conditions of this processing business are efficient and can provide greater benefits.

Farmers in running their business have the aim of obtaining greater profits by using the resources they have. Farmers try to allocate their resources as well as possible in order to obtain large profits. However, large profits do not necessarily mean that the processing of farm products is efficient to do, because there is a possibility that farmers incur large costs in obtaining these large profits.

Income analysis for farmers in carrying out their business in order to increase profits and develop their business. In reality, farmers often pay less attention to business management related to the amount of costs, revenues and profits of their business. Therefore, it is necessary to analyze the income of sugarcane agribusiness in Sungai Asam Village, Kayu Aro District, Kerinci Regency so that farmers can see the development of their business.

Based on the description that has been described, the authors are interested in conducting research with the title "Analysis of Sugar Cane Brown Sugar Agroindustry Income (Case Study of Sugar Cane Brown Sugar Agroindustry in Sungai Asam Village, Kayu Aro Barat District, Kerinci Regency).".

## RESEARCH METHOD

This research will be conducted in Sungai Asam Village, Kayu Aro Sub-district, Kerinci Regency. The selection of this location was carried out purposively by considering that Sungai Asam Village is a village that has the largest sugarcane land area of the other villages in Kayu Aro Sub-district. In addition, Sungai Asam Village is an area with the dominant community income depends on the sugar cane brown sugar processing business and has the largest number of sugar cane brown sugar craftsmen, namely 567 families. Sampling was done deliberately with the consideration that in Sungai Asam Village there are 16 mechanical mills divided into four hamlets. One of the hamlets, namely Block C Hamlet with the largest number of agro-industries, namely 7 agro-industries, was chosen to represent mechanized agro-industries in the village. Data collection methods in this study used observation, interviews, questionnaires, documentation and other related data.

Data analysis in this study using descriptive analysis to determine the general description of the sugar cane brown sugar processing business in Sungai Asam Village, Kayu Aro District, especially in 7 industries. To determine the amount of income used income analysis consisting of revenue and production costs in 7 Agroindustry processing brown sugar cane in Sungai Asam Village, Kayu Aro District, Kerinci Regency. According to Soekartawi (2002) to calculate the total acceptance of farming the formula is used:

$$TR = Q \cdot P$$

Description:

TR = Total Revenue (Rp)

Q = Sugar production obtained (Kg)

P = Selling price of cane brown sugar (Rp / Kg)

According to Soekartawi (2002) the formula for calculating farming costs is:

$$TC = FC + VC$$

Description:

TC = Total cost of sugar cane brown sugar processing business (Rp)

FC = Fixed costs of sugar cane brown sugar processing business (Rp)

VC = Non-fixed costs of sugar cane brown sugar processing business (Rp)

According to Soekartawi (2002) Farm income is the difference between farm income and total farm costs, to calculate farm income using the formula:

$$Pd = TR - TC$$

Description:

Pd = Income;

TR = Total Revenue / Total Revenue;

TC = Total Cost / Total Cost.

## RESULTS AND DISCUSSION

### *Overview of the Sugarcane Brown Sugar Agro-industry*

This agro-industry produces brown sugar made from sugar cane because it increases the selling value of sugar cane. This small-scale sugar cane brown sugar processing industry was founded because the majority of the Sungai Asam Village community planted sugar cane plants. Processing sugarcane sap into cane brown sugar can increase profits. The sugarcane harvesting system is carried out selectively with a selective slash system so that raw materials are always available. Based on information in the field, the sugar cane to be milled has a size of 2 meters. Which will later be cut into pieces again for grinding.

The sugar cane production process in Sungai Asam Village uses two methods, namely the mechanical method and the conventional method. The sugar produced in the form of sugar plots craftsmen in using the machine is charged a rental fee of 1000 / kg of brown sugar cane. The process of producing cane brown sugar using machines is carried out by craftsmen 2 times a week. Brown sugar produced in the form of brown sugar plots with a selling price of 8000-9500 / kg. Brown sugar produced is needed as raw material for soy sauce by factories whose markets are outside the Kerinci Regency area such as Jambi (Selincah), Padang (Cahaya Baru), Palembang (Mikado) and Medan (ABC). In the process of processing cane brown sugar starting from the process of collecting raw materials in the field, grinding and cooking to packaging using human labor rather than technology so that it requires a full day of processing. The technology used is only grinding machines and blowers the rest is still manual.

The raw material used in making sugar cane brown sugar is sugar cane juice. Sugar cane used by sugar cane craftsmen has an average length of 2 meters with an average weight of 0.25 kg per stem. Every 100 kg of sugar cane can produce as much as 10 kg of sugar. This means that craftsmen need raw materials as much as 250 cane stalks to produce 100 Kg of sugar. This production activity takes an average of 8 hours of work/production. The auxiliary material needed is cooking oil. The equipment used in the production process is a cauldron, stirrer, filter, bucket, scale, cement furnace, mold and nira container. The sugar cane brown sugar production process is carried out in several stages, namely, transportation of sugar cane, sugar cane preparation, sugar cane milling, sugar cane juice filtering, cooking, molding and packaging.

### *Sugarcane Brown Sugar Agro-industry Income in Sungai Asam Village*

#### 1. Cost Analysis

Farming costs are sacrifices or set aside resources that can be measured in units of money to produce agricultural goods or services. Farming costs are classified into fixed costs and variable costs (Soekartawi, 2011). Production costs consist of fixed costs, variable costs, auxiliary costs and labor costs.

##### a. Fixed Costs

Fixed costs are costs that do not change in amount despite changes in production volume. fixed fixed costs are costs whose use does not run out in one use or does not affect the amount of production produced. Fixed costs in this agro-industry consist of mill rental costs and depreciation costs. Figure

**Table. 1 Average Fixed Costs of Sugarcane Brown Sugar Agro-industry in Sungai Asam Village**

No.	Description Fixed Cost	Average Fixed Cost
1	Mill Rental	645.714,28
2	Equipment Depreciation	74.507,91
<b>Quantity</b>		<b>720.222,19</b>

Source: Processed Primary Data

Table 1 explains that the average fixed costs incurred by sugarcane brown sugar craftsmen in sugarcane brown sugar processing in Sungai Asam Village amounted to Rp. 720,222.19 per month. For this mill rental is the rent that craftsmen must pay to the mill owner. Each craftsman pays a mill rental of Rp. 1,000/kg where if the sugar produced is 100 kg then the farmer must pay a rental of Rp. 100,000. Craftsmen spend an average mill rental fee of Rp. 645,714.28 per month with an average sugar production of 645.714 Kg per month.

##### b. Variable Costs

Variable costs that change in amount with changes in production volume or farming activities. Variable costs are costs whose amount depends on the production produced or costs that run out in one use. Variable costs in cane brown sugar processing are costs that run out in one production process. The variable costs incurred consist of firewood costs, diesel costs, auxiliary materials costs and labor costs. The average variable costs of sugar cane brown sugar agroindustry in Sungai Asam Village can be seen in Table 1.

**Table.2 Average Variable Costs of Sugarcane Brown Sugar Agroindustry in Sungai Asam Village**

No.	Variable Cost Description	Average Variable Cost
1	Firewood	278.571,42
2	Solar	218.571,4
3	Auxiliary Materials	20.000
4	Labor	1.531.428,5
<b>Quantity</b>		<b>2.048.571,32</b>

Source: Processed Primary Data

Table 2 shows that the average amount of variable costs incurred by cane brown sugar craftsmen in the process of processing cane brown sugar in Sungai Asam Village is Rp. 2,048,571.32 per month. The largest cost lies in the cost of labor then the smallest cost is the cost of auxiliary materials. The cost of diesel fuel is sold freely at a price of Rp. 6800 per liter, the average use of diesel fuel is 32 liters per month. Agroindustry uses firewood on average 28 bundles per month. After diesel and firewood, there is the cost of auxiliary materials which is coconut oil which functions as a surface tension reducer between the froth and liquid nira so that the froth evaporation can be minimized. The use of this auxiliary material is only small, at most only using 1 kg of coconut oil which is valued at Rp. 20,000 per month.

The processing of cane sugar in Kayu Aro sub-district is still classified as traditional because human labor is still needed all day in managing it, in the milling section it has used technology but during the stirring process until

packaging still requires human labor. Where the stirring process takes place from morning to evening or from morning until the sugar cane is ready to be sold, so that some of the agro-industries need labor assistance. The wage given to labor is Rp. 80,000 with working hours of 8 hours, each week the workforce will work for 2 days because the production process is carried out every 2 weeks. Every month the agro-industry must spend an average labor cost of Rp. 1,531,428.5

Total cost is the sum of all costs consisting of fixed costs and variable costs. To find out the details of variable costs. To find out the details of sugarcane agro-industry costs in Sungai Asam Village, West Kayu Aro Sub-district, Kerinci Regency, it can be seen in Table 9 below:

**Table. 3 Total Agroindustrial Costs of Brown Sugar Cane in Sungai Asam Village**

No.	Description	Agro-industry Cost
1	Fixed Cost	720.222,19
2	Variable Cost	2.048.571,32
<b>Quantity</b>		<b>2.768.793,51</b>

Source: Processed Primary Data

Table 3 shows the costs incurred by cane brown sugar craftsmen in processing cane brown sugar are divided into two costs, namely fixed costs and variable costs. Based on the table above the total cost of the whole that must be incurred by the sugar cane brown sugar craftsmen is Rp. 2,768,793.51 per month. .

## 2. Revenue

Sugar cane brown sugar agroindustry acceptance is the amount of production produced multiplied by the selling price. Total sugar cane brown sugar agroindustry revenue is all the money obtained from the sale of sugar cane brown sugar products produced by calculating multiplying the number of products (Kg) by the selling price of the product (Rp / Kg) and assuming the results of products that have been sold by agroindustry actors. The data used is estimated per week which is then calculated to be per month this is done because there is no definite bookkeeping from agro-industry in the research area. The selling price of brown sugar at the time of this study was Rp. 9500 / kg. Revenue in the sugar cane brown sugar agro-industry in Sungai Asam Village, Kayu Aro District, Kerinci Regency can be seen in Table 4.

**Table. 4 Agro-industrial Revenue of Brown Sugar Cane in Sungai Asam Village**

Agroindustry	Production (Kg)	Sale (Kg)	Price (Rp)	Revenue (Rp)
Mr. Kamianto	710	710	9.500	6.745.000
Mr. Adam	600	600	9.500	5.700.000
Mr. Wasiran	600	600	9.500	5.700.000
Mr. Warsito	600	600	9.500	5.700.000
Mr. Didit	680	680	9.500	6.460.000
Ms. Adek	570	570	9.500	5.415.000
Mr. Bapak Giran	760	760	9.500	7.220.000
<b>Quantity</b>	<b>4.520</b>	<b>4.520</b>	<b>66.500</b>	<b>42.940.000</b>
<b>Average</b>	<b>645,71</b>	<b>645,71</b>	<b>9.500</b>	<b>6.134.286</b>

Source: Processed Primary Data

Table 4 shows that the average revenue received by the sugar cane brown sugar agroindustry is Rp. 6,134,286 per month and the revenue of each agroindustry depends on the production produced in each agroindustry. The average agro-industry produces 645.71 Kg of sugar per month (Appendix 3). The sugar produced will be sold directly to the factory owner at a price of 9500 / kg.

## 3. Income

Sugar cane brown sugar agroindustry income in this study is the income of craftsmen who only come from the sugar cane brown sugar agroindustry obtained from the difference between revenue and all costs incurred during the production process. Known income is divided into two namely gross income and net income, gross income is the value of production received by craftsmen before deducting production costs, while net income is the value of production received by craftsmen reduced by production costs during the production process. In detail the income received by craftsmen can be seen in table 5.

**Table. 5 Agro-industrial Income of Brown Sugar Cane in Sungai Asam Village**

<i>Agroindustry</i>	<i>Production (Kg)</i>	<i>Price (Rp)</i>	<i>Total Revenue (Rp)</i>	<i>Total Cost (Rp)</i>	<i>Total Income (Rp)</i>
Mr. Kamianto	710	9.500	6.745.000	2.865.056	3.879.945
Mr. Adam	600	9.500	5.700.000	2.463.111	3.236.889
Mr. Wasiran	600	9.500	5.700.000	2.437.734	3.262.266
Mr. Warsito	600	9.500	5.700.000	2.668.694	3.031.306
Mr. Didit	680	9.500	6.460.000	2.860.167	3.599.833
Ms. Adek	570	9.500	5.415.000	2.731.611	2.683.389
Mr. Giran	760	9.500	7.220.000	3.325.183	3.894.817
<b>Quantity</b>	<b>4.520</b>	<b>66.500</b>	<b>42.940.000</b>	<b>19.351.555</b>	<b>23.588.445</b>
<b>Average</b>	<b>645,71</b>	<b>9.500</b>	<b>6.134.286</b>	<b>2.764.508</b>	<b>3.369.778</b>

Source: Processed Primary Data

Table 5 shows that with the average ability to produce in one month, the average cane brown sugar craftsman in Sungai Asam Village, West Kayu Aro District, Kerinci Regency earned an income of Rp. 3,369,778 per month with a total cost of Rp. 2,764,508 per month. These results differ from the results of research (Riandhy, 2021) in the Analysis of Income and Acceptance of the Sugar Cane Brown Sugar Agroindustry in Lindung Jaya Village, Kayu Aro District, Kerinci Regency, the average income received by the sugar cane brown sugar agroindustry is Rp. 5,067,013 per month. The average fixed cost incurred is Rp. 225,137 which consists of the cost of mill rental and equipment depreciation, and the average variable cost incurred per month is Rp. 1,504,950.

#### 4. Revenue and Cost Ratio (R/C Ratio)

Revenue and cost analysis (R/C) is carried out to see the relative benefits that will be obtained by craftsmen in their activities. Agroindustry is said to be feasible if it has an R / C ratio value of less than one. This means that any additional costs incurred will generate additional revenue so that it can be said that the agroindustry is profitable for craftsmen. The magnitude of the ratio of revenue and costs in the sugar cane brown sugar agroindustry in the study area can be seen in table 6 below.

**Table. 6 Revenue and Cost Ratio (R/C) of Sugarcane Brown Sugar Agroindustry in Sungai Asam Village**

<i>Agroindustry</i>	<i>Total Revenue</i>	<i>Total Cost</i>	<i>R/C Ratio</i>
Mr. Kamianto	6.745.000	2.865.056	2,35
Mr. Adam	5.700.000	2.463.111	2,31
Mr. Wasiran	5.700.000	2.437.734	2,33
Mr. Warsito	5.700.000	2.668.694	2,13
Mr. Didit	6.460.000	2.860.167	2,25
Ms. Adek	5.415.000	2.731.611	1,98
Mr. Giran	7.220.000	3.325.183	2,17
<b>Quantity</b>	<b>42.940.000</b>	<b>19.351.556</b>	<b>15,55</b>
<b>Average</b>	<b>6.134.286</b>	<b>2.764.508</b>	<b>2,22</b>

Source: Processed Primary Data

Based on the theory put forward by Soekartawi that if the R / C Ratio is greater than one ( $R / C > 1$ ). This indicates that each rupiah value spent in production will provide benefits in the amount of revenue value obtained. The R/C Ratio value is obtained from the division of revenue and total costs. From the results of these calculations, the average R / C Ratio of agro-industry in Sungai Asam Village is 2.22. The R / C Ratio value is greater than 1, this means that the sugar cane brown sugar processing business in Sungai Asam Village is feasible.

#### ***Research Implications***

From the results of the study conducted on the brown sugar cane agroindustry in Sungai Asam Village, Kayu Aro District, it is feasible to be developed and has the potential to be developed further. Until now, sugar cane is still something that is sought after in the market, Sungai Asam Village has a more prominent sugar cane production compared to other villages in Kayu Aro District. Sugar cane raw materials are always available, so the raw materials for agroindustry are very well met.

The results of the study show a picture of the amount of agroindustry income. Where it can be seen that the average income received by brown sugar cane craftsmen is greater than the UMP value of Kerinci Regency, which is IDR 3,037,121. This income still allows for further increase by increasing production capacity considering that raw materials are always available, improving the quality of human resources through training for craftsmen, maintaining the quality of the products produced. With this strategy, it is hoped that it will provide opportunities for the agroindustry to expand its business scale.

The income received by craftsmen shows that this agroindustry is profitable and feasible to be developed. Further development of agroindustry has various benefits such as increasing product value, increasing farmer income and can create jobs. This agro-industry has the potential to develop local potential and reduce the rate of urbanization by creating attractive economic opportunities in the village. The development of brown sugar agro-industry opens up opportunities for product diversification from sugar cane, increasing the competitiveness of local products in the market. It is hoped that with this feasibility the government can utilize it as best as possible in order to attract the interest of other farmers to produce brown sugar cane.

## **CONCLUSION**

Based on the results of research on the analysis of sugar cane brown sugar agro-industry income (case study of sugar cane brown sugar agro-industry in Sungai Asam Village, West Kayu Aro District, Kerinci Regency, it can be concluded that the sugar cane brown sugar agro-industry in Sungai Asam Village is still categorized as a small-scale industry which is founded on the background because the majority of the people of Sungai Asam Village plant sugar cane plants. The raw material used in the manufacture of sugar cane brown sugar is sugar cane juice and the necessary auxiliary material is cooking oil. The equipment used in the production process are cauldrons, stirrers, filters, buckets, scales, cement kilns, molds and nira reservoirs. The average income received by the sugar cane brown sugar agro-industry is greater than the UMP value of Kerinci Regency. From the results of these calculations, the average R / C Ratio value of agro-industry is 2.22, so agro-industry in Sungai Asam Village, Kayu Aro District, Kerinci Regency is feasible or profitable to continue.

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