








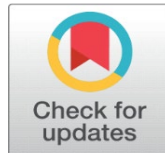


ORGANIC COCONUT SUGAR FACTORY: FEASIBILITY STUDY INDONESIA CASE

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ABSTRACT

Indonesia is the largest producer of coconut sugar in the world, one of the coconut sugar products is organic coconut sugar. The international market demand for organic coconut sugar is very large but Indonesian organic coconut sugar entrepreneurs are unable to fulfill, it for reasons of not being able to meet the required minimum quality and quantity standards. To overcome this problem, it is necessary to build an organic coconut sugar factory to produce coconut sugar according to export market quality standards in large quantities. The construction of organic coconut sugar manufacturing requires a large investment, so a feasibility study is needed to avoid investment mistakes. This study aims to analyze the feasibility of manufacturing organic coconut sugar. Feasibility analysis includes legal aspects, socio-economic aspects, technical aspects, aspects of human resources, market aspects, and financial aspects. The analytical tools used are descriptive qualitative analysis, SWOT analysis, and financial analysis using the payback period (PP), internal rate of return (IRR), net present value (NPV), and profitability index (PI) methods.

Keywords: Organic Coconut Sugar, Feasibility Study, Factory

1. INTRODUCTION

Increased welfare increases awareness of the importance of health and awareness of environmental conservation so the market for organic products is increasing. One example of the development of an organic business is Amazon which acquired the organic supply chain Whole Foods in the United States, then opened a wholesale store Hema Fresh Market in collaboration with stores in China [Shi and](#)

Liu (2018). Several previous studies have proven that consumers of organic products prioritize product quality, this is assessed from the health impact Lea and Worsley (2005) and the environment Ozinci et al. (2017). The emergence of organic products is one solution to health and environmental problems caused by pesticides and other non-natural substances Hughner et al. (2007). Perrini et al. (2010). Health factors are an important concern when buying food products Chakrabarti (2010).

Indonesia is the largest coconut sugar-producing country in the world Mustaufik (2010), Sulyanto and Jati (2013), this is because it is supported by the large area of coconut plantations which reaches 3,707 thousand ha Mustaufik (2010). Coconut sugar is one type of community food processing industry that has a high production value Sulyanto and Jati (2013). The huge potential of coconut sugar in Indonesia has not been fully utilized optimally. This can be seen from the low welfare of coconut sugar craftsmen.

One of the problems of the coconut sugar industry in Indonesia is the marketing problem Sulyanto and Jati (2013). Novandari (2019) states that one of the causes of the low welfare of coconut sugar farmers is that they cannot meet international demand. Even the international market currently has a high interest in organic products Restianto et al. (2021), especially sales of organic products in North America and the European Union which consume up to 90% of the total amount of organic products Willer et al. (2019). Consumption of organic products is a human behavior that has a certain impact on the environment Krajhanzl (2010). Referring to Chen and Lobo (2012) states that consumers are willing to pay a premium price in order to get high-quality organic products Padel and Foster (2005), good taste, and product safety certification (Photopoulos and Krystallis, (2003), Aprile et al. (2012), De Magistris et al. (2015). Sukiman et al. (2007) there are several problems in the development of the coconut sugar agroindustry in Indonesia including 1). This high price fluctuation is due to the poor quality of coconut sugar, 2). Changes in weather that cause the spread of disease in coconut trees and result in low quality, 3). Insufficient maintenance capital, because the income earned is only able to cover basic daily needs, 4). Low marketing and distribution system, and 5). Price gap as a result of unbalanced pricing by medium coconut sugar sellers.

In line with this opinion, Supomo (2007), the international market demand for organic coconut sugar is very large but Indonesian organic coconut sugar entrepreneurs are unable to fulfill, it for reasons of not being able to meet the required quality standards and minimum required quantities. To overcome this problem, it is necessary to build an organic coconut sugar factory to produce coconut sugar according to export market quality standards in large quantities. Building an organic coconut sugar factory in Indonesia requires a very large investment, so a careful and comprehensive feasibility study of organic coconut sugar in Indonesia is needed on technical aspects, legal aspects, socio-economic aspects, management aspects, market aspects, and financial aspects.

2. REVIEW THE LIBRARY

2.1. ORGANIC COCONUT SUGAR

Coconut sugar is a natural sweetener that is made traditionally and is usually used in South and Southeast Asian cuisines such as Indonesia, the Philippines, and India Levang (1988). Coconut sugar is produced from the processing of coconut flower sap or commonly called sap (*Cocos Nucifera* L.) BAFPS, (2010). The process of taking the sap is carried out by coconut sugar farmers by climbing coconut trees and then the surface of the flowers with a sickle, farmers place containers right

under the flowers to collect sap which ranges from 8-12 hours, sometimes farmers use lime juice to prevent the juice from fermenting. [Hebbar et al. \(2015\)](#). After the sap is collected, the farmer will then cook it in a hot pan with continuous stirring until it thickens and becomes crystals [Levang \(1988\)](#). In the last process, the sugar will be sifted and selected based on a smooth texture. The color of sugar that was initially light will turn dark, because of the processing that has been done.

On average, each coconut tree will produce one flower per month. Flowers that have bloomed can produce 1.5 L of sap every day and can be harvested twice a day, in the morning and evening. The composition of fresh sap water contains about 15 grams of sugar/100 grams, when it is boiled, it can produce 200 grams of sugar per flower per day [Hebbar et al. \(2015\)](#). Generally, coconut trees can be tapped for up to 20 years, by cutting a little part of the flower they can produce sap for 40-45 days [Hebbar et al. \(2015\)](#), [Levang \(1988\)](#).

Looking at its content, coconut sugar has lower fructose and glycemic index when compared to cane sugar or conventional refined sugar [CBI \(2016\)](#). This advantage is a special attraction for consumers because coconut sugar is grown organically and has a low fructose content and encourages a healthier lifestyle [Wrage et al. \(2019\)](#).

2.2. MANUFACTURING

Industrialization is a stage carried out by a region as a form of accelerating economic development, but to develop industrialization it has requirements that are not simple including requiring large capital ownership, competitive human resources, media that can develop creativity and human self-actualization, and marketing that can be expanded, adequate facilities and infrastructure, and institutional improvement [Damayanthi \(2008\)](#). According to [Florence \(1948\)](#) there are nine measurable goals in the industrial development process, including increasing awareness of the urgency of industrialization, the application of knowledge in various fields related to the investments made, balanced development between every member of the organization involved in the industry, market expansion and connectivity with new suppliers, differentiation in the manufacturing industry, the phenomenon of urbanization as a result of the development of an industry, and a better standard of living. The industry is believed to be a solution to socio-economic problems in society, in this view, the industry will focus on being labor-intensive, emphasizing local native competencies, and will have a high multiplier effect, and bring benefits to the surrounding area [Kuncoro \(2007\)](#). [Yustika \(2007\)](#) states that the development of industrialization in Indonesia has three thoughts including an industrialization strategy that develops a broad spectrum of industry, the industrialization that prioritizes imported-based advanced technology industries, and industrial agricultural products which are the fruit of continued agricultural development. In view of the industrialization of coconut sugar, it is a continuation of the development of the coconut business, which was initially home-based and individual, so in this industrialization, it is hoped that all can be united so that it can increase economic growth, especially in the Bojongsari area.

3. RESEARCH METHODS

Analysis of various characters and the market potential is used in analyzing the market and market share while finding out the advantages and disadvantages of

SWOT analysis [Leigh \(2009\)](#), [Gurl \(2017\)](#) used as an instrument. In an effort to analyze the social environment, the researcher used a qualitative descriptive method. Financial aspects will be analyzed using the Payback Period (PP), Net Present Value (NPV), Profitability Index (PI), and Internal Rate of Return (IRR) methods, then will be explained with descriptive statistics [Ohimain et al. \(2014\)](#). The financial aspect is needed to determine the profitability of the business run, both from fixed costs and variable costs [Ekine and Onu \(2008\)](#).

4. RESULTS AND DISCUSSION

4.1. LEGAL ASPECT

The legal aspect aims to analyze whether the manufacture of organic coconut sugar is not against the law and can meet the licensing requirements. Documents that need to be prepared for the establishment of coconut sugar manufacturing include:

- 1) a Deed of the establishment of the business, including the articles of association that have been determined by the authorized agency.
- 2) The list of shareholders/members is accompanied by the required documents.
- 3) List of factory head compositions accompanied by the required documents.
- 4) Organizational structure and work systems and procedures, including personnel structure.
- 5) Evidence of operational readiness.
- 6) List of fixed assets and inventory.
- 7) Proof of land tenure, where the factory will be built.
- 8) Photo of factory location and layout.
- 9) Statement letter from shareholders/members regarding participation in the business.
- 10) Statement letter from the head of the factory.
- 11) Business Place Permit (SITU) and SIUP (Trade Business Permit).

The factory that is planned to be built will be located in Bumisari Village, Bojongsari District, Purbalingga Regency. The location was chosen because it is a very strategic place, which is located in the complex for raw materials for coconut sugar (sap) because most of the population in the area works as rice farmers. Besides, the location is also not too far from transportation facilities, making it easier the deliver products in the form of sugar.

Several government policies that indirectly support the marketing of organic coconut sugar include Presidential Instruction No. 4 of 1995, where the policy aims to suppress the high-cost economy, eliminate export trading systems, expedite the flow of goods and documents and simplify administrative procedures, government policy on 6 May 1986 the aims to encourage/involve the private sector to play an active role in increasing non-oil and gas exports, policy dated December 24, 1987 contains, among others, simplification of permits for the export of goods and the abolition of some export tariffs, and the Decree of the President of the Republic of Indonesia Number 57 of 2004 concerning the determination of sugar as a controlled product. Regulation of the Minister of Agriculture Number 64 of 2013 concerning Organic Agriculture Systems. Based on the type of business, organic coconut sugar does not conflict with the law as long as the permit can be fulfilled so

that the production of organic coconut sugar based on legal aspects is declared feasible.

4.2. TECHNICAL ASPECT

The technical aspect aims to analyze whether technically the production of organic coconut sugar can be carried out properly. Based on observations, there is a location plan as a place for a coconut sugar factory, namely in Bumisari Village, Bojongsari-Purbalingga, Central Java Province. Based on the results of observations using the comparison of values obtained the calculation results are as follows: [Table 1](#).

Table 1

Table 1 Location Selection Calculation		
Alternative location	Weight	Bumisari
Market	35%	3
Cost	20%	5
Public	10%	5
Water and Electric	10%	5
Security	10%	5
Transportation	15%	4
Total value	100%	4.55

Description: 5 Very Good, 4 Good, 3 Fairly Good, 2 Bad, 1 Very Bad

In terms of proximity to raw materials, the location of the factory in Bumisari Village gets 5 points. The cost of establishment in Bumisari Village gets 4 points. This is due to the willingness of residents who are willing to use their land at a low cost for factory construction so that investment costs are getting cheaper. Another aspect is the community environment of Bumisari Village, Bojongsari-Purbalingga, Central Java Province, which is very supportive because most of them are coconut sugar farmers. The location has electricity installations and adequate water sources for the establishment of an organic coconut sugar factory. By looking at this condition, the factors for water and electricity facilities and security in Bumisari Village get a value of 5. Based on the results of the analysis of safety factors in Bumisari Village. The means of transportation in Bumisari Village got a score of 4. This is because the location is close to the main road, but the available roads are not in good condition. Based on the calculation results of the analysis of the location of the coconut sugar factory in Bumisari Village, it got an average total score of 4.55 or 0.55 points higher than a good score. In addition to the consideration of the location of the factory, the technical consideration for the establishment of an organic coconut sugar factory is the availability of machinery and equipment along with their spare parts. Machinery and equipment used for the manufacture of organic coconut sugar are widely available in the market, so the procurement of machinery and equipment along with the required spare parts is easy to obtain. Based on the calculation results of the analysis of the location of the coconut sugar factory in Bumisari Village, it got an average total score of 4.55 or 0.55 points higher than a good score. In addition to the consideration of the location of the factory, the technical consideration for the establishment of an organic coconut sugar factory is the availability of machinery and equipment along with their spare parts. Machinery and equipment used for the

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Based on the consideration of the location and the availability of the required machinery and equipment, the establishment of an organic coconut sugar factory in Bumisari Village, Bojongsari-Purbalingga, Central Java Province was declared feasible.

4.3. HUMAN RESOURCES ASPECT

The technical aspect aims to analyse whether there is sufficient manpower to carry out the production of organic coconut sugar properly. This aspect describes the organizational structure, duties, and authorities, the requirements needed to carry out these jobs, as well as the needs of employees to carry out coconut sugar manufacturing.

The organizational structure of coconut sugar manufacturing is structured with the intention that the division of work, employment relations, positions, or employee positions is clear. The following is the organizational structure of the coconut sugar factory: [Figure 1](#)

Figure1

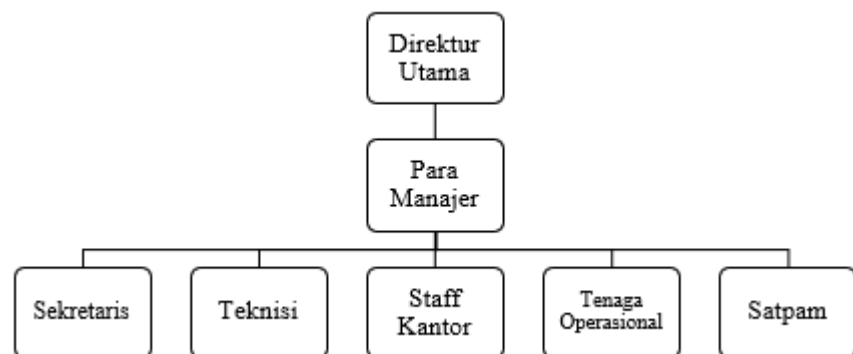


Figure 1 Coconut Sugar Manufacturing Organization Structure

Based on the organizational structure above, it can be identified the need for labor in organic coconut sugar factories as follows in [Table 2](#):

Table 2

Table 2 Employee Needs Plan

Position	Amount	Qualification	Wages
President Director	1 person	<ul style="list-style-type: none"> Have experience in coconut sugar business for at least 3 years Minimum education high school preferably D3 or Bachelor 	IDR 10,000,000

		<ul style="list-style-type: none"> • Have a strong entrepreneurial spirit 	
Manager	12 people	<ul style="list-style-type: none"> • Have experience in coconut sugar processing • Able to communicate well with customers and suppliers • Experienced in marketing coconut sugar • Have knowledge of financial administration • Minimum education high school 	Rp.6.250.000
Secretary	1 person	<ul style="list-style-type: none"> • Have experience in the secretarial field • Able to operate writing software and document/data archiving • Preferably able to speak English • Minimum education D3 Secretariat 	Rp.3.750.000
Technician	1 person	<ul style="list-style-type: none"> • Experienced in the field of machinery • Able to repair and maintain production machines • Mastering passive English • Minimum education S1 	Rp.5.000.000
Office Staff	3 people	<ul style="list-style-type: none"> • Open for fresh graduates • Able to operate computer • Minimum education degree in all majors 	Rp. 2,500,000
Operational Personnel	11 people	<ul style="list-style-type: none"> • Preferably have experience in processing organic coconut sugar. • Able to work hard • Have a disciplined soul • Can work in groups 	Rp. 2,500,000
Security guard	2 persons	<ul style="list-style-type: none"> • Preferably have self-defense skills. • Able to work hard • Responsible • Willing to be placed on morning and night shifts • Male Gender 	IDR 2,000,000

In Purbalingga Regency, especially in Bojongsari Subdistrict, there are many workers with specifications to carry out organic coconut sugar manufacturing, so that based on the human resource aspect the establishment of an organic coconut sugar factory in Bumisari Village, Bojongsari-Purbalingga, Central Java Province is declared feasible.

4.4. MARKET ASPECT

Does the market aspect aim to analyze whether there is a demand for organic coconut sugar products that are quite profitable? In this chapter, we will discuss the analysis of market potential, market share, competitive factors, effective marketing strategies, and SWOT analysis:

The market for organic coconut sugar products is an export market both in Europe and several countries in Asia. If the average consumption of coconut sugar is 1.45 kg/capita/year and the price of coconut sugar per kilo is IDR 32,000 or \$2.05. Thus, the demand for organic coconut sugar in export destination countries can be projected in [Table 3](#):

Table 3**Table 3 Projection of Coconut Sugar Marketing Area at the International Level**

Marketing Area	Total population	Needs Per Capita (In Kg)	Price Per Kg (In USD)	Market Potential (In USD)
German	329,256,000	1.45	2.05	978,713,460.00
China	1,380,914,176	1.45	2.05	4,104,767.39
Dutch	17,600,000	1.45	2.05	52,316,000.00
German	83,783,942	1.45	2.05	249,047,767.60
Malaysia	32.750.000	1.45	2.05	97,349,375.00
Total needs				1,381,531,369.98

Source of Data Processed from Researchers

Based on the calculations in [Table 3](#) of the projection of the marketing area for organic coconut sugar at the international level, it can be seen that the total international market demand is worth \$1.3 billion. The need is so large that it cannot be met by sugar production-coconut Indonesia, so it is necessary to manufacture organic coconut sugar to meet quality standards and minimum quantity requirements.

Competitive conditions will determine the profitability of companies in the industry. Factor competition Here there are five forces that affect competition in the coconut sugar industry, namely: the threat of new entrants, the threat of substitute products, the bargaining power of suppliers, the bargaining power of buyers, and competitive competition among industry group members.

Sugar factory organic coconut performs a SWOT analysis. This analysis is based on thinking that can generate strengths and opportunities but together can minimize weaknesses and threats. SWOT analysis compares external opportunities and threats with internal strengths and weaknesses [Leigh \(2009\)](#). Based on the results of the analysis of the establishment of a coconut sugar factory in Bumisari Village, a SWOT analysis can be described as follows:

Table 4**Table 1 SWOT Analysis**

Strength	Weakness
<ul style="list-style-type: none"> The planned location of a sugar factory in Bumisari village, Bojongsari, Purbalingga, as a coconut sugar center in Central Java, makes it easier for managers of organic coconut sugar factories to obtain raw materials. The manager of the organic coconut sugar factory is well acquainted with the conditions around the organic coconut sugar factory because it comes from the area so they are well acquainted with the 	<ul style="list-style-type: none"> This is a new factory for processing organic coconut sugar that uses modern methods, so not many markets and suppliers are familiar with the factory. There is still limited capital so it has obstacles in the company's development efforts in achieving the most efficient economies of scale.

	<p>location, culture, and habits of the surrounding community.</p> <ul style="list-style-type: none"> • The manager has experience in managing the organic coconut sugar business, so he knows very well about the quality, raw materials, quality of organic coconut sugar, and processing and marketing methods of organic coconut sugar. • Already has a potential market that is ready to be worked on, which is an old market that was cultivated by the manager of an organic coconut sugar factory when it was still managed in the traditional way. • There is an attitude of the surrounding community that welcomes the existence of the factory as a means to accommodate the production of the surrounding community. 	<ul style="list-style-type: none"> • The number of parties involved in the establishment of an organic coconut sugar factory will make it difficult to make decisions quickly in accordance with market changes.
	Opportunity	Threat
	<ul style="list-style-type: none"> • Government policies that encourage the empowerment of Small and Medium Enterprises will support the establishment of organic coconut sugar factories. • The demand for organic coconut sugar is increasing for both the domestic and export markets, as a healthy natural sweetener. • There is a demand for the quality of head sugar products which are characterized by standardization of quality and quantity which so far have not been able to be fulfilled by traditional coconut sugar craftsmen. • There is the ease in applying for credit for small and medium-sized businesses as a way to increase working capital and investment to increase production results. • The attitude of the surrounding community is very supportive of the establishment of an organic coconut sugar factory. • There is a public desire to see the process of making sugar directly so that the process of making sugar can be used as a tourist destination. 	<ul style="list-style-type: none"> • Competition in the organic coconut sugar processing industry is carried out by households, from Banyumas, East Java, and Lampung as coconut sugar centers in Indonesia. • The fluctuating price of organic coconut sugar will greatly affect the continuity of the coconut sugar business because it is difficult to determine the budget for production and marketing costs. • The entry of illegal granulated sugar as a substitute for coconut sugar can affect the price of organic coconut sugar in the market. • There is a stigma from banks that loans given to small and medium enterprises still carry a high risk. • Many coconut sugar craftsmen use sodium bisulfite (NaSO₃) as a preservative which will damage the good name of the coconut sugar market from Indonesia. • There is hope from the farming community so that their children do not become coconut sugar farmers, this can result in a smaller number of young people who are willing to become farmers. • Lack of rejuvenation of coconut plants, so in the long term, it can result in a lack of supply of sap as raw material for organic coconut sugar.

Based on consideration of the demand for organic coconut sugar and based on a SWOT analysis, the establishment of an organic coconut sugar factory in Bumisari Village, Bojongsari-Purbalingga, Central Java Province is declared feasible.

4.5. FINANCIAL ASPECT

In the financial aspect, it discusses investment needs, working capital needs, operational needs of Coconut Sugar Manufacturing, cash-flow estimates, balance estimates and investment feasibility analysis using Payback Period (PP), Net Present Value (NPV), Profitability Index (PI), Internal Rate of Return (IRR), as well as financial ratio analysis. This study assumes the inflation rate used in this study is 5 percent per year, this is based on the national inflation rate of 5 percent per year. Meanwhile, the assumption of the deposit interest rate used in this study is 14 percent per year and in this study, the sales growth rate is set at 5 percent. The coconut sugar factory requires an investment of Rp. 19,945,674,733 (fixed assets). This investment cost consists of preparation costs (study and licensing) of Rp. 50,000,000 and office investment costs of Rp 6,340,900,000, office equipment investment of Rp. 2,975,000,000, and investment did not shrink Rp. 10,579,774,733. Operational costs in this investment will increase annually by 5 percent as a result of inflation. Payback Period (PP) which shows the return on investment of 6 years 81 days. Meanwhile, based on the value of the Net Present Value (NPV) obtained a value of Rp. 810,271,552 is positive. Based on the results of the analysis, the Profitability Index (PI) value of 2.69 is greater than 1.

Based on the feasibility analysis using several financial ratios, all of which exceed the specified requirements, the establishment of an organic coconut sugar factory in Bumisari Village, Bojongsari-Purbalingga, Central Java Province is declared feasible.

5. CONCLUSION

Based on the analysis of the legal aspects of organic coconut sugar manufacturing in Bumi Sari, Bojongsari-Purbalinggan, Central Java Province, it is feasible because it does not conflict with the law, based on technical aspects it is feasible because the location supports and machines and equipment are available, based on aspects of human resources it is feasible because there is a lot of labor available in accordance with the required specifications, based on a feasible market aspect due to the high market potential that has not been fulfilled, and based on a feasible financial aspect because the Net Present Value (NPV) is positive, Profitability Index (PI) is greater than 1, Internal Rate of Return (IRR) greater than the bank interest rate and the Payback period (PP) is shorter than the economic life.

6. RECOMMENDATION

Manufacturing investment in organic coconut sugar production needs to be done because it will not only bring profits to investors but will also be able to improve the welfare of the community, both directly and indirectly. The coconut sugar manufacturer that will be established must be able to produce quality products according to market demand and maintain them to maintain a good name and sustainability of market demand in the long term.

CONFLICT OF INTERESTS

None.

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