JPPIPA 12(4) (2026)

Jurnal Penelitian Pendidikan IPA

http://jppipa.unram.ac.id/index.php/jppipa/index

Analysis of the Development Strategy for the Palm Sugar Agroindustry in South Minahasa Regency

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Received: February 28, 2026
Revised: April 14, 2026
Accepted: April 25, 2026
Published: April 30, 2026

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DOI: 10.29303/jppipa.v12i4.14872

Abstract: The development of the palm sugar agroindustry plays a crucial role in boosting the productivity and income of palm farmers. However, most palm farming operations have not yet been integrated into the processing industry. As a result, they are unable to increase farmers' income. This study aims to: (1) examine and analyze the existing conditions of the palm sugar agroindustry system, (2) describe the EFI and EFE matrix factors of the palm sugar agroindustry system, (3) generate policy recommendations related to the development strategy of the palm sugar agroindustry. This study utilized primary and secondary data. Primary data were collected from 20 palm farmers purposive sampling, while secondary data were obtained from relevant agencies, journals, and publications related to the research. The results of the study show that the total score from the EFI analysis is 3.449 (strong), while the total score from the EFE analysis is 2.027 (weak). Strategies to strengthen and enhance farmers' business opportunities include maintaining product variety and specifications to reach broader markets, as well as leveraging advancements in transportation and information technology by actively utilizing social media. To turn weaknesses into opportunities, farmers must use advanced production tools, market products to new regions, and retain loyal customers. To mitigate threats, farmers need to strengthen their position by increasing product variety, offering affordable prices, and expanding transportation infrastructure to support production and marketing. To address weaknesses and threats, palm sugar farmers must prioritize product quality to ensure it aligns with consumer preferences.

Keywords: Development strategies; Palm sugar agroindustry; SWOT analysis

Introduction

South Minahasa Regency is the center of palm cultivation in North Sulawesi Province. The palm sugar industry is part of the activities of palm farmers who grow palm trees to harvest their sap. The sap is processed into palm sugar and "cap tikus." In South Minahasa Regency, there are five sub-districts that serve as palm sugar production centers: Amurang Timur Sub-district, Tareran Sub-district, Suluun Sub-district, Motoling Timur Sub-district, and Motoling Barat Sub-district (Dinas Perkebunan Kabupaten Minahasa Selatan, 2020). One of the important agricultural commodities with significant potential for development is the plantation sector, which aims to improve the welfare and prosperity of the people, increase the country's foreign exchange earnings, provide employment and business opportunities, enhance production, productivity, quality, value added, competitiveness, and market share, and meet both domestic consumption needs and industrial raw material requirements (Direktorat Jenderal Perkebunan, 2015; Saragih, 2010; Wongkar et al., 2017).

Currently, the sugar palm plays a significant role in the economy of South Minahasa Regency as a source of employment and a raw material for domestic industries. However, most sugar palm farming operations have not yet been integrated into downstream processing industries, service sectors, or the financial sector. As a result, the sugar palm agroindustry entirely distributes

How to Cite:
Rumagit, G. A. J., Kaunang, R., & Ngangi, C. R. (2026). Analysis of the Development Strategy for the Palm Sugar Agroindustry in South Minahasa Regency. *Jurnal Penelitian Pendidikan IPA*, *12*(4), 953–958. https://doi.org/10.29303/jppipa.v12i4.14872

the value added, thereby failing to increase farmers' incomes. Through this study, using SWOT analysis, a review of strategies for developing the sugar palm agroindustry in South Minahasa Regency can be obtained.

This study aims to examine and analyze the current state of the palm sugar agroindustry in South Minahasa Regency, identify the EFI and EFE matrix factors of the palm sugar agroindustry in South Minahasa Regency, and formulate policy recommendations related to the development strategy of the palm sugar agroindustry in South Minahasa Regency.

Previous research findings indicate by Wongkar et al. (2017), that the analysis of internal strategic factors yielded a total score of 3.16, indicating a "moderate" level of ability to leverage strengths to address weaknesses encountered in the development of the palm sugar agroindustry. Meanwhile, the analysis of external strategic factors yielded a total score of 3.26, indicating that the development of the palm sugar agroindustry is in a "strong" external position in terms of leveraging opportunities to address the threats it faces.

The strategy for developing the palm sugar agroindustry involves maintaining product quality and expanding markets; fostering high interest among palm sugar artisans through advancements in production technology, communication, and information; diversifying the packaging and promotion of palm sugar; empowering producers to take advantage of government policies regarding the development of palm tree seedlings; optimizing flagship products that are of high quality and affordably priced; maximizing producers' interest in utilizing available marketing facilities and infrastructure; optimizing capital, market access, and financial institutions; and improving the quality of human resources to cope with extreme weather (Purnamasari et al., 2018).

Method

Time and Location of the Study

The research location, which was determined purposively (Mukhlis et al., 2019; Mukhlis et al., 2024; Asgaf et al., 2025). This study will be conducted over a period of 9 months in South Minahasa Regency.

Data Collection Methods

The types of data collected in this study include primary and secondary data (Sugiyono, 2021; Mukhlis et al., 2022; Mukhlis et al., 2023). Primary data collection, obtained through the distribution of questionnaires, was followed by focus group discussions with respondents— s of palm sugar farmers—as well as direct interviews with palm sugar farmers, collectors, palm sap processing industries, and business actors involved in the palm sugar agroindustry. Secondary data was obtained from agencies related to the research topic, such as the Central Statistics Agency, the South Minahasa District Agriculture Office, as well as existing research journals and relevant books.

Sampling Method

The respondents in this study included palm sugar farmers in South Minahasa Regency, the Agriculture Office, and palm sugar business operators. Using purposive sampling (Mubarokah et al., 2024; Marliyah et al., 2025; Ogari et al., 2026), five subdistricts with the highest palm sugar production in South Minahasa Regency were selected. In each sub-district, 5 farmers who are the largest palm sugar producers were intentionally selected, resulting in a sample size of 25 farmers, 2 representatives from the South Minahasa Regency Agriculture Office, and 3 palm sugar business operators. For each farmer, the business operators involved in processing palm sap into palm sugar and other products, as well as other business operators within the palm sugar agro-industrial system, were identified (Lumintang et al., 2022).

Concept of Variable Measurement

The variables examined in the Development Strategy for the Palm Sugar Agroindustry in South Minahasa Regency are: (1) Identifying EFI (Internal Factor Evaluation) factors, namely the *Strengths* and *Weaknesses* indicators present in the palm sugar agroindustry in South Minahasa Regency. (2) Identifying EFE (External Factor Evaluation) factors, namely the *Opportunities* and *Threats* indicators present in the palm sugar agroindustry in South Minahasa Regency.

Data Analysis Method

The data analysis methods used in this study are descriptive analysis and SWOT analysis (Kaunang et al., 2024). There are two key elements to consider in SWOT analysis: weighting and ranking.

The weighting of factors in the internal environment is based on the magnitude of their influence on the strategic position, whereas in the external environment, it is based on the likelihood of their impact on strategic factors (David, 2003; Hunger & Wheelen, 2003; Rangkuti, 2016).

The steps in determining the EFI and EFE factors are as follows: (1) List the main factors identified. For EFI, these are *Strengths* and *Weaknesses,* and for EFE, they are *Opportunities* and *Threats.* (2) Assign weights ranging from 0.0 (unimportant) to 1.0 (most important). The sum of all weights must equal 1.0. This is done for both EFI and EFE. (3) Assign a rating of 1 for major weaknesses, a rating of 2 for minor weaknesses, a rating of 3 for minor

strengths, and a rating of 4 for major strengths. (4) Multiply the weight by the rating to determine the weighted score. Sum the weighted scores.

The next step is to formulate four types of strategies—namely SO, WO, ST, and WT—as the foundation for the development strategy of the palm sugar agroindustry (David, 2003).

Result and Discussion

Description of the Research Location

South Minahasa Regency is a regency in North Sulawesi Province, Indonesia, with Amurang as its capital. Located in the southern part of North Sulawesi Province, it is 88.9 km from the provincial capital of North Sulawesi, with boundaries that include North Minahasa Regency and Southeast Minahasa Regency to the east, Bolaang Mongondow Regency and East Bolaang Mongondow Regency to the south, and the Sulawesi Sea to the west.

South Minahasa Regency was established pursuant to Law No. 10 of 2003 on the establishment of South Minahasa Regency and Tomohon City in North Sulawesi Province, Indonesia, by the Indonesian House of Representatives (DPR-RI). It was officially inaugurated by the Central Government on August 4, 2003. The administrative center and capital of South Minahasa Regency is located in Amurang. South Minahasa Regency itself is the result of the division of Minahasa Regency. The population of South Minahasa in 2021 was 237,740, with a density of 163.91 people/km², and by mid-2024, it had reached 242,463. The total area is 1,456.46 km². South Minahasa Regency has 17 subdistricts, 10 urban villages, and 167 villages (out of a total of 171 subdistricts, 332 urban villages, and 1,507 villages in North Sulawesi) (BPS Sulawesi Utara, 2021).

South Minahasa Regency, which comprises 17 subdistricts, is further divided into 10 urban administrative districts, 167 village administrative districts, 1,049 neighborhood units, and includes 1 Transmigration Settlement Unit located between Ranoyapo Subdistrict and Tompaso Baru Subdistrict. Tenga Subdistrict has the highest number of village administrative areas among all subdistricts, with 18 villages. Amurang Subdistrict, situated within the Amurang urban area, has the highest number of urban villages, with 6 urban villages, while Sinonsayang Subdistrict has the highest number of neighborhood units, with 1,049 neighborhood units.

South Minahasa Regency consists of 17 subdistricts, with East Amurang Subdistrict having the largest area at 142.3 km², while Motoling Subdistrict has the smallest area, at approximately 25.9 km². There were adjustments to the area of each subdistrict in South Minahasa Regency between 2016 and 2021. This was due to the readjustment of the boundaries of neighboring regencies.

The sustainable food agriculture areas in South Minahasa Regency are located in Tumpaan, Tatapaan, Tompaso Baru, Maesaan, Ranoyapo, and Tenga subdistricts, covering an area of approximately 11,144 ha (Moonik et al., 2020).

The plantation areas are spread across 16 subdistricts, with the exception of Modoinding, namely West Amurang, Amurang, East Amurang, Maesaan, West Motoling, Ranoyapo, Sinonsayang, Tatapaan, Tenga, Tompaso Baru, Tumpaan, East Motoling, Tareran, Kumelembuai, Motoling, and Sulta, with a total area of approximately 89,817.4 hectares.

General Profile of Respondents

Palm trees grow in many areas of South Minahasa Regency, including districts such as West Motoling District, East Motoling District, Tareran District, and Kumelembuai District. One of the main products derived from palm trees is palm sugar (brown sugar/raw sugar), which is made from tapped palm sap that is cooked until it crystallizes or forms into blocks. In addition to sugar, the sago palm can also be utilized for other products such as sap sold directly, or other derivative products within an agroforestry system (Tololiu et al., 2021). The socioeconomic conditions of sago palm farmers in South Minahasa Regency do not fall into the "poor" category because their primary and secondary household expenditures are relatively under control.

The challenges faced by palm sugar farmers in South Minahasa Regency include relatively high production and labor costs in palm sugar processing, especially when traditional methods are still used. Land use and agroforestry systems: In Talaitad Village, Tareran Subdistrict, research indicates that agroforestry-based land management still needs to be optimized to support the sustainable development of the palm sugar industry.

Opportunities for palm sugar farmers in South Minahasa Regency: South Minahasa is one of the main palm sugar-producing regions, with a significant potential for cultivation (for example: "palm sugar plantations in South Minahasa currently cover approximately 2,500 hectares, or 46% of the total palm sugar plantation area in North Sulawesi"). Palm sugar products have strong local appeal and even greater potential if properly packaged and marketed.

EFI and EFE Matrices for the Palm Sugar Agroindustry

The Internal Factor Evaluation (EFI) Matrix consists of the strengths and weaknesses of the Palm Sugar

Agroindustry in South Minahasa Regency, as shown in Table 1.

Table 1. Internal Factor Evaluation (EFI) Matrix

Indicator	Weight	Rating	Score
Strength			
The products offered are high-quality	0.211	4.00	0.844
Raw materials are easily obtainable	0.223	3.75	0.363
Experience in the production process	0.219	4.00	0.876
Affordable product prices	0.141	3.75	0.529
Subtotal Strength			3.085
Weakness			
Lack of new product development	0.080	1.75	0.140
Production equipment is still rudimentary	0.056	1.50	0.084
Product marketing is not yet optimal	0.070	2.0	0.140
Subtotal of Weaknesses			0.364

Source: Processed primary data, 2025

Table 1 shows that, regarding internal factors, there are 4 strengths and 3 weaknesses in the palm sugar agroindustry in South Minahasa Regency in terms of business development. The weights were assigned based on impact, from most important to least important.

Ratings for strengths and weaknesses are assigned values ranging from 1 to 4 based on the results of interviews and focus group discussions (FGDs) conducted with government officials and business operators. The multiplication of the weight column and the rating column yields a score for the internal factors (strengths and weaknesses) of MSMEs (Hafsah, 2004). The total score for strengths is 3.085, while the total score for weaknesses is 0.364.

The External Factor Evaluation (EFE) matrix, consisting of opportunities and threats to the Palm Sugar Agroindustry in South Minahasa Regency, is shown in Table 2. Table 2 shows that, in terms of external factors, there are three types of opportunities and three types of threats facing the palm sugar agroindustry in South Minahasa Regency in the development of its business. The weightings are assigned based on impact, ranging from significant to insignificant.

Ratings for strengths and weaknesses were assigned values ranging from 1 to 4 based on the results of interviews and focus group discussions (FGDs) conducted with government officials and business operators. The multiplication of the weight column and the rating column yields a value/score for the external factors (opportunities and threats) of MSMEs. The total opportunity score is 2.37, while the total threat score is 1.44.

Table 2. External Factors Evaluation (EFE) Matrix

Indicator	Weight	Rating	Score
Opportunities			
Good business relationships with customers	0.141	4.00	0.564
Loyal customers	0.127	3.75	0.476
Government technology outreach	0.141	4.00	0.564
Subtotal of Opportunities			1.604
Threats			
Existence of similar products	0.007	1.75	0.123
Existence of consumer demand rejection	0.080	2.0	0.160
Lack of government guarantees of sustainability	0.070	2.00	0.140
Subtotal of Threats			0.423

Source: Processed primary data, 2025

SWOT Analysis of the Palm Sugar Agroindustry

The SWOT matrix outlines the internal and external conditions of the business to generate strategic alternatives that can be implemented by the Palm Sugar Agroindustry in South Minahasa Regency, as shown in Table 3.

Based on Table 3, there are several alternative strategies that can be implemented by the Palm Sugar Agroindustry in South Minahasa Regency, namely:

S-O Strategy (Strengths-Opportunities)

a) Maintaining product variants and specifications to reach a broader market, particularly in Eastern Indonesia. Consumer loyalty to the products stems from their consistent quality and specifications, which are beneficial to health.
b) Leveraging advancements in transportation and information technology by actively utilizing social media to enable consumers to easily access the Palm Sugar Agroindustry in South Minahasa Regency via the internet and conveniently order products exclusively through the website. Maximizing the use of social media is a key strategy for efficiently and effectively marketing products.

W-O (Weaknesses-Opportunities) Strategy

a) Using advanced production equipment to increase output and meet growing customer demand.
b) Expanding into new markets to broaden our customer base.
c) Retaining loyal customers by offering special prices.

S-T Strategy (Strengths-Threats)

a) Expanding product variants. This strategy is implemented to retain and attract customers in response to the growing diversity of consumer preferences regarding a product.
b) Offering affordable product prices to compete with similar competitors offering lower prices.

c) Increasing transportation capacity to facilitate product distribution.

W-T Strategy (Weakness-Threats)

a) Maintaining product quality to ensure it meets consumer expectations.

Table 3. SWOT Matrix for the Palm Sugar Agroindustry in South Minahasa Regency

EFI / EFE	Strengths (S)	Weaknesses (W)
	1. High-quality products 2. Raw materials are readily available 3. Experience in the production process 4. Products are affordable	1. Lack of new product development 2. Production equipment is still basic 3. Product marketing is not yet optimal
Opportunities (O)	Strategy (S-O)	Strategy (W-O)
1. Good business relationships with consumers 2. Loyal customers 3. Technology training from the government	1. Maintaining product variants and specifications to reach a wider market (S1 + O1) 2. Leveraging advancements in transportation and information technology, while actively utilizing social media (S8 + O3)	1. Using advanced production equipment to increase production (W2 + O1) 2. Marketing products to new regions (W3 + O1) 3. Retaining customers (W1 + O2)
Threats (T)	Strategy (S-T)	Strategy (W-T)
1. Existence of similar products 2. Consumer demand rejection 3. Lack of government guarantees of sustainability	1. Add product variants (S1 + T1) 2. Keeping product prices affordable (S4 + T2, T3) 3. Marketing products (S1 + T2)	1. Maintaining product quality (W2 + T1)

Source: Processed primary data, 2025

Conclusion

Based on the results and discussion, it can be concluded that the strategy to strengthen and improve business opportunities for palm sugar farmers involves maintaining product varieties and specifications to reach a broader market. Additionally, farmers must leverage advancements in transportation and information technology by actively utilizing social media to enable consumers to easily access the palm sugar agroindustry. To turn weaknesses into opportunities, farmers must use advanced production tools, market products to new regions, and retain loyal customers by offering special prices. To mitigate threats, they need to strengthen their position by expanding product varieties, offering affordable prices to compete with similar competitors, and increasing transportation infrastructure to support production and marketing. To address weaknesses and threats, palm farmers must prioritize product quality to ensure it remains aligned with consumer preferences.

Acknowledgments

We would like to thank everyone who contributed to the completion of this research.

Author Contributions

G.R.: Developing ideas, analyzing, writing, reviewing, and responding to reviewers' comments; R.K., C.N.: analyzing data, overseeing data collection, reviewing drafts, and writing.

Funding

This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

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