Strategy for the Development of Seaweed Industry in Indonesia

Sutinah[1*], Harsuko Riniwati[2], Adriana Monikca Sahidu[3], Suryani[4]

[1*]Center of Excellence for Development and Utilization of Seaweed, Universitas Hasanuddin (PUI-P2R-UNHAS). Faculty of Marine Science and Fishery, Hasanuddin University, Makassar, Indonesia
[2]Faculty of Marine Science and Fishery, Brawijaya University, Malang, Indonesia
[3]Faculty of Marine Science and Fishery, Airlangga University, Surabaya, Indonesia
[4]Faculty of Marine Science and Fishery, Hasanuddin University, Makassar, Indonesia
[1*] sutinah.made@unhas.ac.id , inasmade@gmail.com

ABSTRACT

Seaweed exported to Foreign Countries is still raw material. Price of dried seaweed is US $ 1, if it is processed into carrageenan, can reach US $ 7 / kg. - US $ 14 / kg, while the high grade (powder) costs IDR8 million/kg. China is the biggest export market where the demand is only raw material. The purposes of this study are: 1). To analyze factors influence the productivity of seaweed processing industry in Indonesia. 2). To formulate a development strategy for the seaweed processing industry in Indonesia. 3). To design priorities for the right strategy to support the development of the seaweed processing industry in Indonesia. The research location is Makassar Industrial Zone, at PT. Bantimurung Indah, Maros Regency, Seaweed industry in Takalar Regency, Jeneponto, Bantaeng, East Luwu, Malang, Surabaya and surrounding areas. The research was conducted for 6 (six) months. The research approach were qualitative and quantitative, and analyzed with Cobb Douglass, SWOT and PHA.

The results of regression analysis of seaweed processing companies showed that the company is in a condition of decreasing return to scale. The increase in output has a smaller proportion compared to the addition of inputs. The results of the SWOT analysis found the strategic effort to develop Euchemacottonii seaweed processing production. There are three strategies found in the company such as utilizing the availability of land to capture the opportunities of high market demand with government policies that continue to increase processing production to access export markets and limit the export market of raw materials, the availability of production equipment can be accompanied by the quality of its human resources, Utilizing high prices of processed products with strategic distribution to the location. The alternative which is the company's first priority is alternative 1 (production) which is able to overcome production targets, raw material prices, increase raw materials, and improve the quality of labor.

Keywords: Industry, Seaweed, Strategy

Correspondence:
Sutinah
Center of Excellence for Development and Utilization of Seaweed
Makassar, Indonesia
E-mail: sutinah.made@unhas.ac.id

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INTRODUCTION

Background

The potential of Indonesian seaweed is very promising and can be a commodity that can play a role in the movement of national economic progress. Evidently, Indonesia is one of the largest producers of Euchemacottonii seaweed type and controls 50% of the world market share to meet the demand of the export market from the industry of 117,655 tons in 2016. Increased seaweed production is still quite optimistic to be achieved given the high technical support for potential development areas wide open for use. Until now the seaweed aqua-business cycle still leaves quite complex problems including guaranteeing the quality of DES (Dried Eucheuma Seaweed) production at the level of farmers who do not meet export standards, as well as volatile price where 2 (two) of this actor is a scourge for the sustainability of the seaweed industry in Indonesia (Concon, 2012).

Meeting the needs of Charrageenan products Indonesia has not been able to meet domestic needs so it is required to import Charrageenan from other countries, because Charrageenan production in the domestic seaweed processing industry has not been able to achieve the production target in the country. Currently, Indonesia is only able to export seaweed raw materials. If the processing of E.cotton seaweed becomes Charrageenan, there will be an increase of 20 to 30 times in added value. If sold in the form of raw materials the price is US $ 0.3 per kilogram,

SRC (semi reined chrrageenan) is 6 US dollars/Kg and 10 US dollars/Kg for finished Chrrageenan powder (Siang, 2005).

There are still problems that the processing industry faces in producing finished products, such as the lack of quality of raw materials, and the determination of the changing price of raw materials (KKP, 2018). There is a partnership pattern established by seaweed exporting traders in the dry form at the cultivation location. Between the cultivator and the collecting trader occurs a kind of working contact where the collector is a messenger from the dried seaweed exporting industry, so that the seaweed processing industry into a large-scale finished product experiences obstacles in the availability of quality raw materials (Sutinah, 2018)

According to FachriKurnia, Sutinah M, Mardiana E. F (2014), the low competitiveness of seaweed is caused by external and domestic factors. External factors are shown by an increase in competition with China as a major producer of seaweed in the international market. Domestic factors are shown by the unequal level of competitiveness of each seaweed production center so that the sale of dried seaweed cannot meet production costs. In addition, seaweed farmers also face the problem of the weak position of farmers in determining prices from production.

Many seaweed industries in South Sulawesi are no longer operating due to the lack of supplies of raw materials from farmers, such as PT. Bantimurung Indah because of the collecting traders as the coordinator of the exporting

company whose function is to collect seaweed from Eastern Indonesia through a partnership pattern. This partnership provides initial capital to the cultivators of IDR1. 000,000 per person, with the condition, that all of the harvest will be sold to the traders (Sutinah, Firman, Mutiara, 2017). This causes the industry no longer obtain raw materials.

Purpose
Based on the above description, the purpose of this study is as follows:
1. To formulate a strategy for developing the seaweed processing industry in Indonesia.
2. To design priorities of appropriate strategies to support the development of the seaweed processing industry in Indonesia.

METHODOLOGY

Time and Place of Research
This research was conducted in the processing industry in South Sulawesi, namely Takalar, Jeneponto, Bantaeng, East Luwu, Makassar, and Maros. Simultaneously the research will also be held in Surabaya, Malang and surrounding areas from April to October 2019. This location was selected deliberately (purposively) with consideration that the area has a seaweed processing industry.

Population and Sample
The population in this study are all companies involved in the seaweed processing industry in South Sulawesi and Eucheumacottonii seaweed cultivators consisting of:
1. Seaweed processing company which has the same product
2. Eucheumacottonii seaweed cultivator in South Sulawesi
The sample in this study were 3 (three) processing industries found in PT., and PT. Bantimurung Indah, Maros Regency.

Data analysis technique
Data processing is used with several analyzes, namely the analysis of factors affecting productivity, SWOT analysis and processed through internal and external factors, as well as AHP analysis (Hierarchy Analysis Process).

SWOT analysis
SWOT strategy analysis can be applied by analyzing and sorting out various things that affect the four factors, then applying it in the SWOT matrix image, where the application is how strengths are able to take advantage of the opportunities, then how strengths) are able to deal with existing threats, and finally how to overcome weaknesses that are able to make threats real or create a new threat.

Table 1: SWOT Matriks

Internal factors External Factors	Strength	Weakness
Opportunities	S-O (Aggressive Strategy) Create strategies that use power to take advantage of opportunities	W-O (Turnaround Strategy)Create strategies that overcome weaknesses to take advantage of opportunities.
Threats	S-T (Diversification Strategy) create strategies that use force to overcome threats.	W-T (Defensive Strategy) Create strategies that overcome weaknesses to avoid threats

Source: Rangkuti, 2017

PHA (Process Hierarchy Analysis)
Process Hierarchy Analysis (PHA) is a method that is often used to assess actions related to the comparison of the weight of importance between factors as well as the comparison of several alternative choices. The PHA method is a model that was introduced by Thomas L. Saatyin 1971. In the process, the PHA included logical considerations and personal values that depend on imagination, experience and knowledge. On the other hand, the PHA process provides a framework for group participation in decision making or problem solving.

The working principle of PHA is the simplification of complex unstructured, strategic, and dynamic problems into its parts, as well as organizing in a hierarchy (Santika Meilani, 2014).
Some alternative strategy formulations obtained from the SWOT analysis will be continued with PHA to find the most priority alternative strategies. The steps to use PHA are as follows:
a. Formulation of objectives, criteria and alternatives that are the elements of the problem to be examined.
b. Arrangement of hierarchical structure.
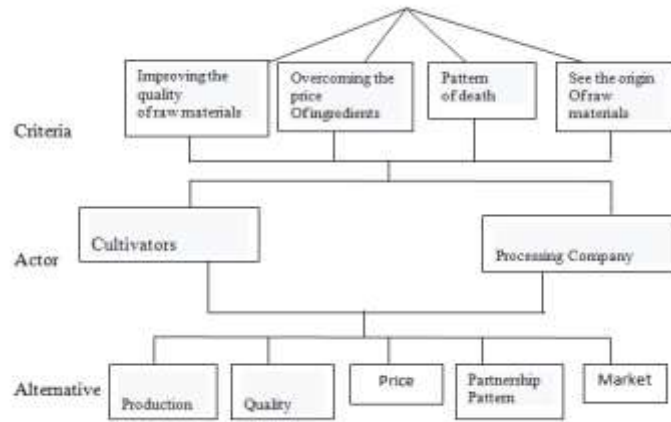Focus Industry-Based Seaweed Development Strategy

Figure 1: PHA (Process Hierarchy Arrangement)

SWOT Analysis Strategy on developing seaweed processing industry in companies in Indonesia

Analysis of the development strategy of seaweed processing production in Indonesia is inseparable from environmental conditions, the internal and external environment. The environment is generally interpreted as a place in separable from a condition, situation and events that affect the production and marketing of processed seaweed products.

Internal Strategy Factor Analysis

The analysis used to identify seaweed processing companies in the form of strengths and weaknesses (Weakness) owned by the company in various aspects related to the development strategy of seaweed processing companies.

Table 2: Internal Strategy Factors

Internal Strategy Factors		Significant Level	Weight	Rating	Score
Strength	strategic business location	4	0.24	5.00	1.18
	High product prices	3	0.18	4.00	0.71
	International standard production equipment	3.5	0.21	4.00	0.82
Weakness	Product packaging does not exist	2	0.12	2.00	0.24
	Human error is still being improved	2.5	0.15	2.00	0.29
	Production has not reached the target	2	0.12	2.00	0.24
Total		17	1.00		3.47

Source: Primary data after processing, 2019

Based on the table, it can be seen that the total score of strengths and weaknesses is 3.47.

Factor Analysis of External Strategies

External analysis is used to identify the scope of the processing company in the form of opportunities (Opportunities) and threats (Threats) owned by the Company on various aspects related to the development strategy of the company's processing production. The analysis of external factors is intended to find various opportunities that can be achieved by the Company on various aspects related to the strategy of developing processing production. This analysis is also intended to identify threats (Threats) which are inhibiting factors outside the Company's authority on various aspects related to the processing production development strategy

Table 3: External Strategy Factors

External Strategy Factors		Significant Level	Weight	Rating	Scor
Opportunities	.Near to the distribution point (port)	4	0.24	4	0.94
	.High market demand	3	0.18	4	0.71
	Availability of quality human resources	4	0.20	3.50	0.70
	Government policy	3	0.15	4	0.6
Threats	Competition	3	0.18	1.5	0.26
	climate	3	0.18	3	0.53
	Total	17	1.00		3.38

Source: Primary data after processing, 2019

The above table showed the total score of strengths and weaknesses is 3.38.After calculating the weights of each internal and external factors a position matrix analysis is then conducted to see where the position of the company's processing production development strategy is. Based on the table, an internal value consisting of strengths and weaknesses is 3.47 and an external value consisting of opportunities, is 3.38. Thus the position matrix can be illustrated in the following SWOT position matrix:
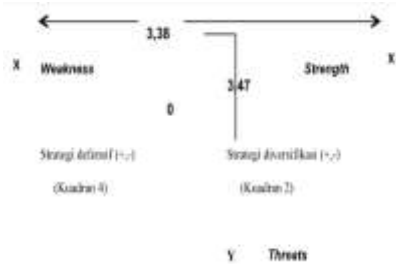

Figure 3: SWOT Analysis Diagram of Production Development of Euchema Cottonii Processing Companies, 2019

The results of the external internal matrix obtained from the total value of the weighting score in the Company's manufacturing production development strategy, for internal factor is 3.47. This value is the difference between strengths and weaknesses where strength is greater than weaknesses. For external factors, the value is 3.38, the difference between opportunity and threat where the opportunity value is greater than the threat.

The company's position in the development strategy of processing production is in quadratic 1 means that this position is a profitable position, the company has opportunities and strength so that the company can take full advantage of the opportunity. According to Rangkuti (2017) this is a very profitable situation for companies that have opportunities and strengths so that they can take advantage of existing opportunities.

The strategy used in quadrant 1 is an aggressive strategy. SO (Strengths-Opportunities) aggressive strategy, that uses the power to take advantage of opportunities. After knowing the results above, it is necessary to do an analysis by compiling strategic factors with the SWOT matrix. This matrix produces four sets of possible alternative strategies (SO, ST, WO, WT), as illustrated in the following image:

Table 4: Matrix of Euchemacottonii Seaweed Processing Production Development at the Company, 2019

IFAS / EFAS	**Strength** 1. strategic business location (S1) 2. High product price (S2) 3. Availability of international standard production equipment (S3)	**Weakness** 1. Missing product packaging (W1) 2. Human error that is still being fixed (W2) 3. Production has not reached the target (W3)
Opportunities 1.Near to the distribution point (port) (O1) 2.High market demand (O2) 3.Availability of quality human resources (O3) 4. Government policy (O4)	S-O Strategy (Agressive) 1. Utilizing the availability of land to capture opportunities for high market demand with government policies that continue to improve market access (S1, O2, O4) 2. The availability of production equipment can be accompanied by the quality of its human resources (S3, O3) 3. Utilizing high prices of production results with locations near distribution. (S2, O1)	W-O Strategy (Turnaround) 1. Take advantage of high market demand to continue to increase production in order to achieve targets. (O2, W3) 2. Utilizing the availability of quality human resources to continue to improve the human error. (O3, W2)
Threats 1. Competition (T1) 2. climate (T2)	Strategi S-T (Diversification) 1. Maintaining the price of quality products with existing equipment to anticipate competition with the raw material industry. (S2, S3, T1) 2. Utilizing a strategic locationto cope with changing climate conditions-change. (S1, S4, T2)	Stategi W-T (Defensive) . Overcoming the problem of climate change in order to take advantage of opportunities to achieve production targets. (W4, T2)

The four various possible strategies in the form of SO (Strengths-Opportunities), ST (Strengths-Threats), WT (Weakness-Threats), and WO (Weakness-Opportunities) strategies, on the SWOT matrix, are not used entirely in development strategies but adjusted to the SWOT position matrix. In the study area, the company's position is in quadratic 1 so that the right strategy used in this position is aggressive strategy. This aggressive strategy is more focused on SO (Strenghts-Opportunities) strategy, which is using power to take advantage of opportunities. So that the right strategies used by the company in the development of manufacturing industry production are SO (Strength-Opportunities) which include:
1. Utilizing the availability of land to capture opportunities for high market demand with government policies that continue to improve market access (S1, O2, O4)
2. The availability of production equipment can be accompanied by the quality of its human resources (S3, O3)
3. Utilizing high prices of production results with locations near distribution (S2, O1)

This strategy is carried out with the existing strengths associated to the availability of strategic business locations and high production prices, with conditions of distribution locations close to exploiting the opportunities that exist. Seaweed prospect is a regional mainstay commodity with high market demand.

PHA analysis
SWOT analysis will be continued with PHA to analyze the mostly prioritized alternative strategies.
The steps to use PHA are as follows:
a. Formulation of criteria and alternatives are the elements of the problem to be examined.
- From the SWOT results it was found that the criteria to be assessed were production targets, raw material prices, availability of raw materials, and availability of labor. Alternative strategies are production, quality, price, policy, and market.
b. Arrangement of hierarchical structure.
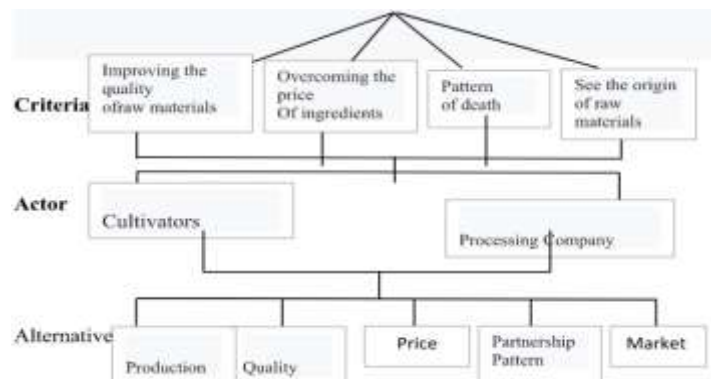Focus Industry-Based Seaweed Development Strategy

Figure 2: PHA (Process Hierarchy Arrangement)

Determination of priorities for each criterion and alternative

1. Comparison of criteria

Table 5: Comparison of criteria

Criteria	Production target	Raw material Price	Availability of raw materials	Availability of labor
Production target	1.00	0.50	0.50	0.50
Raw material Price	2.00	1.00	1.00	1.00
Availability of raw materials	1.00	1.00	1.00	1.00
Availability of labor	1.00	1.00	1.00	1.00
TOTAL	5.00	3.50	3.50	3.50

Comparison Criteria Normalization Table:

Table 6: Normalization Comparison of Criteria

Criteria	Criteria			
	Production target	Raw material Price	Availability of raw materials	Availability of labor
Production target	0.10	0.10	0.10	0.10
Raw material Price	0.30	0.30	0.30	0.30
Availability of raw materials	0.30	0.30	0.30	0.30
Availability of labor	0.30	0.30	0.30	0.30
TOTAL	1.00	1.00	1.00	1.00

Table 7: Criteria Value of Each Alternative

Alternative	Production target	Raw material Price	Availability of raw materials	Availability of labor
Priority Criteria	10.00	30.00	30.00	30.00
Alternative 1	0.20	0.25	0.25	0.25
Score	2.00	7.50	7.50	7.50
Alternative 2	0.20	0.125	0.125	0.125
Score	2.00	3.75	3.75	3.75
Alternative 3	0.20	0.125	0.125	0.125
Score	2.00	3.75	3.75	3.75
Alternative 4	0.20	0.125	0.125	0.125
Score	2.00	3.75	3.75	3.75
Alternative 5	0.20	0.125	0.125	0.125
Score	2.00	3.75	3.75	3.75

The total value of each alternative is the division of the total value of each criterion for each alternative by 100.

Table 8: Total Value of Each Alternative

Alternative	Total Value
Alternative 1	0.25
Alternative 2	0.13
Alternative 3	0.13
Alternative 4	0.13
Alternative 5	0.13

From the above table, the first alternative priority is alternative 1, production, with a value of 0.25 then alternative 2, alternative 3, alternative 4, and alternative 5 with a value of 0.13.

CONCLUSIONS AND SUGGESTIONS

Conclusion

Based on the results of the analysis and discussion, the conclusions are:

1. Regression analysis of seaweed processing companies showed that the company is in a condition of decreasing return to scale, which means that the increase in output has a smaller proportion than the addition of inputs.

2. The SWOT analysis explained the strategy of the company in an effort of developing seaweed processing production of Euchemacottonii. The strategy is divided into three elements: utilizing the availability of land to capture high market demand opportunities with government policies that continue to increase processing production to access export markets and limit the export

market of raw materials; the availability of production equipment can be accompanied by the quality of its human resources; utilizing high prices of processed products with strategic distribution locations.

3. The company's first priority is alternative 1 (production) is able to overcome production targets, raw material prices, increase in raw materials, and improve the quality of labor.

SUGGESTIONS

The results of this study suggest further research of seaweed processing industry in South Sulawesi:

1. It is known that the seaweed processing industry is still very small because some industries still focus on the export of seaweed in raw form.

2. The company, especially seaweed managers are still more active and able to communicate and need to establish good cooperation with farmers and collectors to increase the source of raw materials for seaweed to increase processed production.

3. The government, especially the Minister of Fisheries, is recommended to reduce the import of seaweed processing products and issue a policy so that cosmetics and food companies choose to consume domestic processing products.

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