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## **Added Value Analysis of Processed Cassava Products (Gethuk and Balung Kethek)**

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### **Abstract**

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#### **Keywords:**

Business efficiency, profit, added value, cassava

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Agroindustry plays an important role in increasing the added value of agricultural products which are perishable and have short shelf life. The added value is obtained from the processing process which raises costs and forms new prices along with greater profits. This study aims to analyze the profits, business efficiency, and added value of *Gethuk* and *Balung Kethek* in the *Gethuk Semar* Industry. The basic method of this research is descriptive method. The respondents were determined using non-probability sampling methods, purposive sampling technique, and key informants. Added value analysis was done by Hayami method and the business efficiency was analyzed using the R / C ratio and the B / C ratio. The results of the analysis show that the processing of cassava into *Gethuk* and *Balung Kethek* is profitable, efficient, and has added value. *Gethuk* provides benefits, business efficiency, and higher added value than *Balung Kethek*. Based on the results of this study, it is advised to optimize the use of cost inputs. The cost of cooking oil in *Balung Kethek* is too immense. The *Gethuk Semar* Industry may use high-antioxidant cooking oil that can be used several times in the production process.

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## INTRODUCTION

Agriculture is a leading sector in increasing the economic growth of a country. The agricultural sector plays a role in meeting the needs of agro-industrial raw materials. Agroindustry is able to increase shelf life and added value of perishable and short shelf life agricultural products (Akinngbe, 2010). Cassava agro-industry has advantages in the fulfillment of raw materials. Cassava is plentiful and easy to cultivate in Indonesia. Cassava grows in any season and can be cultivated even in critical land. Karanganyar Regency is one of the areas that cultivates a large number of cassava. It is shown in Table 1.

**Table 1. Production and Harvested Area of Crops in Karanganyar Regency year 2017**

| No | Commodities    | Production (Ton) | Harvested Area (Ha) | Production/Ha (Ton) |
|----|----------------|------------------|---------------------|---------------------|
| 1  | Lowland Rice   | 331.785          | 52.992              | 62,61               |
| 2  | Cassava        | 83.125           | 2.590               | 321                 |
| 3  | Sweet Potatoes | 33.943           | 894                 | 379,51              |
| 4  | Corn           | 27.120           | 4.090               | 66,30               |
| 5  | Peanuts        | 2.268            | 1.534               | 14,79               |
| 6  | Soybeans       | 421              | 231                 | 18,21               |
| 7  | Green beans    | 13               | 11                  | 12,15               |

Source: Central Bureau of Statistics Karanganyar Regency 2018

Table 1 shows the production and harvested area of crops in Karanganyar Regency. Cassava production is in the second highest position after lowland rice. The total production of cassava in 2017 was 83,125 tons with the harvest area of 2,590 ha. This shows that Karanganyar Regency has the potential to develop a cassava business. According to Nainggolan & Aritonang (2017), cassava production centers produce high yields yet low prices. Therefore, it is necessary to increase cassava processing activities in cassava production centers.

Cassava processing agro-industry in Karanganyar Regency has begun to developed. Among them are cassava chips, *Gethuk*, *Balung Kethek*, and other traditional foods. Cassava processing can increase profits and added value. Previous research stated that processing cassava into several products in Nigeria provides added value, especially to the economic value of cassava. Products that provide the greatest added value are dry-processed cassava and cassava flour (Lawal, Omotesho, & Oyedemi, 2013). Another study stated that the processing of cassava into *siger* rice (analog rice made from cassava) can increase the added value of about 2 times of fresh cassava value per kg (Novia, Zakaria, & Lestari, 2013). Matters that need to be considered in increasing profits and added value are the efficiency of input use. The processing of cassava into chips, mocaf flour, and *rengginang* (crackers) in Bengkulu Province is more profitable than selling fresh

cassava. These products also provide added value for raw materials per kg (Ishak et al., 2017).

The difference between this study and previous studies is the use of two different products in one industry. Another differentiator is *Balung Kethek* product that has never been studied before. *Gethuk Semar* Industry has not been widely used as an object of research. This industry has a wide variety of products and has an extensive network of cooperation. Value added analysis is one of the research objectives that can be carried out at *Gethuk Semar* Industry. The aims of this research are 1) to analyze the advantages of *Gethuk* and *Balung Kethek*, 2) to analyze the business efficiency of *Gethuk* and *Balung Kethek*, 3) to analyze the added value of *Gethuk* and *Balung Kethek*.

## RESEARCH METHOD

The basic method used in this research is descriptive method (Prianto, 2011). The research technique used is case study technique. This study was carried out purposively (purposive) in Karanganyar Regency with the consideration that cassava production in this regency is the second highest after lowland rice. The location is precisely at *Gethuk Semar* Industry, Karangpandan District, Karanganyar Regency since this industry is a developed cassava processing industry in Karanganyar Regency and its surroundings. This industry has *Gethuk* and *Balung Kethek* products. Both products use the *Jalak Towo* variety of cassava for its soft texture and savory taste. *Gethuk* is produced every day in larger quantities than *Balung Kethek* products. *Balung Kethek* is produced four times per week and has a variety of flavors.

The data used were primary and secondary data. Primary data included work experience both in the field of cassava processing and outside the field of cassava processing, history, vision, and mission of *Gethuk Semar* Industry, use of costs or production inputs, total production, product prices, number of workers, use of capital, raw materials, and the tools used in production. Secondary data included the production of crops and cassava in Karanganyar Regency. The main data used was primary data obtained from interviews. Selected respondents are those who understand thoroughly and have in-depth information regarding the object. The method of determining respondents was non probability sampling with purposive sampling technique and key informants. There were 3 respondents: the owner of *Gethuk Semar* Industry, workers in the production section of *Gethuk*, and workers in the production of *Balung Kethek*. Data collection techniques used were observation, interviews, note-taking, and documentation. Data collection was carried out in August 2019.

Profit analysis was calculated as total revenue (TR) minus total costs (TC) using the formula as follows (Waseso et al., 2017):

$$\pi = TR - TC$$

Business efficiency was analyzed using the R / C ratio and B / C ratio approaches. R / C ratio was calculated by the formula as follows (Waseso et al., 2017):

$$R/C \text{ ratio} = \frac{\text{Total Revenue (IDR)}}{\text{Total cost (IDR)}}$$

The B / C ratio was calculated using the following formula (Hariance, Annisa, & Budiman, 2018):

$$B/C \text{ ratio} = \frac{\text{Profit (IDR)}}{\text{Total Cost (IDR)}}$$

The added value in *Gethuk Semar* Industry was analyzed using Hayami method.

**Table 2. Variables and Score in Added Value Analysis using Hayami Method**

| No.  | Variable   | Score                     |
|--|--|---------------------------|
| Output, Input, and Price                         |  |                           |
| 1.   | Output (kg/ production)  | (1)                       |
| 2.   | Input (kg/ production)   | (2)                       |
| 3.   | Workers (Working day/production process)                       | (3)                       |
| 4.   | Conversion factor  | (4) = (1)/(2)             |
| 5.   | Labor Coefficient  | (5) = (3)/(2)             |
| 6.   | Output price (IDR/kg)  | (6)                       |
| 7.   | Average wage for workers per working day (IDR/production hour) | (7)                       |
| Revenue and income                               |  |                           |
| 8.   | Price of raw materials (IDR/kg)                                | (8)                       |
| 9.   | Other input contributions (IDR/kg)                             | (9)                       |
| 10.  | output value (IDR/kg)  | (10) = (4) x (6)          |
| 11.  | a. Added value (IDR/kg)  | (11a) = (10)-(9)-(8)      |
|  | b. Additional value ratio (%)                                  | (11b)= [(11a)/(10)]x100%  |
| 12.  | a. Workers' allowance (IDR/kg)                                 | (12a) = (5) x (7)         |
|  | b. Workers' share (%)  | (12b)=[(12a)/(11a)]x100%  |
| 13.  | a. Income (IDR/kg)   | (13a) = (11a)-(12a)       |
|  | b. Income level (%)  | (13b)= [(13a)/(10)]x100%  |
| Remuneration for the Owner of Production Factors |  |                           |
| 14.  | Margin (IDR/kg)  | (14) = (10)-(8)           |
|  | a. Labor income (%)  | (14a) = [(12a)/(14)]x100% |
|  | b. Other input contributions (%)                               | (14b) = [(9)/(14)]x100%   |
|  | c. Company income (%)  | (14c)=[(13a)/(14)]x100%   |

Source: Hayami et al. (1987) in Kustiari (2012) in Ishak et al.(2017)

## RESULTS AND DISCUSSION

### Profit Analysis

A producer is faced with cost problem that must be incurred and calculated during the production process. The total cost of production includes total fixed costs and total variable costs. The total cost of *Gethuk* and *Balung Kethek* is shown in table 3.

**Table 3. Total Cost Analysis of Gethuk and Balung Kethek in August 2019**

| No.           | Cost component            | <i>Gethuk</i>         |                               | <i>Balung Kethek</i> |                               |
|---------------|---------------------------|-----------------------|-------------------------------|----------------------|-------------------------------|
|               |                           | Amount (IDR)          | Percentage of total costs (%) | Amount (IDR)         | Percentage of total costs (%) |
| Fixed Costs   |                           |                       |                               |                      |                               |
| 1             | Deprecation of machines   | 676.500,00            | 0,44                          | 406.125,00           | 1,49                          |
| 2             | Permanent workers         | 900.000,00            | 0,59                          | 900.000,00           | 3,31                          |
|               | Total fixed cost (IDR)    | 1.576.500,00          | 1,03                          | 1.306.125,00         | 4,80                          |
| Variable cost |                           |                       |                               |                      |                               |
| 1             | Raw Materials             | 35.000.000,00         | 22,89                         | 4.800.000,00         | 17,63                         |
| 2             | Auxiliary material        | 44.642.500,00         | 29,19                         | 1.868.640,00         | 6,86                          |
| 3             | Packing                   | 36.122.200,00         | 23,62                         | 4.022.800,00         | 14,78                         |
| 4             | LPG Gas                   | 7.315.000,00          | 4,78                          | 4.248.000,00         | 15,60                         |
| 5             | Cooking oil               | 0                     | 0,00                          | 5.400.000,00         | 19,84                         |
| 6             | Outsourcing               | 24.800.000,00         | 16,22                         | 3.840.000,00         | 14,11                         |
| 7             | Water and electricity     | 1.250.000,00          | 0,82                          | 500.000,00           | 1,84                          |
| 8             | Transport                 | 1.550.000,00          | 1,01                          | 1.200.000,00         | 4,41                          |
| 9             | Miscellaneous             | 668.000,00            | 0,44                          | 38.400,00            | 0,14                          |
|               | Total variable cost (IDR) | 151.347.700,00        | 98,97                         | 25.917.840,00        | 95,20                         |
|               | <b>Total Cost (IDR)</b>   | <b>152.924.200,00</b> | <b>100,00</b>                 | <b>27.223.965,00</b> | <b>100,00</b>                 |

Source: Primary data analysis, 2019

The biggest cost in *Gethuk* production is the cost of auxiliary materials, especially coconut. 5,250 coconuts are needed every month. Coconut used to strengthen the savory taste of *Gethuk*. The distinctive feature of *Gethuk* is the usage of plenty coconut mixtures. The composition of coconut is 3 kg per 5 kg of cassava. Other auxiliary materials are sugar and salt. The composition of sugar is 1 kg per 5 kg of cassava. The salt used in the *Gethuk* mixture is half a tablespoon per 5 kg of cassava. The biggest cost in the production of *Balung Kethek* is the cost of cooking oil in the amount of IDR 5,400,000.00 per month. Cooking oil is used in large quantities since the frying process is repeated for three times. The frying process aims to maintain the crispiness of the *kethek balung*.

The total cost of *Gethuk* production is IDR 152,924,200 and *Balung Kethek* production is IDR 27,223,965.00. The total cost of *Gethuk* production in August 2019 was greater than the production cost of *Balung Kethek*. It was due to differences in the number of processed inputs. Based on research conducted by Nuzuliyah (2018), the greater amount of input for processing raw materials, the

greater production costs will be. The total cost depends on the amount of raw material input to be produced. Total cost analysis was used to facilitate profit analysis. Costs incurred with good planning will provide great benefits for the business. Benefits can be seen through fees and revenues.

The revenue of *Gethuk* in August 2019 was IDR 222,200,000.00 which came from the sale of 15,900 pcs of *Gethuk*. The number of *Balung Kethek* sold was 1,800 pcs for the 200 gr package and 840 pcs for the 400 gr package. Revenue of *kethek balung* in August 2019 was IDR 30,480.00. Revenue is used as the basis for calculating profit.

**Table 4. Analysis of *Gethuk* and *Balung Kethek* Profits in August 2019**

| No | Information   | <i>Gethuk</i>  | <i>Balung Kethek</i> |
|----|---------------|----------------|----------------------|
| 1  | Revenue (IDR) | 222.200.000,00 | 30.480.000,00        |
| 2  | Cost (IDR)    | 152.924.200,00 | 27.223.965,00        |
|    | Profit (IDR)  | 69.275.800,00  | 3.256.035,00         |

Source: Primary Data Analysis, 2019

Based on Table 4, processing cassava into *Gethuk* and *Balung Kethek* brings more profit. According to Kehinde & Aboaba (2016), cassava processing in Nigeria provides considerable benefits. *Gethuk* profit is IDR 69,275,800.00 and *Balung Kethek* is IDR 3,256,035.00. Imran, Murtisari, & Murni's (2014) research showed that processing cassava into chips generates profit of IDR 6,116,500.00. The profit of *Gethuk* is greater than the chips. On the other hand, the profit of *Balung Kethek* is less than than chips. Another study conducted by Ani, Ojila, & Abu (2019) in Nigeria stated that the processing of cassava provides more profit. The profit from the dry processing called *garri* is IDR 1,050,000.00. Research in Ghana has also shown that processing cassava into *garri* brings profit of IDR 1,968,750.00 (Yidana & Amadu, 2013).

The difference between *Gethuk* and *Balung Kethek* profits is quite significant due to different production activities. *Gethuk* production is carried out for 31 days and *Balung Kethek* for 24 days. The number of cassavas that is processed for *Gethuk* is 5 times more than the *Balung Kethek*. Processing cassava into *Gethuk* and *Balung Kethek* brings profit. Profits are directly proportional to the amount of revenue. This means that the greater the revenue, the greater the profit. Profits are inversely proportional to the total cost of production. The larger the costs, the smaller the profits (Yulia, Sribudiani, & Yoza, 2015).

### **Business Efficiency**

Business efficiency is measuring whether a business is feasible or not by looking at the production results and outputs used in the production process (Waseso, Sumantri, & Irnad, 2017). The R / C Value ratio is calculated by the total revenue and cost. The B / C Value Ratio compares the ratio of profit to total cost.

**Table 5. Analysis of *Gethuk* and *Balung Kethek* Business Efficiency in August 2019**

| No | Information   | <i>Gethuk</i> |             | <i>Balung Kethek</i> |            |
|----|---------------|---------------|-------------|----------------------|------------|
|    |               | R/C ratio     | B/C ratio   | R/C ratio            | B/C ratio  |
| 1  | Revenue (IDR) | 222.200.000   | 69.275.800  | 30.480.000           | 3.256.035  |
| 2  | Cost (IDR)    | 152.924.200   | 152.924.200 | 27.223.965           | 27.223.965 |
|    |               | 1,45          | 0,45        | 1,12                 | 0,12       |

Source: Primary Data Analysis, 2019

Based on the value of the R / C ratio, the *Gethuk Semar* Industry is profitable since the value is more than 1. The value of the B / C ratio is seen from the amount of BRI interest rates in August 2019 in Karanganyar Regency 0.44. Based on the B / C ratio, only *Gethuk* business is counted as efficient and feasible to develop. The *Balung Kethek* business is inefficient and not feasible to develop. Although the B / C value of *Balung Kethek* ratio shows inefficient, *Gethuk Semar* Industry is included in the business that deserves to be developed. This is because the B / C ratio value of *Gethuk* is efficient and *Balung Kethek* contributes to the profits seen from the R / C ratio value of more than 1 (Hariance et al., 2018).

Imran, Murtisari, & Murni's (2014) research on added value analysis of cassava chips in Bone Bolango Regency showed that cassava processing is efficient with an R / C ratio of 2.20. Research by Ishak et al. (2017) showed that the B / C ratio for processing cassava into chips was 2.5. Previous research conducted in Nigeria by Ani et al. (2019) stated that cassava chips had an efficiency value of 2.1538. According to research by Yidana & Amadu (2013), the processing of cassava into *garri* has an R / C ratio of 2.0. These values are greater than processing cassava into *Gethuk* and *Balung Kethek* in *Semar Gethuk* Industry. It means that alternatives are needed to reduce and streamline production costs in *Gethuk Semar* Industry. Another study of cassava processing into starch in Nigeria by Lawal et al. (2013) showed 1.2 R / C ratio.

### Added Value Analysis

Processing cassava into *Gethuk* and *Balung Kethek* provides added value to cassava. It results in higher selling price and longer shelf life. According to Hasanah, Mayshuri, & Djuwari (2015), a product will be seen from the added value it provides. The production process carried out by the agro-industry offers added value from agricultural products. The value of the product will be directly proportional to the level of customer satisfaction. If the added value increases, the customer satisfaction will follow. This is one of the reasons for the development of many agro-industries. Agro-industry has an important role in increasing the added value of agricultural products. *Gethuk Semar* industry has a role in increasing the added value of cassava.

The added value of *Gethuk* is IDR 15,485.40/kg. The added value of *Balung Kethek* is IDR 10,370.40 per kg. It means that 1 kg of cassava produces an added value of Rp.10,370.40. *Gethuk* and *Balung Kethek* have a significant difference in added value. *Balung Kethek* has high input and lower output price than *Gethuk*. The added value is the gross added value. According to Imran et al. (2014), Net

added value is the gross added value after deducting the depreciation of equipment. The amount of depreciation of *Gethuk* production tools was IDR 23.10 per kg and IDR 109.83 per kg for *Balung Kethek*. Therefore, the net added value of *Gethuk* is IDR 15,426.30 per kg and IDR 10,260.57 per kg for *Balung Kethek*.

**Table 6. Added Value of *Gethuk* and *Balung Kethek* per day**

| No.   | Variable   | <i>Gethuk</i> | <i>Balung Kethek</i> |
|---|--|---------------|----------------------|
| <i>Output, Input, and price</i>                         |  |               |                      |
| 1   | <i>Output</i> (kg/ production)                                 | 125,00        | 29,00                |
| 2   | <i>Input</i> (kg/ production)                                  | 250,00        | 50,00                |
| 3   | Workers (Working day/production process)                       | 8,00          | 8,00                 |
| 4   | Conversion factors   | 0,50          | 0,58                 |
| 5   | Labor coefficient  | 0,03          | 0,16                 |
| 6   | <i>output price</i> (IDR/kg)                                   | 60.000,00     | 50.000,00            |
| 7   | Average wage for workers per working day (IDR/production hour) | 5.000,00      | 5.000,00             |
| <i>Revenue and Income</i>                               |  |               |                      |
| 8   | Price of raw materials (IDR/kg)                                | 4.000,00      | 4.000,00             |
| 9   | Other input contributions (IDR/kg)                             | 10.514,60     | 14.629,60            |
| 10  | <i>Output price</i> (IDR/kg)                                   | 30.000,00     | 29.000,00            |
| 11  | a. Added Value (IDR/kg)  | 15.485,40     | 10.370,40            |
|   | b. Additional value ratio (%)                                  | 51,62         | 35,76                |
| 12  | a. Workers' allowance (IDR/kg)                                 | 160,00        | 800,00               |
|   | b. Workers' share (%)  | 1,03          | 7,71                 |
| 13  | a. Income (IDR/kg)   | 15.325,40     | 9.570,40             |
|   | b. Income level (%)  | 51,08         | 33,00                |
| <i>Remuneration for the Owner of production factors</i> |  |               |                      |
| 14  | Margin (IDR/kg)  | 26.000,00     | 25.000,00            |
|   | a. Labor income (%)  | 0,62          | 3,20                 |
|   | b. Other Input contributions (%)                               | 40,44         | 58,52                |
|   | c. Company income (%)  | 58,94         | 38,28                |

Source: Primary data analysis, 2019

The results of the analysis showed that *Gethuk* and *Balung Kethek* provide added value to cassava. The added value of *Gethuk* is greater than *Balung Kethek*, since the input production of *Balung Kethek* is higher while the selling price of is lower. A large input contribution can reduce profits. The more tools and the length of the production process also affect the input contribution. Judging from the size of the company's margin and profitability, *Gethuk* and *Balung Kethek* have a difference of IDR 1,000 per kg. The margin on *Gethuk* is higher than *Balung Kethek*.

The income margin relates to the cost input and product value. The use of large fees will reduce the income margin. In order to optimize the use of costs, it needs to be planned in advance. Costs incurred needs to be balanced with the amount of production and value of the product. The cost of the *Balung Kethek* does



not match its production amount. The costs incurred during the production process are large and is not proportional to the product produced. Hence, the income margin is low. Cost efficiency needs to be done in the production process of *Balung Kethek*. Cost efficiency can be done by reducing a cost and allocating it to other costs or other jobs. Cost efficiency will increase revenue margins. An increasing income margin will also increase the added value of the product (Asmara, Setiawan, & Putri, 2011).

## CONCLUSION

Based on the results and discussion, it can be concluded that the production process of cassava into *Gethuk* and *Balung Kethek* is considered profitable, efficient, and provides added value. The amount of profit, business efficiency, and added value of *Gethuk* products is greater than *Balung Kethek*.

## RECOMMENDATION

There are several suggestions that can be given regarding the added value of processing cassava into *Gethuk* and *Balung Kethek* products. *Gethuk Semar* industry should make efficient use of production costs, especially packaging costs for increased profit and business efficiency. The biggest input in *Balung Kethek* is the cost of cooking oil. It is recommended to use cooking oil with antioxidant. It can reduce input costs since the oil can be used several times in the production process and have an impact on increasing the added value of *Balung Kethek*.

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