Agroindustry Development Strategy for Palm Sugar in Bone Regency

Mulyani[1*], *Andi* Nur Faidah Rahman[2], *Jumriah* Langkong[2]

[1]Master Program of Agroindustrial Engineering, Faculty of Agriculture, Hasanuddin University, 90245, Makassar, Indonesia
[2]Department of Agricultural Technology, Faculty of Agriculture, Hasanuddin University, 90245 Makassar, Indonesia

Abstract. Bone Regency is one of the potential palm sugar producing areas because it has many sources of raw materials. However, palm sugar is still produced traditionally, resulting in low product quality. This study aims to understand the overview of palm sugar industry and analyze the appropriate development strategy to be applied to the palm sugar industry in Bone Regency. The research method applied is descriptive quantitative. The data analysis method uses descriptive analysis, SWOT and AHP. The results of alternative strategies using SWOT are SO strategy: increased promotion for marketing expansion online and offline. WO strategy: improvement of palm sugar production infrastructure to meet export product standards. ST strategy: improving product quality through training/technical guidance on the application of quality management. WT strategy: increased commitment and cooperation between palm stakeholders in strengthening palm sugar agroindustry, namely the quality of export-ready palm sugar products. The priority strategy based on the AHP results, especially the main determinant factor is human resources, with the responsible actor being the government. The final goal of the palm sugar agroindustry development strategy is the improvement of palm sugar production facilities and infrastructure to meet export product standards.

1 Introduction

Indonesia is an agricultural country. However, along with the times Indonesia is also moving towards an industrial country. Areas of rice fields, plantations, forests and oceans, are the main capital of Indonesia as an agro-industrial country. Thus to obtain industrial raw materials is very easy. The vast territory of Indonesia and the geographical location of Indonesia challenge its people to develop into a competitive industrial country. Of course, it must be supported by human resources and the role of the government to support the realization of an agro-industrial state.

* Corresponding author: mulyani_st@yahoo.com

In the 1970s the world of agroindustry grew and developed and in 1985-2000 there was a very rapid development that there was an increase in production, the amount of product demand and an increase in labor absorption [1]. Agro-industry plays a very important role, because it meets the needs of the community for industrial products, especially basic needs. Agro-industry also requires a lot of raw materials, so the need for labor and farmers who produce raw materials is very high to support the development of their industry.

The share of the agricultural sector in total exports reached 2.3 percent. The non-oil and gas sector contributed 15.97 percent to other processing industries by 81.71 percent [2]. The 2009 BAPPENAS report noted that the agricultural sector was least affected by the 2008 crisis compared to other sectors. on demand and not due to economic factors. The real agricultural sector is the most efficient and reliable sector.

As a driver of agricultural development, it is assumed that the agricultural industry plays an important role in regional development for the purpose of equitable economic development. The presence of agro-industry in rural areas is expected to increase demand for agricultural commodities because agro-industry plays a role in transforming agricultural products into goods that are useful for community needs [3].

Bone Regency is one of the administrative regions on the east coast of South Sulawesi Province, which is 174 km from Makassar City. Bone is the third largest district in South Sulawesi Province with a total of 27 sub-districts. Bone Regency covers an area of 4,559 km2, of which Bontocani District is the largest and Tanete Riattang District is the smallest.

The geographical location and landscape conditions of Bone County both positively and negatively affect the environment. The availability of industrial and energy potential of mineral resources shows a positive influence. This in turn can have a negative impact if the management of industrial development, mineral resources and energy is not controlled and in accordance with the principles of good, correct and sustainable management. These three impacts must be properly managed, planned, and maintained because in addition to offering promising commercial value for regional economic growth, they also answer the problems of physical, environmental, and social change.

Industrial resource development is carried out through the development of industrial human resources; use, supply and distribution of natural resources; development and use of industrial technologies; development and use of creativity and innovation; provide financial resources.

According to the Industrial Law No. 3 of 2014, the preparation of RPIK is in accordance with regional superior resources, so that regional leading industries are analyzed first and determined according to the RPIK of Bone Regency.

Bone Regency has many sources of raw materials and various choices that can be developed to build industries and choose various industrial options to develop, one of which is Palm Sugar Commodities [4] which are illustrated as follows.

Table 1. Top commodities of palm sugar in bone regency in 2019-2024.

No	Comodity	Raw Material	Product Variation	Potential Location
1	Palm Sugar	Large coconut production volume in 2017: (>15 567 366 tons) Aren Production volume in 2017: (>1,011,025 tons)	a) Medium-scale Palm Sugar and Ant Sugar Processed Industry b) Palm Sugar Processed Industry Large-scale Ant Sugar for export c) Refreshing beverage industry d) Low heat sugar industry. e) Drug industry	1. Featured : Bontocani, Ponre, Tellu Limpoe, Bengo 2. Potential: Kahu, Barebbo, Ajangale

Source : Bone Regency Industry Office in 2019

One of the main raw materials used in the industry in Bone Regency comes from palm oil cultivation. Palm is a type of palm plant that produces fruit, sap and starch or flour on its stems. The results of this palm oil production can all be used and have economic value. However, the sap products cultivated by the community are mainly sap processed into palm sugar, and this product has a very wide market. Countries that need palm sugar from Indonesia are Saudi Arabia, the United States, Australia, New Zealand, Japan and Canada [5]

As an example of the increase in sweetener consumption in the world, as reported by sucden.com, at the beginning of the 20th century, sugar consumption for the population of 1.6 billion rose to eight million tons. Today, the world population is more than seven billion people and sugar consumption is more than 170 million tons. That is, sugar consumption is increasing not only due to population growth, but also due to consumption trends. The growth of consumption per inhabitant is 4-5 times during this time

Sap from palm plants can be processed into palm sugar. Palm is a plant that provides many benefits for human life. This sweet liquid producing tree has an important function and role ecologically, economically, socially and culturally, especially in the lives of the people of Bone Regency.

Basically, the development of palm oil plants in Indonesia is very promising. In addition to meeting the needs of domestic consumption of processed palm products, it can also increase employment, farmer income, national income and can preserve natural resources and the environment. Therefore, as a policy basis, concrete steps are needed, namely mapping the potential of palm trees, developing palm trees, increasing utilization and processing of both physical and production parts.

Generally, palm sugar artisans have part-time jobs, but actually rely more on palm sugar production. The economic base of the people (rural communities) is feasible and needs development. In addition, sap farmers usually operate as their own sugar producers. In other words, no sap farmer sells his sap to palm sugar producers. Since palm sugar artisans are many and all make palm sugar traditionally, each craftsman is mostly static, no idea has emerged to improve the quality of production. Therefore, the yield of sugar production varies from one craftsman to another. Even the results of the same person can vary from day to day. Because traditionally, farmers have not thought of looking for alternative markets that will buy their sugar products at a higher price than the price set by the collecting merchants.

In terms of marketing, almost all craftsmen are not familiar with marketing channels or networks. During this time, there were almost no cooperatives or artisan groups looking for alternative markets. The only way to sell your product is to collectors at a standard price set by the collector. Based on preliminary observations with palm sugar artisans from several sub-districts, the total palm sugar production from year to year is declining due to the conversion of palm oil plantation land and more promising corn farmers, while demand continues to increase [6, 7].

Table 2. Decrease in area and number of palm oil production in potential districts in 2018 and 2022.

Sub-district	**Area (Ha)**		**% decrease**	**total production (kg)**		**% decrease**
	2018	**2022**		**2018**	**2022**	
Bontocani	268	267	0.37%	188,860	178,012	5.74%
Tellu Limpoe	82	75	8.54%	69,540	62,640	9.92%
Bengo	74	71	4.05%	67,663	66,368	1.91%
Awangpone	1604	850	47.01%	7,712	6,624	14.11%

Source: Bone District in 2018 Figures and Food Crops, Holticulture Office and Bone County Plantation: 2022

Therefore, the profile of the Palm Sugar Small Industry in Bone Regency is needed and a palm sugar agro-industry development strategy that is tailored to the characteristics and problems of the agro-industry concerned. The development strategy will be influential in maintaining competitiveness or business existence and overcoming existing problems in the palm sugar agro-industry business.

2 Research methodology

This research will be carried out at the Industrial Office of Bone Regency which is located at Jl. Dr. Wahidin Sudirohusodo, Tanete Riattang Barat District, Bone Regency, South Sulawesi as a leading sector in Industrial development, leading Palm Sugar Craftsmen (not yet developed and starting to develop), Food Crops, Holticulture and Plantation Office of Bone Regency and at Palm Sugar Craftsmen in Bontocani District, Ponre District and Tellu Limpoe District.

The types of data used in this study are secondary and primary data. Secondary data is data that has been collected by data collection agencies and published to the user community. Primary data is data collected from the original source and goes directly to the location.

The methods used in data collection are interviews, documentation, questionnaires. The interview was conducted to obtain data from entrepreneurs in the palm sugar small industry in Bone Regency as well as from related agencies. Interviews were conducted to collect data on the strengths, weaknesses, opportunities and threats of the palm sugar small industry. The documentation method is used to obtain data or information about things that have something to do with research, by looking back at past written sources in the form of numbers or information such as books, magazines, documents, regulations, meeting minutes, daily notes and so on [8]. This method is used to collect physical data and business conditions of the palm sugar industry in Bone Regency. Questionnaire is a data collection technique carried out by giving a set of questions or written statements to respondents to [1] he questions in the questionnaire use essay and choice models. The selection of the model is expected that respondents will provide answers objectively and in detail.

Data analysis was carried out qualitatively and quantitatively. The collected data was analyzed using descriptive analysis, IFE/EFE, SWOT analysis, and AHP. Descriptive analysis is used to descriptive the ant sugar processing process carried out in Bone District, IFE/EFE is used to analyze internal and external factors that affect palm ant sugar development strategies and to see the position of palm ant sugar agroindustry, SWOT to formulate alternative strategies. Alternative strategies that have been formulated through SWOT will be selected again through FGD to choose alternative strategies that are considered the most supportive for the development of palm ant sugar agro-industry. After that, the priority strategy to be implemented will be done with AHP. The framework of thinking in formulating a strategy for the development of palm sugar IKM agro-industry in Bone Regency can be seen in Figure 1.

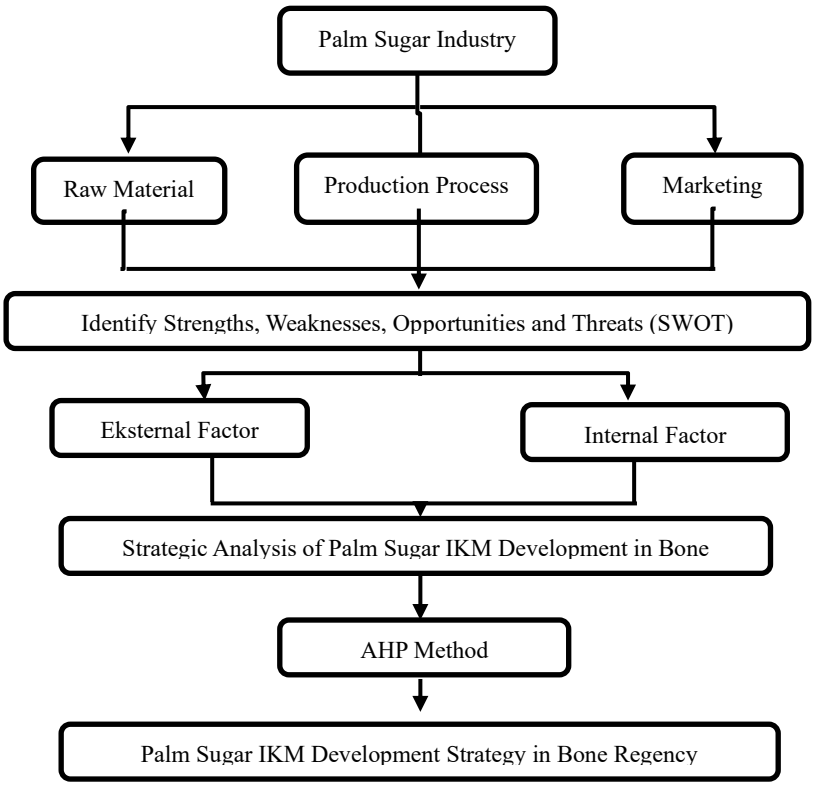

Fig. 1. Research thinking framework.

3 Research results

3.1 Profile of palm sugar small industry in Bone District

3.1.1 Palm sugar potential of bone regency

The development of palm oil commodities carried out by the Panagan Hrticulture and Plantation Agriculture Office of Bone Regency is allocated to 11 leading and potential districts (Bontocani, Ponre, Tellu Limpoe, Bengo, Kahu, Barebbo, Ajangale) in Bone Regency. In 2017, where palm oil commodities had a harvest area of 491 hectares. With the amount of production produced as much as 1,011. 025 kg.

This means, from the production aspect, this sector has the strength and ability to supply the contingency of raw materials for the palm sugar processing industry. Palm Sugar Processing Industry Spread in several Districts in Bone Regency which are divided into featured and potential areas as in the data below:

Table 3. Palm sugar processing data in bone regency.

Sub-district	Area (Ha)		Total Production		Number of Craftsmen
	2018	2022	2018	2022	
Flagship					
Bontocani	268	267	188.860	178.012	40
Tellu Limpoe	82	75	69.540	62.640	25
Bengo	74	71	67.663	66.368	10
Ponre	630	630	272.160	332.220	30
Potential					
Kahu	167	163	107.032	116.403	12
Barebbo	30	30	19.170	19.902	3
Ajangale	30	3	78.026	1.660	3

Source: Bone district in 2018 figures and food crops and holticulture office in 2022

3.1.2 Palm sugar processing human resources

Palm Sugar craftsmen are spread in several districts in Bone Regency. The following is the data of Palm Sugar Craftsmen in Featured and Potential Districts in Bone Regency as follows:

Table 4. Number of palm sugar craftsmen.

Sub-district	***Number of Craftsmen (People)***
Flagship	
Bontocani	40
Tellu Limpoe	25
Bengo	10
Ponre	30
Potential	
Kahu	12
Barebbo	3
Ajangale	3

Source : Bone regency industry office in 2023

This palm sugar craftsman is an average hereditary palm sugar craftsman with excellent processing knowledge with high experience. But to diversify products, craftsmen do not yet have knowledge.

3.1.3 Palm sugar processing technology

The equipment used to make palm sugar in bone district has evolved from traditional. But in general, palm sugar processing still uses traditional equipment. Some of the equipment used are as follows:

1. Sieve
   This filter is used to filter sap water that has been taken and ready to be cooked
2. Wok
   The pan used is a large pan according to the stove used
3. Wooden spoon
   The stirring spoon is made of large wood so it is easy to stir the palm sap until it thickens
4. Hearth
   The furnaces used are various which are basically made of clay. The use of stoves aims to reduce production costs considering the long cooking time so that it is more effective to use firewood as fuel.
5. Mold
   The mold is made of bamboo which is in the shape of a cone and there is also made of coconut shell so that the shape is round.

3.1.4 Palm sugar processing process

Palm sugar not only has benefits as a sweetness giver that is often used in many types of Indonesian food. Apparently, there are also some benefits of palm sugar that are good for body health, including cancer, anemia problems, improving the immune system and maintaining normal cholesterol level.

Palm sugar is sugar produced through the process of tapping sap water from palm trees (Arenga pinnata Merr). The sap water tapped usually uses male flowers from the palm tree or enau.

The process of making palm sugar uses more male flowers because the sap from male flowers produces more sap water than that produced by bentina flowers. In addition, the quality of sap water from male flowers is more satisfactory.

Palm sugar in Bone Regency has a peculiarity of shape, which is conical and round. Even commodities produced from this home-based business, developed in a number of villages and sub-districts in this area. In the process of making sugar, residents take the basic ingredients of making sugar by tapping the existing enau tree, which must be reached on foot. Tapping enau trees is carried out by residents twice a day, namely in the morning and evening.

Fig. 2. Palm sap taking.

The tapping results produce a sweet liquid from the enau tree, which has been accommodated in bamboo, which is then managed by cooking it in a pan that has also been designed, the cooked liquid must always be stirred, and molded into chunks of palm sugar using a cone-shaped printing tool.

Fig. 3. Palm sugar processing.

Making brown sugar begins by tapping bunches of male flowers that emit sweet liquid or dripping sap. The liquid from the bunches of male flowers is spitted using bamboo that has been specially designed to hold the liquid. The liquid is cooked in a pan with the process of cooking enau liquid takes two to three hours, then molded into chunks of palm sugar using a cone-shaped printing tool.

Some of the benefits of palm sugar (brown sugar) are inseparable from some of the nutritional content of palm sugar. Some of the substances in palm sugar, namely carbohydrates, proteins, fats, calcium, iron, phosphorus, vitamin B3 (niacin) and vitamin C.

In addition, palm sugar also contains dietary fiber which is very good for the health of the digestive system so that it can avoid medical problems in the digestive system. Palm sugar also contains fructose and sucrose which are high enough to provide a natural and healthy sweet taste.

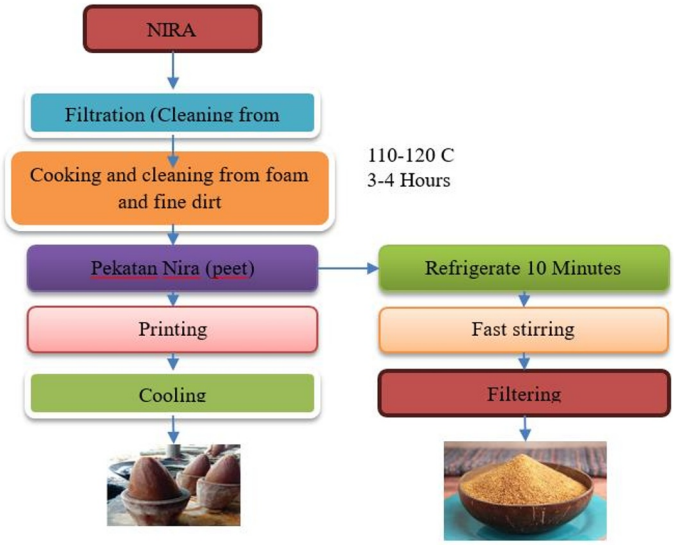

Fig. 4. Production process flow of palm sugar industry.

3.1.5 Product marketing

Palm Sugar products in Bone Regency began to develop with the existence of Palm Sugar products with various forms and variants including Ant Sugar, Box Sugar, and Red Ginger

Palm Sugar. Some palm sugar derivative products already have business legality and Halal certificates from MUI. However, palm sugar craftsmen do not yet have business legality complete with makeshift packaging.

3.1.6 Palm sugar industry supply chain bone regency

The supply chain of the palm oil industry starts from input suppliers from plantations and palm sap traders. Input suppliers also include providers of supporting, auxiliary and machining materials. From the input chain, raw and other materials are supplied to manufacturers to be obtained into finished products. From the manufacturer the product goes to traders and exporters to be sold so that it reaches the final consumer. Supply Chain of palm palm processing industry as presented in the figure below:

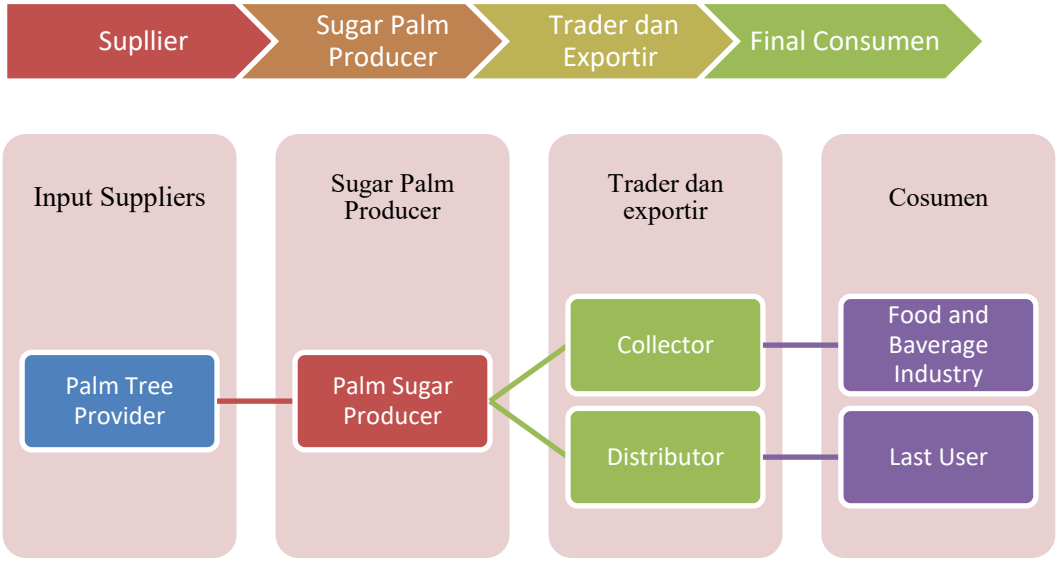

Fig. 4. Palm sugar industry supply chain in bone regency.

3.2 SWOT results and analysis

SWOT analysis is used to obtain expert perception and assessment of internal and external factors of the palm oil industry in Bone Regency which can ultimately identify strengths, weaknesses, opportunities and threats. From the evaluation of IFAS (Internal Factor Analysis System) and EFAS (External Factor Analysis System) weighting, several alternative strategies were obtained that can be used in efforts to develop the palm oil processing industry in Bone Regency. After obtaining several alternative strategies, it is necessary to choose priorities based on certain criteria. This priority setting must be done because the implementation of all SWOT analysis results strategies requires very large resources and not all of them can be accommodated by local governments, so the Analytical Hierarchy Process (AHP) approach is used. Formulation of Internal Factors and External Factors Based on the documents, literature review, preliminary survey at IKM palm sugar Bone Regency, as well as the general description that has been revealed, elements of internal and external factors are obtained as presented in Table 5 and Table 6. Based on respondents' assessments, internal factors and external factors can be categorized into strengths, weaknesses, opportunities, and threats.

Table 5. Formulation of internal factors.

No	Internal Factor	Kind
1	Palm Sugar Bone is a traditional product for generations and has distinctive characteristics	Strange
2	Products have been widely known to the wider community	Strange
3	The location of agro-industry is close to the source of raw materials	Strange
4	Sugar palm is environmentally friendly because it does not use pesticides	Strange
5	Existing human resources have adequate palm processing experience	Strange
6	Lack of ability to absorb knowledge and technology in search of new innovations	Weakness
7	There are no other brands and business licenses yet	Weakness
8	No packaging technology innovation or application	Weakness
9	Lack of managerial skills in managing the business	Weakness
10	Product quality that has not been standardized	Weakness

Table 6. Formulation of external factors.

No	External Factor	Kind
1	The development of agricultural product processing technology	Opportunity
2	There is government policy support in the development of competitive small and medium industries	Opportunity
3	The opening of the Palm Sugar export market	Opportunity
4	The development of information technology in terms of product marketing	Opportunity
5	There is support from banks in terms of capital in the form of KUR	Opportunity
6	The number of competitors among Palm Sugar artisans	Threats
7	The number of substitute goods	Threats
8	The conversion of palm oil land into corn plantation land	Threats
9	The increasing quality standards of food products on the market	Threats
10	Decreasing Number of Palm Raw Materials Due to Less Productive Palm Plant	Threats

3.3 Internal factor evaluation (IFE)

By examining the internal factors that will affect the development of palm sugar agro-industry in Bone Regency, an internal strategy factor is identified which includes aspects of strengths and weaknesses.

The results of interviews and questionnaires given to respondents obtained several factors internally consisting of five strengths and five weaknesses.To measure the extent to which strength and weakness factors affect the palm ant sugar development strategy, an IFE analysis was carried out by assessing these strength and weakness factors. IFE measurement results can be seen in the table below.

Table 7. Identification of the internal environment of the palm oil agroindustry (IFE).

No.	Internal Factor	Weight	Ratting	Score
	STRANGE			
1	Palm Sugar Bone is a traditional product for generations and has distinctive characteristics	0.125	4	0.50
2	Products have been widely known to the wider community	0.1	4	0.40
3	The location of agro-industry is close to the source of raw materials	0.175	4	0.70
4	Sugar palm is environmentally friendly because it does not use pesticides	0.05	4	0.20
5	Existing human resources have adequate experience in processing palm oil	0.05	4	0.20
Total		0.5		2
	WEAKNESS			
1	Lack of ability to absorb knowledge and technology in search of new innovations	0.05	3	0.15
2	There are no other brands and business licenses yet	0.1	3	0.3
3	No packaging technology innovation or application	0.15	3	0.45
4	Lack of managerial skills in managing the business	0.05	3	0.15
5	Product quality that has not been standardized	0.15	4	0.6
Total		0.5		1.65

The total value obtained from the IFE matrix is 3.65. According to [10] the position of the value is in the weighted average value (2.5). This condition shows that internally the current position of the palm oil agroindustry is quite good in utilizing its strengths and trying to overcome existing weaknesses. The strength that is the main strength is The location of agro-industry is close to the source of raw materials, namely with a value (0.70). The next strength is Palm Sugar Bone is a traditional product for generations and has regional characteristics with a value (0.50), the product has been widely known to the wider community (0.4), sugar palm is environmentally friendly because it does not use pesticides (0.20), existing human resources have adequate experience in processed palm oil (0.20).

Weakness factors that are considered to have an influence on the development of palm sugar agroindustry are product quality that has not been standardized (0.6), No innovation or application of packaging technology (0.45), No brand and other business licenses (0.3), Lack of ability to absorb knowledge and technology in search of new innovations (0.15), and Lack of managerial ability in managing business (0.15).

3.4 Evaluation of external factors (EFE)

External environmental factors that affect the development of palm sugar agroindustry in Bone Regency are seen from the aspects of opportunities and threats, which consist of 10 factors consisting of five opportunity factors and five threat factors. The results of the assessment of these external factors can be seen in the table below:

Table 8. Identification of the external environment of aren agroindustry (EFE).

No.	External Factor	Weight	Ratting	Score
	OPPORTUNITY			
1	The development of agricultural product processing technology	0.1	4	0.40
2	There is government policy support in the development of competitive small and medium industries	0.1	4	0.40
3	The opening of the Palm Sugar export market	0.15	4	0.60
4	Sugar palm is environmentally friendly because it does not use pesticides	0.1	4	0.40
5	The development of information technology in terms of product marketing	0.05	3	0.15
Total		0.5		1.95
	THREATS			
1	The number of competitors among Palm Sugar artisans	0.1	2	0.20
2	The number of substitute goods	0.05	2	0.10
3	The conversion of palm oil land into corn plantation land	0.05	2	0.10
4	The increasing quality standards of food products on the market	0.2	4	0.80
5	Decreasing Number of Palm Raw Materials Due to Less Productive Palm Plant	0.1	3	0.30
Total		0.5		1.5

The total value obtained from the EFE matrix is 3.45. According to [10], the position of the value is below the weighted average value (2.5). This condition shows that externally, the palm oil agroindustry is currently still lacking in utilizing opportunities and trying to overcome existing threats.

From this assessment, it was found that the main factor that can be utilized in the development of palm sugar agro-industry in Bone Regency is the opening of the Palm Sugar export market (0.6). The next opportunities are the development of agricultural product processing technology (0.4), the existence of government policy support in the development of competitive small and medium industries (0.4), the development of information technology in terms of product marketing (0.4) and the support from banks in terms of capital in the form of KUR (0.15)

Factors that pose a threat are the increasing quality standards of food products on the market (0.80), the decline in the number of palm raw materials due to less productive palm crops (0.30), the number of competitors among palm sugar artisans (0.20), the number of substitute goods (0.10) and the conversion of palm oil land into corn plantations (0.10).

3.5 Alternative palm sugar agroindustry development strategy with swot matrix

The results of identification and assessment of IFE and EFE factors that have been carried out are continued by mapping in the SWOT matrix to obtain alternative strategies for developing palm sugar agro-industry in Bone Regency. By using the SWOT matrix, several alternative development strategies were obtained to be carried out in Bone Regency consisting of the SO strategy, WO strategy, ST strategy and WT strategy. For more details can be seen in the table below.

Table 9. SWOT matrix results.

SO	**WO**
introduce and facilitate Appropriate Technology in accordance with the Needs of the Palm Sugar Industry	Implementation of Technical Training / Guidance, Management, Marketing and Diversification of Palm Processed Products for the Palm Sugar Industry
Increased promotion for online and offline marketing expansion	Free Licensing, Design, Packaging and Brand Rights Facilitation
facilitation of palm oil business actors in obtaining business capital and fulfilling export needs	Improvement of palm sugar production facilities and infrastructure to meet export product standards
ST	**WT**
Socialization of palm oil rejuvenation	Government policy in terms of rejuvenation of palm plants
Improving the Quality of Palm Sugar Products through training / technical guidance on the implementation of quality management	Increased commitment and cooperation between all palm oil stakeholders in strengthening palm sugar agro-industry Insert

SO strategy produces three alternative strategies, namely 1) introducing and facilitating Appropriate Technology in accordance with the needs of the Palm Sugar Industry. This strategy is a very important strategy for the continuity and standardization of the quality of ant sugar produced. The results of research conducted in Bone Regency, the facilities and infrastructure used are still very simple and can affect the quality of the products produced. This is an obstacle in the process of making palm sugar and will also affect the palm sugar produced does not meet export standards. 2) Increased promotion for the expansion of online and offline marketing. Promotion is an important part of efforts to expand palm sugar marketing, this is considering that palm sugar products are still marketed simply through traditional markets. With Promotion, it can expand the marketing area which will have an impact on the sales of Palm sugar products and the sustainability of the palm sugar agroindustry industry in Bone Regency. 3) facilitation of palm oil business actors in obtaining business capital and fulfilling export needs. The People's Business Credit Program (KUR) is one of the government's programs in increasing access to financing for Micro, Small and Medium Enterprises (MSMEs) which are channeled through financial institutions with a guarantee pattern. The KUR program is intended to strengthen business capital capacity in the context of implementing policies to accelerate real sector development and empower MSMEs. With the fulfillment of capital for Palm Sugar agroindustry in Bone Regency, it can help SMEs in producing Palm Sugar products to meet the needs of Palm sugar export demand.

The WO strategy produces three alternative strategies, namely 1). Implementation of Technical Training / Guidance, Management, Marketing and Diversification of Palm Processed Products for the Palm Sugar Industry. In improving the ability of Palm Sugar agroindustry business actors, technical guidance, management, marketing and product diversification are needed. With government support in the implementation of this technical guidance activity, it can develop Palm Sugar agroindustry in Bone Regency. 2). Free Licensing, Design, Packaging and Brand Rights Facilitation. With the license, design, packaging and brand rights for palm sugar agroindustry in Bone Regency can provide opportunities for palm sugar agroindustry to be able to compete with similar products both in the national market and in the export market. 3). Improvement of ant sugar production facilities and infrastructure to meet export product standards. This strategy is a very important strategy for the continuity and standardization of the quality of ant sugar produced. The results of research conducted in Bone Regency, the facilities and infrastructure used are still very simple and can affect the quality of the products produced. This is an obstacle in the process of making palm sugar and will also affect the palm sugar produced does not meet export standards.

The ST strategy produces two alternative strategies, namely: 1) Socialization of rejuvenation of palm oil plantations. This strategy is very useful in ensuring the availability of raw materials for making Palm Sugar in Bone Regency. 2) Improving the Quality of Palm Sugar Products through training / technical guidance on the application of quality management. In improving the ability of Palm Sugar agroindustry business actors, technical guidance, management, marketing and product diversification are needed. With government support in the implementation of this technical guidance activity, it can develop Palm Sugar agroindustry in Bone Regency.

The WT strategy produces alternative strategies, namely: 1). Government policy in terms of rejuvenation of palm plants. This strategy is needed to ensure full commitment from the government in terms of support for the development of Palm Sugar Agroindustry in Bone Regency. With this government policy, it has become the basis for the implementation of socialization activities for the rejuvenation of palm oil plantations. 2). Increased commitment and cooperation between all palm oil stakeholders in strengthening palm sugar agro-industry. This strategy is very important considering the lack of commitment from all stakeholders, be it the government, palm oil farmers, and the private sector. Commitment and cooperation are highly expected in the form of partnerships with companies that use ant sugar products for marketing consistency.

The results of the SWOT matrix obtained 10 alternative strategies for the development of palm sugar agroindustry in Bone Regency. The ten alternative strategies were then selected by expert respondents through an FGD conducted at the Bone Regency Industrial Office.

The results of the FGD obtained five alternative strategies that are considered the most important and represent the overall alternative strategies to develop palm sugar agro-industry in Bone Regency. The five alternative strategies are 1). Increased promotion for the expansion of online and offline marketing. Strategy, 2). Improvement of palm sugar production facilities and infrastructure to meet export product standards, 3). Implementation of Technical Training / Guidance, Management, Marketing and Diversification of Palm Processed Products for the Palm Sugar Industry, 4). Improving the Quality of Palm Sugar Products through training / technical guidance on the application of quality management, and 5). Increased commitment and cooperation between all palm oil stakeholders in strengthening palm sugar agro-industry.

3.6 Strategy formulation with AHP

The alternative strategy selected in the FGD will be continued by using AHP, to obtain priority strategies to be implemented for the development of palm sugar agroindustry in Bone District. Analysis using AHP to select strategy priorities begins with the formulation of criteria and subcriteria to be used in comparing each alternative strategy (Saaty, 1980). The goal set is the strategy of developing palm sugar agro-industry in Bone Regency. Priority is determined using a paired comparison with a scale of nine for each criterion. The results of AHP analysis can be seen in the figure below.

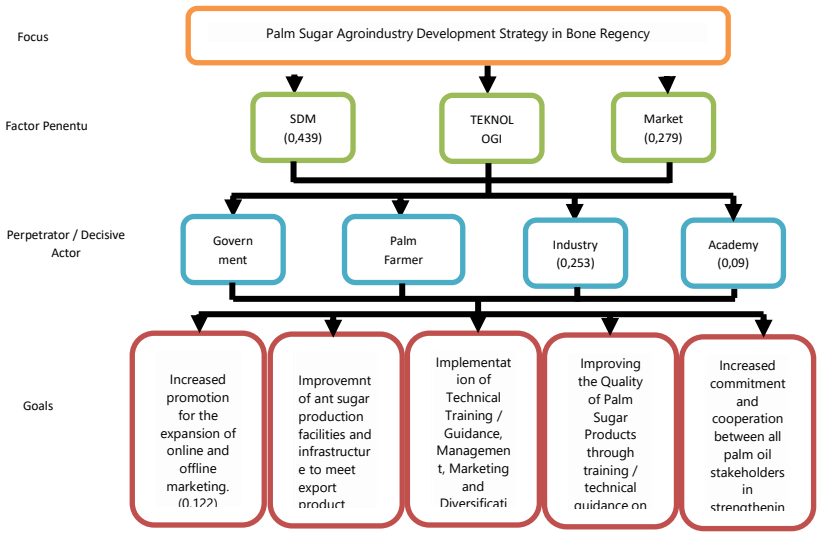

Fig. 5. AHP analysis results.

The results of the AHP analysis are known that the most important determining factor that must be addressed is HR (0.493), namely increasing the knowledge of craftsmen through Technical Guidance / Training, followed by improving technology (0.195), Market (0.310). Market factors get the lowest value because market potential can be met with guaranteed product quality for export.

The actor who is the main actor who plays the most role in the development of palm oil agroindustry is the government has the strongest important value (0.532), compared to industry (0.144), then palm oil farmers (0.233) and academics (0.09). In terms of decisive actors, the government is considered the responsible decisive actor. This is because in the development of palm sugar agro-industry, policies are needed to support and also in the form of technological assistance that will be used for quality and efficient palm sugar processing in Bone Regency.

The ranking of strategies / objectives that received the highest rank in developing palm sugar agroindustry is Improvement of palm sugar production facilities and infrastructure to meet export product standards (0.410) followed by Increased commitment and cooperation between all palm sugar stakeholders in strengthening palm sugar agroindustry (0.089), Implementation of Technical Training / Guidance, Management, Marketing and Diversification of Palm Processed Products for the Palm Sugar Industry (0.152), Improving the Quality of Palm Sugar Products through training / technical guidance on the application of quality management (0.206) and the last is Increasing promotion for the expansion of online and offline marketing. Strategy (0.141).

4 Conclusion and advice

4.1 Conclusion

The conclusion that can be drawn in this study is that the development of palm sugar agroindustry in Bone Regency is very important to implement. This is seen from the value of the IFE factor worth (3.65), this means that internally it is very supportive in the development of the ant sugar agroindustry in the future. Likewise, the EFE value is 3.45. This indicates that there are still many opportunities that have not been properly utilized. From the results of the study, 10 alternative strategies were also obtained that represent upstream to downstream development in efforts to develop palm sugar agro-industry, which can be applied in Bone Regency. Strategy priorities that can be implemented immediately based on the processed results of AHP, especially the main determining factors that have been obtained. This factor is Human Resources, with the responsible actor is the government as a facilitator who will be prioritized for improving the quality of palm sugar to meet export product standards. The ultimate goal of the palm ant sugar agro-industry development strategy is the improvement of palm sugar production facilities and infrastructure to meet export product standards.

4.2 Advice

The development of palm sugar agro-industry is inevitable and it is hoped that the government can be more aggressive to follow up on the development. This is because sugar palm is a superior commodity and provides great added value. For further research, it should be carried out thoroughly from upstream to downstream.

References

1. S, E. Suryani, Peranan, peluang dan kendala pengembangan agroindustri di Indonesia, **24** (2006).
2. BPS Kabupaten Bone, (Kabupaten Bone Dalam Angka Tahun 2020, 2020).
3. Feryanto. Peranan agribisnis dalam pembangunan pertanian dan ekonomi. *feryanto.wk.staff.ipb.ac.id*, (2010).
4. Dinas Perindustrian Kabupaten Bone, (RPIK Kabupaten Bone, 2020).
5. Lempang, M, (Pohon Aren dan Manfaat Produksinya, 2012).
6. Bps Kabupaten Bone, (Kabupaten Bone Dalam Angka Tahun 2018, 2018).
7. Dinas Tanaman Pangan, H. dan P, (Potensi tanaman aren di Kabupaten Bone tahun 2022, 2022).
8. Arikunto, (Prosedur Penelitian Suatu Pendekatan Praktek, 2006).
9. Saaty, T. L. The analytic hierarchy process. (1980).
10. F. David, R, (Manajemen Strategis : Konsep, Salemba Empat, 2006).