Feasibility Based on Production Patterns by Home Industries in Hargotirto, Kokap, Kulon Progo, Yogyakarta

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Abstract. This study aims to determine the pattern of coconut sugar production and compare the income and business feasibility of each production pattern. Utilizing proportionate stratified random sampling, 90 respondents of industrialists were gathered. There are three production patterns coconut sugar home industry: pattern (1) processing the formed coconut sugar (60 home industry), pattern (2) processing the brown sugar (21 home industry), and pattern (3) processing formed coconut sugar into brown sugar (9 home industry). The average income of pattern (1) IDR 695,010 per month, pattern (2) IDR 787,745 per month, and pattern (3) IDR 2,326,578 per month. The values of business feasibility based on R/C were: pattern (1) 1.001; pattern (2) 1.057 and pattern (3) 1.056. Business feasibility based on capital productivity obtained pattern (1) 187.7%, pattern (2) 152.4%, and pattern (3) 6.2%. Business feasibility based on labor productivity per (man days) was: pattern (1) IDR 65,569, pattern (2) 67,820 IDR, and pattern (3) 290,289 IDR. The results of study revealed that the most preferred production pattern was pattern (1) processing to formed coconut sugar. The three production patterns were feasible (R/C> 1). Pattern (3), processing formed coconut sugar into the brown sugar, was the most productive.

1 Introduction

Coconut sugar is a processed product derived from coconut juice (sap), obtained by evaporating coconut juice (Cocos nucifera L.) until reaching its saturated liquid and formed a crystalline structure. and then formed [1, 19]. Coconut juice is a liquid produced from coconut flower bunches. Coconut sugar is widely used as a sweetener and gives a brown color to food and is widely consumed by the community to provide a sweet and healthy taste [2]. Compared to white sugar, formed coconut sugar and brown sugar have higher protein levels, fat, calcium, phosphorus, and iron [3]. Coconut Sugar May Have a Lower Glycemic Index whereas coconut sugar around of 54 [16]. Coconut sugar is becoming popular as an alternative to beetroot or cane sugar due to its high mineral content and lower glycaemic index. As its market price is about twice as high as that of conventional sugar, coconut sugar may become target to fraudulent manipulation. [24] The amount of coconut sugar consumption continues to increase in line with the increasing population. This increase in consumption results in an increase in business opportunities for coconut sugar.
production. According the result of [15], developing market penetration strategies and product development strategy is an alternative strategy to developed and applied in the development of coconut sugar business group Bonedaa Village, Bone Bolango District. One of the coconut sugar production centers in Java is in Kokap District, Kulon Progo Regency, Special Region of Yogyakarta. Table 1 illustrates the distribution of coconut production in Kulon Progo Regency based on the district.

| District   | Plant area (Ha) | Yielding crops (Ha) | Production (tons) |
|------------|-----------------|---------------------|------------------|
| Temon      | 1393.33         | 1317.31             | 2.27             |
| Wates      | 1310.64         | 1132.00             | 2.46             |
| Panjatan   | 1964.48         | 1480.09             | 4.38             |
| Galur      | 2358.52         | 2124.00             | 4.18             |
| Lendah     | 1658.82         | 1452.45             | 2.58             |
| Sentolo    | 1137.92         | 1025.54             | 2.34             |
| Pengasih   | 1682.00         | 1606.50             | 2.83             |
| Kokap      | 2998.50         | 2881.00             | 4.72             |
| Girimulyo  | 950.71          | 887.50              | 1.64             |
| Nanggulan  | 1051.19         | 838.00              | 1.46             |
| Kalibawang | 796.68          | 737.34              | 1.44             |
| Samigaluh  | 949.00          | 874.00              | 1.42             |

Source: [17]

Coconut sugar production in Kulon Progo Regency is an agricultural, cultural heritage passed down from generation to generation. The majority of production is carried out traditionally with simple technology on a micro-scale (home industry) with family labor. A large number of producers have made the formed coconut sugar and brown sugar agro-industries their preferred livelihoods to fulfill their daily needs and is generally carried out by both men and women in one household [4]. Coconut sugar or palm sugar is superior product in Banyumas regency, which supported by widespread of coconut tapping trees covering 5,157 ha and production of coconut sugar reach 57,400 tons per year, but welfare of coconut sugar entrepreneur are still relatively low [21]. Data as of March 22, 2015 in US So how did coconut palm sugar grow 100.4% in one year [22]. The activities of tapper palm farmers in South Halmahera district can, contributing to increase the socio-economic welfare of farmers tapping palm [23]

Initially, the pattern of coconut sugar production was to process sap into formed or blocked coconut sugar, referred to as pattern 1. The formed coconut sugar is processed from heated sap, thereby evaporating and leaving a solid brown and sweet sediment. When it is still hot, the sediment is then formed to be a tube block or semicircle [1]. Then the coconut sugar production pattern develops, processing the sap into crystal sugar or brown sugar, termed as pattern 2. Finally, the production pattern of brown sugar from formed/block coconut sugar has begun, defined as pattern 3. The novelty of this research is to compare the three production patterns to determine which one is the most feasible and productive.

This research raises a question on which pattern is the most profitable and feasible to be developed. This study compares the business feasibility of three coconut sugar production patterns developed in Kulon Progo, Yogyakarta Special Region. Although coconut sugar production is growing in number [5], the majority of coconut sugar producers are living in poverty. This research is expected to be the basis for the most profitable and feasible production options to develop.
2 Research Methods

The research location was determined purposively in Kokap District for being the highest planting area [17] and amount of production. Hargotirto Village was chosen for possessing the largest number of producers (home industry), as presented in the following table.

Table 2. Number of Producers (Home Industry) of Coconut Sugar in Kokap District

| Village Name | Number of Producers (Home Industry) |
|--------------|-------------------------------------|
| Hargorejo    | 188                                 |
| Hargotirto   | 976                                 |
| Hargowilis   | 86                                  |
| Jatimulyo    | 344                                 |
| Kalirejo     | 18                                  |
| Total        | 1580                                |

Source: [18]

The number of research respondents was determined by the Slovin formula, namely 90 out of 976 producers. A sampling of respondents was carried out using proportional stratified random sampling, based on the average production amount per year. Randomly selected 32 out of 343 producers in the high production category, 47 out of 513 producers in the medium production category, and 11 out of 120 producers in the low production category.

The research was conducted in a survey with interview techniques with a questionnaire guide. Primary data obtained from producers were the number of inputs in the production process, input prices, production quantities, product prices, number of labor, labor wages, and other costs. This study employed an analysis of costs, income, and profits. Business feasibility was calculated using the Revenue Cost Ratio (R/C) analysis, labor productivity, and capital productivity [6]. The research was carried out during the production period of March 1 - 31, 2019. The prices used were the prices in effect at the time of the research. The assumption utilized was that producers were rational (profit orientation), and all production was sold, or the production value was calculated. The data were presented descriptively in the form of tables. The comparison of business feasibility was carried out using table analysis.

3 Results and Discussion

3.1 Profile of Respondents

The respondents of this study were 90 producers (home industry). The number of respondents identified as pattern 1 was 60 people, pattern 2 was 21 people, and pattern 3 was 9. The distribution of producers revealed that pattern 1, producing formed sugar from sap, was the most preferred. Pattern 1 was the first pattern recognized by the community, and many have been passed down from generation to generation. Pattern 2 is processing sap into brown sugar with 21 producers. It is a production pattern known after pattern 1. Pattern 2 has been known since the 1990s, an innovation brought by community empowerment activists from various campuses and NGOs. Technology develops due to market opportunities connected by community empowerment facilitators. Until now, this market opportunity is still available.

Meanwhile, pattern 3, processing formed sugar into brown sugar, was started by the activist of the Multi-Purpose Cooperative (KSU) Jati Rogo, who developed export...
marketing in the form of ant sugar, since sugar producers have not been able to meet the
demand for the export market. The KSU managers, driven by 9 people, ended up producing
brown sugar. However, the material was not made from sap, but coconut sugar was formed
in block. The formed coconut sugar was then processed with more advanced technology to
become brown sugar and was marketed overseas.

### Tabel 3. Profile of Respondents by Production Pattern

| No | Profile | Pattern 1 | Pattern 2 | Pattern 3 |
|----|---------|-----------|-----------|-----------|
|    |         | 60 home industry | 21 home industry | 9 home industry |
| A. | Gender  |           |           |           |
| 1. | Male    | 48        | 13        | 8         |
| 2. | Female  | 12        | 8         | 1         |
| B. | Education |         |           |           |
| 1. | Elementary School | 38 | 14 | 4 |
| 2. | Junior High School | 11 | 4 | 0 |
| 3. | Senior High School | 8 | 1 | 4 |
| 4. | University | 2 | 1 | 1 |
| 5. | No school | 1 | 1 | 0 |
| C. | Business Experience (years) |       |           |           |
| 3-10 |       | 6 | 5 | 5 |
| 11-20 |       | 7 | 5 | 1 |
| 21-30 |       | 22 | 7 | 2 |
| ≥31 |       | 25 | 4 | 1 |

According to the profile in table 3, the producers in the coconut sugar home industry
were still dominated by men. The education level of producers was relatively evenly
distributed, the majority of which were elementary school graduates. In pattern 3, the
percentage of high school education was indeed higher. Interestingly, pattern 3 was
dominated by new producers who have begun their business in less than 10 years. They
were young people relatively progressive and had broader business insights, than those of
pattern 1 or pattern 2, dominated by producers who have been in business for more than 30
years. more than 30 years of working still on a home industry scale. Maybe it needs a touch
of policy from the government to make it more developed, such as research results about
Pacitan District Government Policy Implementation in the Sugar Coconut Industry, the
Micro Cooperative and Business Office and the Pacitan Regency Industry and Trade Office
in order to increase coconut sugar SMIs carry out coaching and facilitation. The guidance
and facilitation includes training, work equipment facilities, product legality facilities,
promotional facilities and capital facilities [25].

### 3.2 Production Cost Analysis

Table 4 depicts that either pattern 1 or 2 required affordable production costs. The
amount of this cost was what people considered in choosing the production pattern in their
business. The real (explicit) costs incurred less than IDR 500,000 per month. The majority
of them did not pay attention to implicit costs not incurred. While pattern 3 was chosen by a
few producers due to the larger scale of the business, using a lot of tools and materials,
thereby requiring large total costs. Accordingly, only a few producers were interested in
developing pattern 3 as the costs were more than IDR 30,000,000 per month.
and facilitation includes training, work equipment, facilities, product legality, facilities, Micro Cooperative and Business Office and the Pacitan Regency Industry and Trade Office. Pacitan District Government Policy Implementation in the Sugar Coconut Industry, the policy from the government to make it more developed, such as research results about domination by new producers who have begun their business in less than 10 years. More than 30 years of working still on a home industry scale. Maybe it needs a touch pattern 1 or pattern 2, dominated by producers who have been in business for more than 30 years.

According to the profile in table 3, the producers in the coconut sugar home industry were young people relatively progressive and had broader business insights, than those of the home industry.

3.2 Production Cost Analysis

Accordingly, only a few producers were interested in developing pattern 3 as the costs were more than IDR 30,000,000 per month. Whereas for capital owners, pattern 3 was the appropriate alternative to begin a coconut sugar business, as long as it could build markets outside the region or export markets. The KSU managers, driven by 9 people, ended up producing a small amount of this cost was what people considered in choosing the production pattern in their business. The real (explicit) costs incurred less than IDR 500,000 per month. The majority of them did not pay attention to implicit costs not incurred. While pattern 3 was chosen by a business. The real (explicit) costs incurred less than IDR 500,000 per month.

Table 4. Results of Cost Analysis for Each Production Pattern Per Month (IDR)

| No | Type of Costs | Description | Pattern 1 | Pattern 2 | Pattern 3 |
|----|---------------|-------------|-----------|-----------|-----------|
| A. | Explicit Costs | Production inputs | 282,863 | 407,952 | 33,048,333 |
|    |               | Depreciation cost | 16,710 | 22,150 | 33,422 |
|    |               | Labor fees | 0 | 0 | 1,838,333 |
|    | Total A | | 299,573 | 430,103 | 34,920,088 |
| B  | Implicit Costs | Production inputs | 559,824 | 587,659 | 0 |
|    |               | Family Labor fees | 66,108 | 65,495 | 90,000 |
|    |               | Rent room | 66,667 | 66,667 | 66,667 |
|    |               | Own capital interest | 1,748 | 2,509 | 203,701 |
|    | Total B | | 694,347 | 722,330 | 360,367 |
|    | Total Costs (A+B) | | 993,920 | 1,152,432 | 35,280,455 |

Table 5. Analysis Results of Producer Income and Profits Per Month (IDR)

| No | Description | Pattern 1 | Pattern 2 | Pattern 3 |
|----|-------------|-----------|-----------|-----------|
| A. | Income | Total Production (kg) | 61.8 | 65.5 | 1.868 |
|    | Production Price (IDR) | 16,150 | 18,690 | 20,111 |
|    | Revenue (IDR) | 994,583 | 1,217,848 | 37,246,667 |
|    | Total Income | 695,010 | 787,745 | 2,326,578 |
| B  | The Advantage | 664 | 65,415 | 1,966,211 |

3.3 Income and Profit Analysis

Very striking in pattern 3, producers could produce 1.8 tons of brown sugar per month, indicating a large business scale and the ability to absorb large raw materials. Pattern 3 was carried out by producers with comprehensive market insights. They also obtained higher prices for entering the export market. In a nutshell, processing brown sugar was more profitable but on a large scale and with a range of markets outside the region or exports. If the producers of printed coconut sugar (pattern 1) want to continue producing printed sugar, they must enlarge their business scale. Raw materials do not only rely on their coconut trees. According to the result of the research if traditional coconut sugar processed was the least hygroscopic (1.21 × 10-4 g water/g solid/minutes) [20]. If pattern 2 is to be developed, the business pattern must be improved with raw materials buying sap from other people or shift toward pattern 3, utilizing printed coconut sugar as raw material. Pattern 2 could also be encouraged to enter foreign markets or export markets to obtain a higher selling price.

Whereas for capital owners, pattern 3 was the appropriate alternative to begin a coconut sugar business, as long as it could build markets outside the region or export markets.
3.4 Business Feasibility Analysis

Table 6 exhibits that the R/C of each pattern was merely around 1. Even though it is greater than 1, this business is hazardous because the ratio of costs incurred to benefits is almost the same. From the aspect of BCR analysis, this effort is worth the effort but needs to be careful. The results of this study are in line with the research of Azhar et al [8], which reveals that the coconut sugar home industry in Pastap Julu Village was feasible to be developed because the R/C value was 2.84 (more than 1).

However, the research conducted on the coconut sugar producer in Tasikmalaya Regency had an average income of IDR 590,200 per production with an R/C value of greater than 1.5, which was 1.92; therefore, the brown sugar business was feasible to run because the R/C value was greater than 1 [9]. Similar results were also obtained by research with the same effort in Karangreji Village, Garum District, Blitar, namely an R/C value of 1.2 with an income of IDR 3,357,789.47 per month [10]. The results of research on the feasibility of the home industry for other products in the same area, namely DIY can be used as a comparison with the feasibility of the coconut sugar home industry, for example the results of research by B.S Sinaga [11] on the tofu home industry in Sleman obtained an R/C value of 1.38 in the tofu industry in Bantul Regency.

Regarding labor productivity, conventional production patterns (patterns 1 and 2) were less attractive since the wages per man-days were IDR 65,000. The reality in the field disclosed that the younger generation was not interested in developing a coconut sugar business. Apart from the low wages, they have to wait for the product to be marketed at least a week before receiving the money from sales. They preferred to work in other sectors, such as construction, factory, or others. Pattern 3 implied development prospects both in terms of feasibility based on labor productivity and capital productivity.

The brown sugar industry made from coconut sugar can be developed, but it requires capital support, foreign markets, or exports as well as the support of coconut sugar raw materials. One thing that can be developed is business partnership pattern 3 with pattern 1. This partnership will guarantee the stability of raw materials and prices.

The description of a home industry development with more modern management and market expansion can increase business feasibility from labor productivity. Of the three patterns, the R/C value is almost the same, but for the productivity of the most productive labor is pattern 3, this is because in this pattern the raw material that is processed is in the form of printed sugar, while patterns 1 and 2 are sap. This affects the processing time from raw materials to final products because the processing stage takes a long time to reduce the moisture content of the sap so that it thickens and can be printed or processed further into brown sugar. For pattern 3, it only continues processing printed sugar into brown sugar so that at the same time it can process more raw materials into the final product, namely brown sugar. However, the household industry of granular brown sugar in Kulon Progo made of formed coconut sugar based on R/C show that the industry is not feasible to develop, but shows that the value added of IDR 1,427 and that made of coconut sap is IDR 793. While, the value added of brown sugar in Purworejo is IDR 644. [13] The coconut sugar home

| No | Description                  | Pattern 1 | Pattern 2 | Pattern 3 |
|----|------------------------------|-----------|-----------|-----------|
| 1  | R/C                          | 1.001     | 1.057     | 1.056     |
| 2  | Labor Productivity (IDR per man-day) | 65,569   | 67,820   | 290,289   |
| 3  | Capital Productivity (%)      | 187.7     | 152.4     | 6.2       |
industry, compared to other home industries, has a lower feasibility level measured from capital productivity, R/C and labor productivity for the same area, namely DIY. The development of the Nata De Coco home industry in Bantul [13], uncovered labor productivity of IDR 173,039 perman-days and capital productivity of 216.22% per month. Zahran’s research [14] on vaname shrimp pond farming in Temon, Kulon Progo Regency, discovered the feasibility of the R/C aspect of 01.83 as the marketing opportunity was still wide open. The nutmeg syrup home industry in Ngade Village, Ternate City will gain the Net B/C Ratio analysis resulted 1.427531083> 1 [20].

4 Conclusions

- Three production patterns of coconut sugar in Kokap, Kulon Progo comprised processing the sap into formed coconut sugar (pattern 1), processing the sap into brown sugar (pattern 2), and processing the formed coconut sugar into brown sugar (pattern 3).
- The value of business feasibility based on the R/C analysis was relatively the same. Nevertheless, the productivity analysis of capital and labor in pattern 3 was mostly different.
- If the community sticks to pattern 1 or 2, it is highly suggested to develop the scale of the business by enlarging the raw materials that do not only rely on sap from their coconut trees.
- The development of pattern 3 requires technological support, export markets, or outside the region and a partnership of coconut sugar raw materials with producers in pattern 1.

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