Added Value Analysis of Processed Cassava Products

(Gethuk and Balung Kethek)

Eni Astuti, Rhina Uchyani Fajarningsih and Nuning Setyowati
Sebelas Maret University, Surakarta, Central Java
Correspondence e-mail: eniastuti716@gmail.com

Submitted : March 19th, 2020 ; Revised : April 7th, 2020; Accepted: June 3rd, 2020

Abstract

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-atioxidant cooking oil that can be used several times in the production process.
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 (Akinnagbe, 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):

\[ \frac{R}{C} \text{ ratio} = \frac{\text{Total Revenue (IDR)}}{\text{Total cost (IDR)}} \]
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 |
|-----|----------------------------------------------------|-------|
| 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)   |
| 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% |
| 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                  | Gethuk         | Balung Kethek | Gethuk         | Balung Kethek |
|-----|---------------------------------|----------------|---------------|----------------|---------------|
|     |                                 | Amount (IDR)   | Percentage of total costs (%) | Amount (IDR)   | Percentage of total costs (%) |
| 1   | Fixed Costs                     |                |               |                |               |
|     | 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                   | 35,000,00,00   | 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                         | 7,315,00,00    | 4,78          | 4,248,000,00   | 15,60         |
| 5   | Cooking oil                     | 0              | 0,00          | 5,400,000,00   | 19,84         |
| 6   | Outsourcing                     | 24,800,00,00   | 16,22         | 3,840,000,00   | 14,11         |
| 7   | Water and electricity           | 1,250,00,00    | 0,82          | 500,000,00     | 1,84          |
| 8   | Transport                       | 1,550,00,00    | 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         |
|     | Total Cost (IDR)                | 152,924,200,00 | 100,00       | 27,223,965,00  | 100,00        |

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

| No | Information    | Gethuk         | Balung Kethek |
|----|----------------|----------------|---------------|
| 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 | Gethuk | Balung Kethek |
|----|-------------|--------|---------------|
|    |             | 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 gari 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                        | Gethuk          | Balung Kethek |
|-----|---------------------------------|-----------------|---------------|
| 1   | Output (kg/ production)         | 125,00          | 29,00         |
| 2   | Input (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   | output price (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 |

Revenue and Income

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 | Output price (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         |
Remuneration for the Owner of production factors

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.

**REFERENCES**

Akinnagbe, O. M. (2010). *Constraints and Strategies Towards Improving Cassava Production and Processing in Enugu North Agricultural Zone of Enugu State, Nigeria*. 35(3), 387–394.

Ani, D., Ojila, H., & Abu, O. (2019). *Profitability of Cassava Processing: A Case Study of Otukpo Lga, Benue State, Nigeria*. 6, 12–23. https://doi.org/10.18052/www.scipress.com/SFP.6.12

Asmara, R., Setiawan, B., & Putri, W. N. (2011). *Analisis Nilai Tambah dan Efisiensi Usaha Agroindustri Minyak Cengkeh*. XI(1), 44–55.

Hariance, R., Annisa, N., & Budiman, C. (2018). *Kelayakan Finansial Agroindustri Olahan Pepeaya (Carica pepaya L.) di Nagari Batu Kalang Kecamatan Padang Sago Kabupaten Padang Pariaman*. 3(1), 1–9.

Hasanah, U., Mayshuri, & Djuwari. (2015). *Analisis Nilai Tambah Agroindustri Sale Pisang di Kabupaten Kebumen The Value Added Analysis of Sale Pisang Agroindustry in Kebumen Regency*. 18(3), 141–149.

Imran, S., Murtisari, A., & Murni, N. K. (2014). *Analisis Nilai Tambah Keripik Ubi Kayu di UKM Barokah Kabupaten Bone Bolango Supriyo Imran, Amelia Murtisari, Ni Ketut Murni Jurusan Agribisnis Fakultas Pertanian Universitas Negeri Gorontalo*. 1(4), 207–212.

Ishak, A., Firison, J., Dinata, K., Mutmaidah, S., Kelapa, K. P., & Tengah, K. B. (2017). *Analisis Keuntungan dan Nilai Tambah Produk Olahan Ubi Kayu Skala Rumah Tangga di Kabupaten Bengkulu Tengah*. 596–607.

Kehinde, A. L., & Aboaba, K. O. (2016). *Analysis of Value Addition in The Processing of Cassava Tubers to “Garri” Among Cottage Level Processors in Southwestern
Nigeria.
Lawal, A. M., Omotesho, O. A., & Oyedemi, F. A. (2013). *An Assessment of the Economics of Cassava Processing in Kwara State*.

Nainggolan, H. L., & Aritonang, J. (2017). *Analisis Integrasi Subsistem Agribisnis Ubi Kayu di Kecamatan Pancur Batu Kabupaten Deli Serdang*. 20(3).

Novia, W., Zakaria, W. A., & Lestari, D. A. H. (2013). *Analisis Nilai Tambah dan Kelayakan Pengembangan Agroindustri Beras Siger*. 1(3), 210–217.

Nuzuliyah, L. (2018). *Analisis Nilai Tambah Produk Olahan Tanaman Rimpang Added Value Analysis of Rhizome Product*. 7, 31–38.

Prianto, F. W. (2011). *Pola Pengembangan Agroindustri yang Berdaya Saing*. X(1), 48–71.

Waseso, G. D., Sumantri, B., & Irnad. (2017). *Analisis Keuangan dan Efisiensi Usaha Susu Pasteurisasi di Koica Milk Shop Kecamatan Selupu Rejang Kabupaten Rejang Lebong Bengkulu*. 12(4), 454–465.

Yidana, J. A., & Amadu, Y. (2013). *The impact of cassava processing on the livelihoods of women processors in Central Gonja district of the northern region of Ghana*. 8(49), 6524–6528. https://doi.org/10.5897/AJAR12.859

Yulia, I., Sribudiani, E., & Yoza, D. (2015). *Analisis Biaya Produksi Hasil Kerajinan Rotan pada Industri Usaha Kecil dan Menengah (UKM) di Kecamatan Rumbai, Pekanbaru (Studi Kasus UD. Dona Rotan Furniture)*. 2(2), 1–11.