



Research Article

Inclusive Palm Sugar Business Model in Kolaka Timur Regency, Indonesia

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Abstract | The plantation subsector is integral to the agricultural sector developed in Kolaka Timur Regency. One of the leading commodities that is a source of livelihood for the community and an icon of this region is the sugar palm or enau tree. The sugar palm plant plays a strategic role in the economy of Kolaka Timur, especially in Dangia District, where sugar palm trees are often found growing naturally among cocoa plantations owned by farmers. The sap of the sugar palm trees owned by the local community is processed into palm sugar, a product widely known in Southeast Sulawesi. Palm sugar from Kolaka Timur is one of the region's leading products that has the potential to become a mainstay commodity in the domestic and international markets. The sustainability of the palm sugar business requires attention and support from various parties to provide optimal contributions to improving the economy of Kolaka Timur. The significant market potential, including export opportunities, has not been optimally utilized because the management of palm sugar is still traditional and on a household scale. This study aims to find the right inclusive business method through value chain mapping using the business model canvas (BMC). A two-stage link methodology analysis is used to achieve this goal, focusing on the palm sugar value chain of producers, collectors, wholesalers, and retailers. The results of the BMC mapping show that the palm sugar business still needs partnerships to support access to capital, technological innovation, and broader marketing reach. Strong and sustainable partnerships are expected to help the palm sugar business become more inclusive while providing more significant benefits for all actors in the value chain.

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Introduction

Agriculture is a sector that produces food that is very important for human survival, so it is a priority for every country, including Indonesia. Various types of food products continue to be developed in each region by paying attention to local characteristics and uniqueness (Tampubolon *et al.*, 2024; Khaerul, 2024). Southeast Sulawesi Province, especially Kolaka Timur Regency, the development of the agricultural sector, including plantations, horticulture, forestry, and food crops, contributes to the Gross Regional Domestic Product (GRDP) of Kolaka Timur Regency, with a value reaching 41.57% in 2024 (BPS, 2024). One of the leading plantation commodities in Kolaka Timur is the sugar palm or enau tree, a source of livelihood for the community and a regional icon. The community uses this sugar palm tree to produce palm sugar, a typical product widely known. The area of sugar palm plantations in Kolaka Timur is recorded as reaching 81.35 hectares with a production of 9.065.50 kilograms in 2024 (BPS, 2024).

The plantation subsector, mainly the aren plantation, plays a vital role in the economy of Kolaka Timur. Interestingly, plantations in this area develop naturally without intensive cultivation processes. Arenga palms grow among cocoa plantations owned by farmers, who then use the sap from the trees to produce aren sugar. The aren sugar business is one of the primary sources of income for the community and has excellent potential to continue to be developed as a superior regional product. Red sugar has a unique taste and aroma (Liu *et al.*, 2022). One type of popular brown sugar is palm sugar, a processed product obtained from processing sap, a liquid produced from the male flower clusters of the sugar palm tree (*Arenga pinnata*) (Martini *et al.*, 2012; Abdullah *et al.*, 2014). The use of aren sap is not only limited to the brown sugar industry but is also known for its high nutritional content. Aren sap contains various essential nutrients, including sugar (10.27%), protein (0.41%), fat (0.71%), ash (0.38%), and minerals such as calcium, potassium, iron, phosphorus, sodium, and organic acids (Masitah and Suwianto, 2023). This nutritional content makes palm sugar a natural sweetener that provides a distinctive sweet taste and has the potential to source additional nutrition.

Palm sugar marketing by farmers in Kolaka Timur is

still carried out conventionally. Distribution patterns of production results vary, from direct sales to consumers around, especially if palm sugar production is relatively small, to marketing in local traditional markets or through collectors at the sub-district level. As a mainstay commodity in Kolaka Timur Regency, palm sugar has excellent market potential, including export opportunities. However, this opportunity is not yet optimal because most palm sugar is still processed traditionally on a household scale, limiting the added value of products along the supply chain, so it has not boosted the farmer's economy.

The marketing chain of palm sugar is very short because it only involves producers and consumers. This differs from the marketing of brown sugar in printed or granulated form, such as coconut sugar, which affects more actors in the marketing chain and produces more competitive prices (Sumadi *et al.*, 2020). Transformation of the palm sugar business is needed to utilise this enormous market potential more optimally by local farmers and entrepreneurs, contributing to increasing income, fulfilling basic needs, and improving the regional economy.

Research on inclusive business models for palm sugar can help home industries meet economic needs sustainably and see business development opportunities. The inclusive business concept ensures that poor people, especially small-scale farmers, can participate in value chain decision-making, opening up opportunities for economic and social innovation (Osterwalder and Pigneur, 2010; Lundy *et al.*, 2012). This model is essential for analyzing and developing the potential of palm sugar in Kolaka Timur, which is currently managed on a household scale.

Previous research has not used the link methodology method in compiling a suitable business model, especially regarding the palm sugar business model. Palm sugar research such as that conducted by Sumadi *et al.*, (2020); Basuki *et al.*, (2021); Rawung *et al.*, (2021); Simbolon *et al.*, (2021); Syahidah *et al.*, (2021); Pinem *et al.*, (2022); Alam *et al.*, (2023); Fitriwati *et al.*, (2023) and Pinem *et al.*, (2022) tend to focus on the development and analysis aspects of financial benefits, without intensely studying the palm sugar value chain or the application of the business model canvas (BMC). BMC is an effective tool for analyzing and designing a comprehensive business model, which is very relevant in supporting

the development of the palm sugar business. On the other hand, value chain and BMC studies are generally carried out separately, with research objects that are more often in large industries or SMEs (Ratnasari and Sunarto, 2021; Aliwinoto *et al.*, 2021) and do not touch the home industry that produces palm sugar.

This study comes with significant novelty, namely with a specific focus on palm sugar commodities as the object of study. In addition, the analytical methods used, including BMC and value chain analysis, are rarely applied in palm sugar studies, thus providing high-added value. Through this study, it is hoped that there will be potential for developing and strengthening the palm sugar business in Kolaka Timur with a more structured approach based on a suitable business model.

Materials and Methods

This study uses a qualitative approach with a descriptive design. Data collection methods include observation, exploration, and in-depth interviews. The collected data were analyzed using the link methodology in two stages: value chain mapping and business model canvas (Lundy *et al.*, 2012). The research location was

determined purposively in Kolaka Timur Regency, especially in Dangia District, the centre of palm sugar development in Southeast Sulawesi Province (Figure 1). This district has a palm plant area of 18.5 hectares, with production reaching 2.287 kg in 2024. The village that is the focus of the palm sugar industry development will be selected as the research location in this district.

The study population included palm sugar farmers, collectors, wholesalers, retailers, and end consumers. A total of 85 palm sugar farmers were taken as respondents from five production centre villages in Dangia District, namely Lamosila, Lalongkateba, Anambada, Lembah Subur, and Wande Villages. The trader sample consisted of three collectors, three wholesalers, and 15 retailers (three from each of the five villages). In addition, 15 end consumers were also sampled, with three people per village. The sampling technique for traders and consumers was carried out using the snowball sampling method.

Results and Discussion

Palm sugar making process

Palm sugar (enau) is a superior product from several

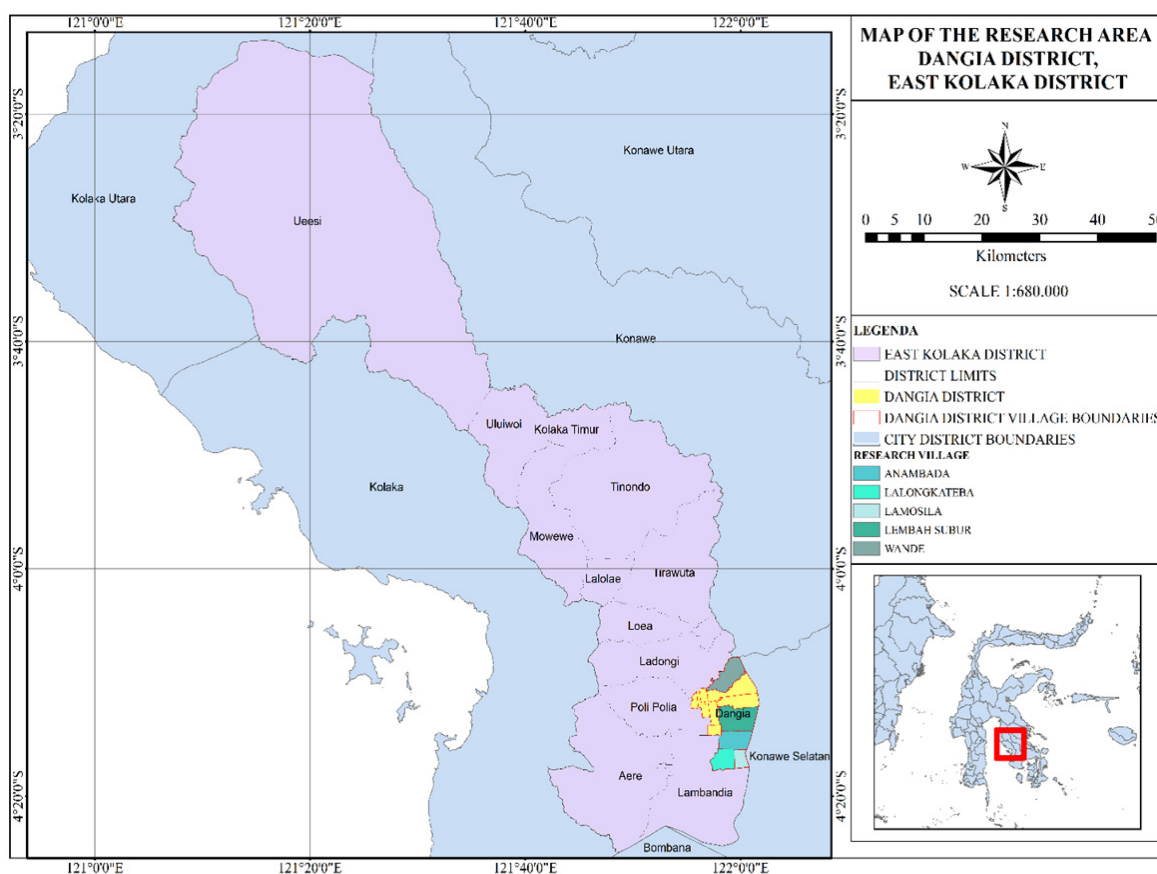


Figure 1: Research location map

villages in Kolaka Timur Regency. The production of palm sugar has become a tradition that has been preserved from generation to generation by local farmers. Palm sugar is made using traditional methods (Figure 2). The initial stage involves gently beating the flower stalks of the sap using a wooden tool, starting from the base to the tip of the stalk. This beating aims to open the pores of the flower stalk so that the sap water can flow out easily. After the pores are open, the tip of the flower stalk is cut at a specific position based on the observations and feelings of the tapper. This is done because the level of maturity of the sap flowers varies. Some are still young, half-old, or old.

The sap water that slowly comes out of the cut stalk will be collected. For the sap flow to be stable, the tapper attaches a pounding to the end of the cut, then covers it with coconut fibre tied to the stalk. This process takes about three days. After the tapper unties and installs a large bamboo container to collect the sap water, it is tied and hung on the sap flower stalk, then transported like carrying a long rifle. Before or after tapping, the tip of the flower stalk is cut about

3 mm to maintain the quality of the palm sap so that it remains clean and not sour. Palm sap is usually collected twice daily, in the morning around 06.00 and the afternoon at 15.30.

After being collected, the palm sap is put into a large pan on a wood stove, boiled until cooked, and moulded into brown sugar. After one hour of boiling, the palm sap changes to dark light brown. Before being moulded, the palm sap is stirred evenly for 15-20 minutes. The moulded sugar is then wrapped in dry coconut leaves and ready to sell. Palm sugar artisans in the Dangia District have maintained this traditional method until now, and we hope there will be more attention paid to preserving the palm tree (enough) to support the sustainability of palm sugar production. This is important because the regeneration of palm trees still depends on civets, which are now starting to become rare.

Brown sugar value chain

The value chain of palm sugar in Indonesia is generally



Figure 2: Palm sugar making process (enau), (a) beating the stalk, (b) collecting the palm water (enau), (c) cooking process, (d) printing process, (e) packaging process, (f) preparation for sales

almost the same in every region because the process is still straightforward and lacks a touch of innovation (Figure 3).

The palm sugar value chain describes a series of processes, from providing raw materials in the form of palm sap from the enau tree, processing the sap into palm sugar, printing and packaging, and marketing and distribution to end consumers. In mapping the palm sugar value chain in Kolaka Timur Regency, there are three levels: core process, partner network and external influences.

Core processes

The palm sugar production process in Kolaka Timur Regency includes several main stages: collecting sap, processing sap into palm sugar, printing and packaging, and distribution to consumers. Palm sap can be harvested after the palm tree reaches a minimum age of five years, with optimal production at 10-15 years. Each tree produces around 7 to 10 litres of sap, collected and filtered first for cleanliness before being taken to the cooking area. The cooking process takes 4-5 hours, during which the sugar liquid must be continuously stirred until it thickens and is

ready to be poured into moulds. After hardening, the palm sugar is left overnight before packaging, using banana leaves or teak leaves as traditional wrapping.

The management and distribution of palm sugar is carried out at home, with the role of farmers and their families being substantial. Farmers are fully responsible for the sap harvest stage, while the farmer's wife plays a role in processing until distribution to end consumers. Producers who sell sugar in large quantities (≥ 150 kg/month) distribute their products 5% directly to consumers, 20% to retailers, and 75% to collectors. Meanwhile, producers with sales volumes of <150 kg/month distribute 10% to consumers and 90% to collectors. The price of palm sugar ranges from IDR15.000/kg for consumers and collectors, providing a profit of IDR9.900/kg for producers.

The palm sugar business in Kolaka Timur faces various internal and external challenges that hinder its development. Internal factors include conventional production management without SOP (Standard Operating Procedure), low product quality, and limited capital. Meanwhile, external factors include less competitive prices, an undeveloped market,

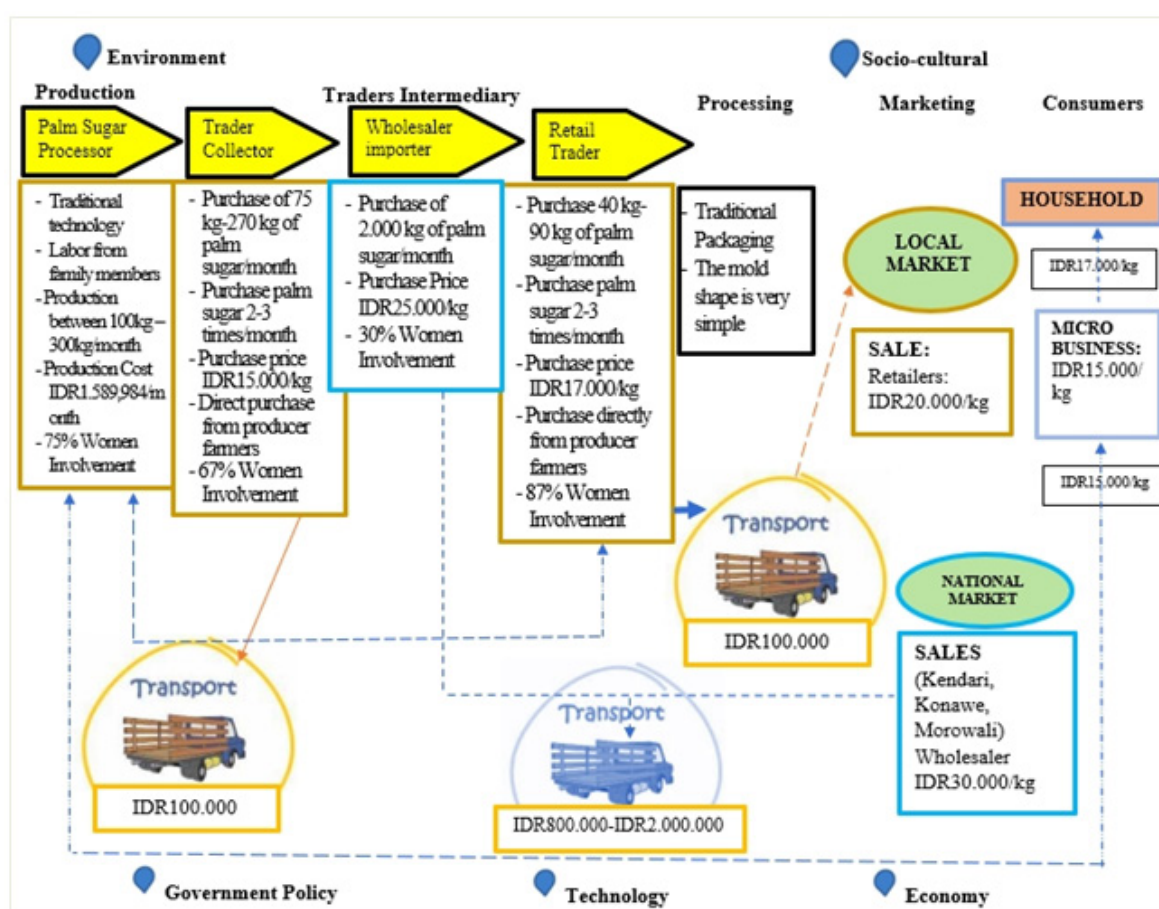


Figure 3: Palm sugar value chain in kolaka timur regency

and minimal support from government and local institutions. Actors involved in the palm sugar supply chain in Kolaka Timur Regency include collectors, wholesalers, retailers, and consumers. Collectors buy palm sugar directly from producers at IDR15.000/kg, and wholesalers resell it at IDR30.000/kg, including for markets outside the region and between islands.

Partner network

In the palm sugar value chain in Kolaka Timur Regency, several partners support the development of the palm sugar industry. Rainforest Alliance, through the GALS (Gender Actions Learning Sustainability) TRATIONS program, plays a vital role in strengthening groups, building partner institutions, and training to improve economic opportunities and working conditions for palm sugar producers. This program helps producers develop skills to support business sustainability and improve farmer welfare.

The Kolaka Timur Regency Government, through the Investment and One Stop Integrated Service Office also plays a role by facilitating business licensing for palm sugar producers. In addition, universities such as Halu Oleo University Kendari also partner in the Community Partnership Program (PkM), providing incidental business management training to support business management skills for producers.

Solid and sustainable external partnerships between palm sugar producers and actors in the supply chain have not yet been optimally formed. This causes prospective business potential not to be fully developed, and the goal of improving the standard of living of producers has not yet been achieved. Work partners need more intensive and sustainable involvement to maximise palm sugar business opportunities and benefit the local community more significantly.

Business model canvas

The canvas business model of the palm sugar business (Figure 4) in Kolaka Timur Regency can be seen as follows. The canvas business model is a business model that describes the fundamental thinking about how an organization or company creates, captures and delivers value (Osterwalder and Pigneur, 2010). The canvas business model is a business model depicting nine interrelated elements.

External influences

Several external factors, including economic aspects, government policies, technology, socio-culture, and the environment, influence the palm sugar value chain in the Kolaka Timur Regency. Unstable global economic conditions can make it difficult for farmers to achieve profitable selling prices (Rianse et al., 2018;

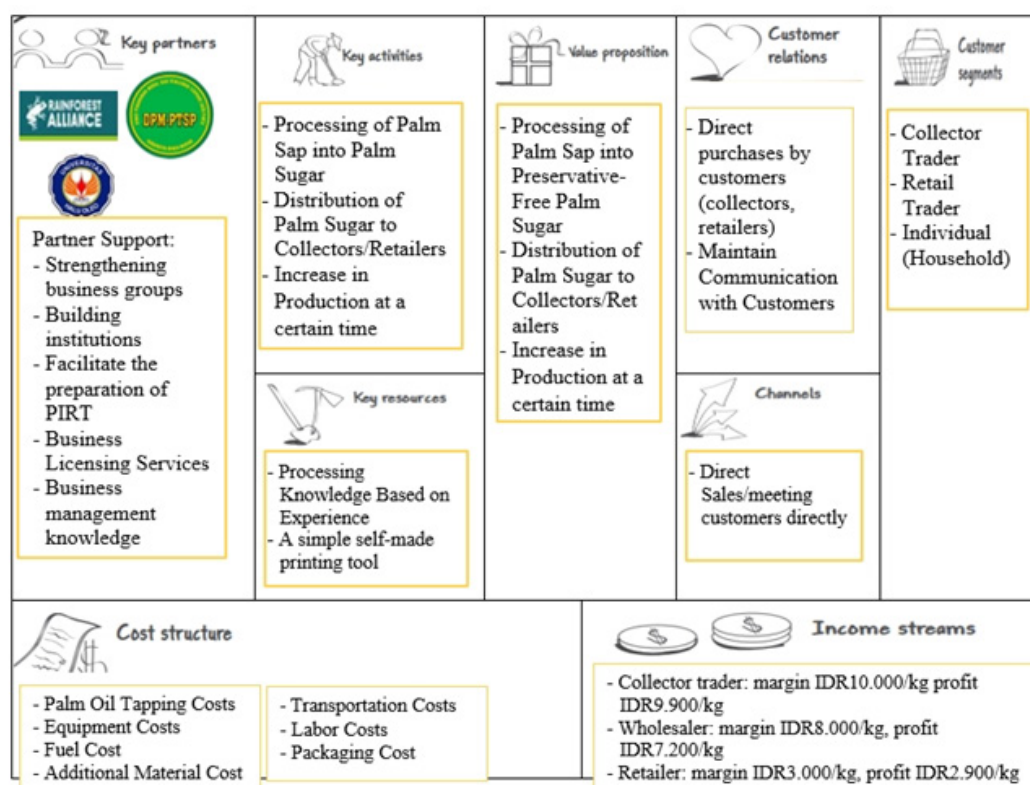


Figure 4: Business model canvas (BMC)

Makkarennu *et al.*, 2019). Currently, palm sugar producers in Kolaka Timur still rely on a direct sales system to consumers, which often does not provide optimal profits due to the lack of a comprehensive marketing network.

Technological factors are essential in processing palm sap into sugar to increase the product's added value (Puspasari and Sudibyo, 2019; Azhar *et al.*, 2020). More advanced processing allows producers to create derivative products with higher selling value, such as palm or powdered sugar. It can be used as an essential ingredient for instant food or drinks. However, the technology used in the field is still straightforward and lacks innovation. Efforts to improve this technology require education and training that the government can facilitate or collaborate with partners with expertise in this field.

Socio-cultural factors also affect the price and demand for palm sugar. At certain moments, such as religious celebrations, national holidays, and traditional ceremonies, the need for palm sugar increases because it is used in various traditional foods, such as cucur cakes, dadar cakes, and onde-onde. This increase in demand often causes the price of palm sugar to soar, which benefits producers.

Customer segment

The palm sugar business customers are consumers, retailers and collectors. Consumers are buyers who use palm sugar for household needs or businesses they own, such as food/beverage businesses and generally live around the producer. Retailers are buyers who resell to consumers; retailers usually open companies at home or in traditional markets. Collectors are buyers with considerable capital who buy palm sugar directly from producers and then sell to large traders in the city or outside the Regency (inter-island).

Value propositions

The value proposition of palm sugar producers that plays a role in the formation of added value is performance and customization. Palm sugar producers improve product quality by paying attention to operational standards for harvesting, which are generally obtained based on experiences passed down from parents, in addition to punctuality in providing palm sugar products according to customer demand, an added value owned by palm sugar producers. Another thing is that palm sugar

is purely made from natural raw materials without preservatives. For example, lime mixed into palm sap water in the processing process into palm sugar is believed to be an amami preservative that prevents the acidity of palm sap water and the occurrence of the fermentation process, in addition to being a thickener that accelerates the crystallization process, preventing it from creating a unique taste and texture in palm sugar products. Customization is a product that is adjusted to consumer needs. The manufacture of palm sugar is adjusted to consumer demand in terms of the desired quantity and quality.

Channels

The distribution channel used by palm sugar producers is quite simple, direct sales through face to face interactions and mobile phone media. All customers in the palm sugar supply chain purchase directly from producers, resulting in limited marketing reach.

Customer relationship

Palm sugar producers maintain relationships with customers through personal communication. Namely, farmers communicate directly and maintain relationships so that the buying and selling system runs smoothly. Intensive communication between palm sugar producers and customers is carried out to maintain good face-to-face relationships or through mobile phone communication media.

Revenue streams

Palm sugar producers in the five research villages generate income through direct sales to customers, with a minimum production of 100 kg per month at a production cost of IDR 11,200 per kg. Of the total production, 5-10% is sold to consumers, 0-20% to retailers, and 75-90% to collectors. The profit from sales to consumers and collectors, where the selling price is IDR 15,000, is IDR 9,900 per kg. Meanwhile, sales to retailers, with a selling price of IDR 17,000, yield a profit of IDR 2,900 per kg.

Key resources

Palm sugar producers need essential resources to run the business. Key resources consist of physical, human, financial, and social resources. Physical resources include physical assets such as palm sugar-making equipment, pans, moulds, basins, filters, stirrers, stoves, tubes, jerry cans, coasters, and machetes. In addition, the technology used is still straightforward and traditional, and there is no touch of innovation or

warehousing because the scale of sales is still limited to customer demand. The workforce consists of people who can carry out the palm sugar production process, which consists of palm sap tappers carried out by men and palm sugar makers (palm sap cookers) carried out by women. The knowledge and skills possessed by the workforce are obtained based on experience. There is no access to credit, training or learning special skills through innovation.

Key activities

The process of making palm sugar is carried out in several stages, from tapping palm sap, cooking the sap into sugar, printing, packaging and selling. There has been no technological touch either during sap extraction or in the production process. All are done sustainably and regeneratively.

Key partners

The existing partnership relationship between palm sugar producers consists of Rainforest Alliances through the GALS (Gender Actions Learning Sustainability) TRAXIONS program, the Investment and One-Stop Integrated Service Office and universities in Southeast Sulawesi (UHO). The partnership relationship has not been running continuously and is still temporary and project-based. The role is limited to strengthening groups through socialization and introducing programs and facilitation in business licensing. Currently, the impact of the partnership that has been built has not been felt by palm sugar producers. It is hoped that alliances can be built with external parties, especially those related to access to business capital, knowledge or innovation that supports product diversification and partnerships in the marketing process.

Table 1: *The cost structure of palm sugar*

Cost structure	Total price
The price of palm sap is IDR500,- x 10 litres	IDR5.000
Additional ingredients (candlenut + lime) IDR100 x 2pcs	IDR200
Labor cost (Cooking) IDR5.000 x 1 time	IDR5.000
Tool depreciation	IDR213.446
Packing IDR1.000,- (materials + labor)	IDR1.000
Total	IDR11.413,446

Cost structure

The production costs incurred by palm sugar producers

in 5 research villages per kg can be seen in [Table 1](#).

Conclusions and Recommendations

The palm sugar value chain in Kolaka Timur Regency involves several main actors: palm sugar producers, collectors, wholesalers (wholesalers/importers), and retailers. Palm sugar producers sell their products to collectors, who then distribute them to wholesalers. These wholesalers are essential in marketing palm sugar for local and inter-regional distribution, including between islands and districts. For local marketing, wholesalers usually sell palm sugar in small quantities to local retailers, while for inter-regional marketing, sales are made in large quantities. In terms of profit, selling palm sugar to consumers through collectors at a selling price of IDR15.000 per kilogram generates a profit margin of IDR9.900 per kilogram. Meanwhile, sales to retailers at a selling price of IDR17.000 per kilogram provide a profit of IDR2.900 per kilogram. However, the technology producers use to process palm sugar is still very simple, and the workforce involved is generally family members, especially women, who play a role from processing palm sap to marketing the product. The canvas business model for palm sugar in Kolaka Timur shows an urgent need for partnership support. This support is needed to help producers access capital, obtain more efficient processing technology innovations, and expand marketing reach.

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Novelty Statement

This research offers substantial novelty by specifically focusing on palm sugar commodities as its subject. Moreover, the analytical techniques employed, such as the Business Model Canvas (BMC) and value chain

analysis, are seldom utilized in palm sugar research, thereby contributing significant added value.

Author's Contributions

Sitti Rosmalah: Conceptualizing research, designing objectives, methodology, and scope of study.

Akhmad Maulana: Data analysis, compiling an inclusive business model framework, and implementing the Business Model Canvas approach.

Sitti Rahma Ma'mun, Suparman, Mustam: Literature review and theoretical study.

La Ode Muh. Munadi: Managing coordination and communication with stakeholders.

Rina Astarika, La Ode Jabuddin, Anwar Saeed Khan: Compiling and editing the final research report, ensuring data accuracy and quality of delivery.

Generative AI or AI assisted technology statement

We affirm that this research process has been conducted without the use of Generative AI or AI-assisted technologies. All research methods, data analysis, and conclusions have been derived through traditional academic processes and manual efforts.

Conflict of Interest

This research has no conflict of interest regarding funds, organizations, government, or other higher education institutions.

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