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ANALYSIS OF STRATEGIES FOR DEVELOPING SEAWEED CULTIVATION IN LONTAR VILLAGE SERANG DISTRICT

Analisis Strategi Pengembangan Kampung Perikanan Budidaya Rumput Laut di Desa Lontar Kabupaten Serang

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ABSTRACT

The amount of seaweed production in Lontar Village which decreases every year so it needs to be analyzed to increase the amount of *Eucheuma cottonii* production in Lontar Village. The analysis used is a SWOT analysis for the direction of seaweed cultivation business development. The results of the IFAS analysis and EFAS internal and external factors there are 5 factors. Strength factors include high public interest in seaweed cultivation, easy to obtain labor, simple seaweed cultivation equipment, availability of large seaweed cultivation areas and maintenance and harvesting can be arranged. Weakness factors include lack of knowledge and skills in aquaculture, seaweed, seaweed often affected by diseases and pests, lack of quality seeds, no seaweed processing industry and poor water quality that affects harvesting. Opportunities in seaweed farming business include seaweed exports, becoming a flagship product of government programs, seaweed processing industry, seaweed cultivation technology and improving facilities and infrastructure. Threats from seaweed farming businesses include the threat of climate change, the absence of training from extension workers, seaweed prices fluctuate, seaweed farmers are reduced and assistance from the government has not met the needs of farmers and has not been evenly distributed. A suitable strategy to apply is the S-O (Progressive) Strategy consisting of optimizing the cultivation area and the amount of seaweed production (S4, S5, O1, O2), the use of technology in seaweed cultivation accompanied by training (S1, S3, O4, O5) and HACCP training and certification to farmers (S1, O1, O2).

Keywords : Analysis, Aquaculture, Seaweed, SWOT

ABSTRAK

Jumlah produksi rumput laut di Desa Lontar yang setiap tahunnya mengalami penurunan sehingga perlu dilakukan analisis untuk meningkatkan jumlah produksi *Eucheuma cottonii* di Desa Lontar. Analisis yang digunakan adalah analisis SWOT untuk arah pengembangan usaha budidaya rumput laut. Hasil analisis IFAS dan EFAS faktor internal dan eksternal terdapat 5 faktor. Faktor kekuatan meliputi tingginya minat masyarakat terhadap budidaya rumput laut, mudah untuk mendapatkan tenaga kerja, peralatan budidaya rumput laut yang sederhana,

tersedianya areal budidaya rumput laut yang luas dan pemeliharaan dan panen dapat diatur. Faktor kelemahan meliputi kurangnya pengetahuan dan keterampilan dalam usaha budidaya, rumput laut, rumput laut sering terkena penyakit dan hama, kurangnya jumlah bibit yang berkualitas, tidak ada industri pengolahan rumput laut dan kualitas air yang kurang baik yang berpengaruh terhadap panen. Peluang dalam usaha budidaya rumput laut meliputi ekspor rumput laut, menjadi produk unggulan program pemerintah, industri pengolahan rumput laut, teknologi budidaya rumput laut serta peningkatan sarana dan prasarana. Ancaman dari usaha budidaya rumput laut meliputi ancaman perubahan iklim, belum adanya pelatihan dari penyuluh, harga rumput laut mengalami fluktuasi, pembudidaya rumput laut berkurang serta bantuan dari pemerintah belum sesuai kebutuhan pembudidaya dan belum merata. Strategi yang cocok diterapkan adalah Strategi S-O (Progresif) terdiri dari mengoptimalkan areal budidaya dan jumlah produksi rumput laut (S4, S5, O1, O2), Penggunaan teknologi dalam budidaya rumput laut didampingi dengan pelatihan (S1, S3, O4, O5) dan Pelatihan dan sertifikasi HACCP kepada pembudidaya (S1, O1, O2).

Kata Kunci : Analisis, Budidaya, Rumput Laut, SWOT

INTRODUCTION

Blue economy-based development provides opportunities for countries that have coastal, marine and fisheries resources to manage and develop programs that can support economic resilience and quality and equitable economic growth (Anjani *et al*., 2023). Seaweed is one of the mainstay commodities in Indonesia's blue economy development plan which is part of Indonesia's RPJMN (National Medium Term Development Plan) for 2020-2024 (Fatimah & Situmorang, 2019). The implementation of the blue economy-based program was optimized by establishing a government program called Aquaculture Village (Alifa *et al*., 2024).

Aquaculture Village is a program for optimizing a fishery area to create superior fishery commodities by empowering local communities with the aim of sustainable cultivation (Saksono, 2013). The considerations and objectives of developing this Aquaculture Village are to improve the surrounding economy, create growth with good quality to strengthen the fisheries sector by improving the welfare of local farmers (Henggu *et al*., 2024). One of the areas that holds the Aquaculture Village program is Lontar Village with its superior commodity being seaweed, *Eucheuma cottonii*.

The Aquaculture Village in Lontar Village, Tirtayasa District, Serang Regency, Banten Province is a program that aims to optimize improving the welfare of the cultivating community (Radiarta *et al*., 2015). Seaweed cultivation activities in Lontar Village are supported by the Ministry of Maritime Affairs and Fisheries. This government support is based on data on Indonesian seaweed production, 99.73% of which comes from cultivation (Priono, 2016). The seaweed cultivation business in Lontar Village has experienced problems in recent years. Every year the production of *Eucheuma cottonii* seaweed in Lontar Village decreases.

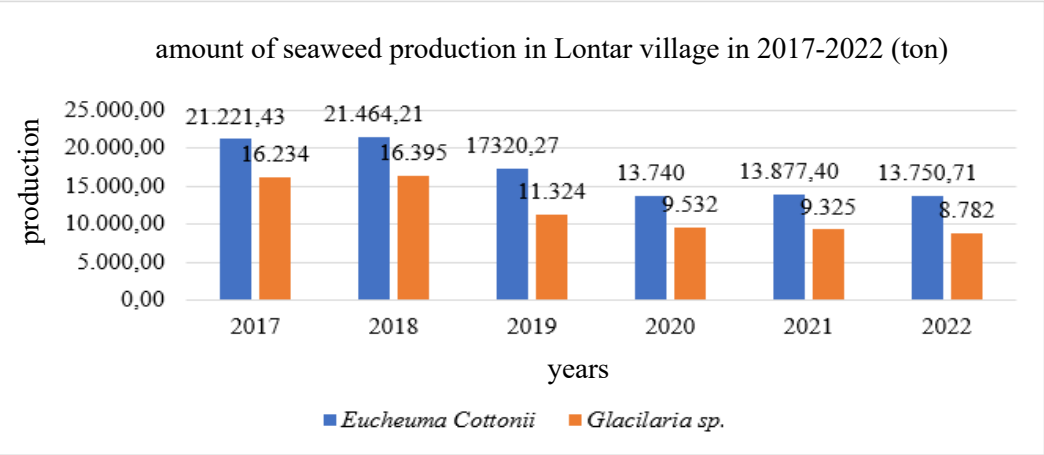

Figure 1. Total Seaweed Production in Lontar Village 2017-2022 (Dinas Perikanan Kabupaten Serang, 2022)

The amount of seaweed production in Lontar Village which decreases every year requires an analysis to increase the amount of seaweed production in Lontar Village. This became the background for this research. In this research, an analysis of the internal and external factors of the seaweed cultivation business in Lontar Village will be carried out and formulation of development directions so that the seaweed cultivation business can be developed so that seaweed production can increase every year and farmers can live prosperously in a sustainable (Widyastuti, 2013).

METHODS

Time and Place of Research Research was carried out from November 2023 to February 2024 in Lontar Village, Serang Regency, Banten. Data analysis uses quantitative descriptive analysis methods. Descriptive analysis is used to describe data systematically, factually and accurately. Quantitative methods are used to describe research using statistical data resulting from concrete analysis (Ridwan *et al*., 2021). Quantitative research data is in the form of numerical data processed statistically which aims to present the current state of variables in the form they are (Sari *et al*., 2023). In formulating development direction, analysis is needed so that the development direction strategy is in accordance with the needs of the object to be developed. SWOT matrix analysis is used to create a structured development direction based on SWOT components, Strength, Weakness, Opportunities, Treath (Chrismastianto, 2017). Next, IFAS, EFAS, IFE and EFE analyzes are carried out. IFAS analysis is an analysis used to determine internal factors which include the strengths and weaknesses of the condition of a research object, while EFAS is to determine external factors which include opportunities and threats (Mahfud, 2019). IFE analysis is an analysis used to evaluate internal factors through calculating weights and ratings to determine the X axis, while EFE analysis is an analysis used to evaluate external factors and determine the Y axis. (Ratnawati, 2020).

RESULT

IFAS and EFAS Analysis

Based on the results of the IFAS and EFAS analysis, the following are the internal and external factors that influence the seaweed cultivation business in Lontar Village in Table 1.

Table 1. IFAS and EFAS Analysis

Internal Factors	External Factors
Strength: 1. High public interest in seaweed cultivation 2. Easy to get labor 3. Simple seaweed cultivation equipment 4. Availability of large seaweed cultivation areas 5. Maintenance and harvest can be regulated.	Opportunity: 1. Export seaweed 2. Become a superior product for government programs 3. Seaweed processing industry 4. Seaweed cultivation technology 5. Improvement of facilities and infrastructure.
Weakness: 1. Lack of knowledge and skills in seaweed cultivation 2. Seaweed is often affected by diseases and pests 3. Lack of quality seeds 4. There is no seaweed processing industry 5. Poor water quality.	Threat: 1. Threat of climate change 2. There is no training from extension workers 3. Seaweed prices fluctuate 4. Seaweed cultivators are decreasing 5. Assistance from the government does not meet the needs of cultivators and is not evenly distributed.

IFE and EFE Matrix Analysis

Based on the calculation results, the following are the IFE and EFE values in Table 2.

Table 2. IFE and EFE Analysis

IFE Matrix				
No.	Strength	Weight	Rating	Score
1.	High public interest in seaweed cultivation	0,08	3,93	0,30
2.	Easy to get labor	0,12	3,98	0,48
3.	Simple seaweed cultivation equipment	0,11	3,98	0,43
4.	There is a large seaweed cultivation area available	0,07	3,95	0,28
5.	Maintenance and harvest can be regulated.	0,11	3,93	0,42
	Total Score			1,90
No.	Weakness	Weight	Rating	Score
1.	Lack of knowledge and skills in seaweed cultivation business	0,11	2,12	0,24
2.	Seaweed is often affected by diseases and pests	0,11	3,59	0,41
3.	Lack of quality seeds	0,09	3,29	0,29
4.	There is no seaweed processing industry	0,10	3,41	0,35
5.	Poor water quality.	0,10	3,59	0,36
	Total Score			1,65

EFE Matrix				
No.	Opportunity	Weight	Rating	Score
1.	Seaweed exports	0,11	3,85	0,41
2.	Become a superior product of government programs	0,08	3,90	0,31

EFE Matrix				
No.	Opportunity	Weight	Rating	Score
3.	seaweed processing industry,	0,09	3,68	0,32
4.	Seaweed cultivation technology	0,10	3,68	0,37
5.	Improvement of facilities and infrastructure.	0,09	3,80	0,35
	Total Score			1,76
No.	Threat	Weight	Rating	Score
1.	Threat of climate change	0,11	3,78	0,40
2.	There is no training from extension workers	0,14	2,29	0,31
3.	Seaweed prices fluctuate	0,12	3,24	0,38
4.	Seaweed cultivators are decreasing	0,06	1,95	0,12
5.	Assistance from the government does not meet the needs of cultivators and is not evenly distributed.	0,11	3,12	0,35
	Total Score			1,56

Grand Strategy Matrix Analysis

The grand strategy matrix analysis is an analysis to determine the selected strategy for the seaweed cultivation business in Lontar Village. The grand strategy matrix consists of 4 strategies consisting of the S-O (Strengths-Opportunities) strategy which is progressive, the S-T (Strengths-Threats) strategy which is diversification, the W-O (Weaknesses-Opportunities) strategy which is turn around and defensive W-T (Weaknesses-Threats) strategy (Pandelaki, 2012). Determining the selected strategy requires a grand strategy analysis calculation (Ratnawati, 2020). This analysis uses the results of IFE calculations to determine the X axis and EFE to determine the Y axis which is recalculated using the formula (Sarmin *et al*., 2021). The following are the score values for each factor and the calculations to determine the X-axis and Y-axis:

1. Total score of strength (S) : 1.90
2. Total score of weakness (W) : 1.65
3. Total score of opportunity (O) : 1.76
4. Total score of threat (T) : 1.56

The total score for each component is entered into the SWOT analysis formula, to determine the X axis and Y axis. The following is the calculation:

$$X\ ;\ Y\ = \frac{S-W}{2}\ ;\ \frac{O-T}{2}$$

$$X\ ;\ Y\ = \frac{1.90-1.65}{2}\ ;\ \frac{1.76-1.56}{2}$$

$$X\ ;\ Y\ = 0.13\ ;\ 0.10$$

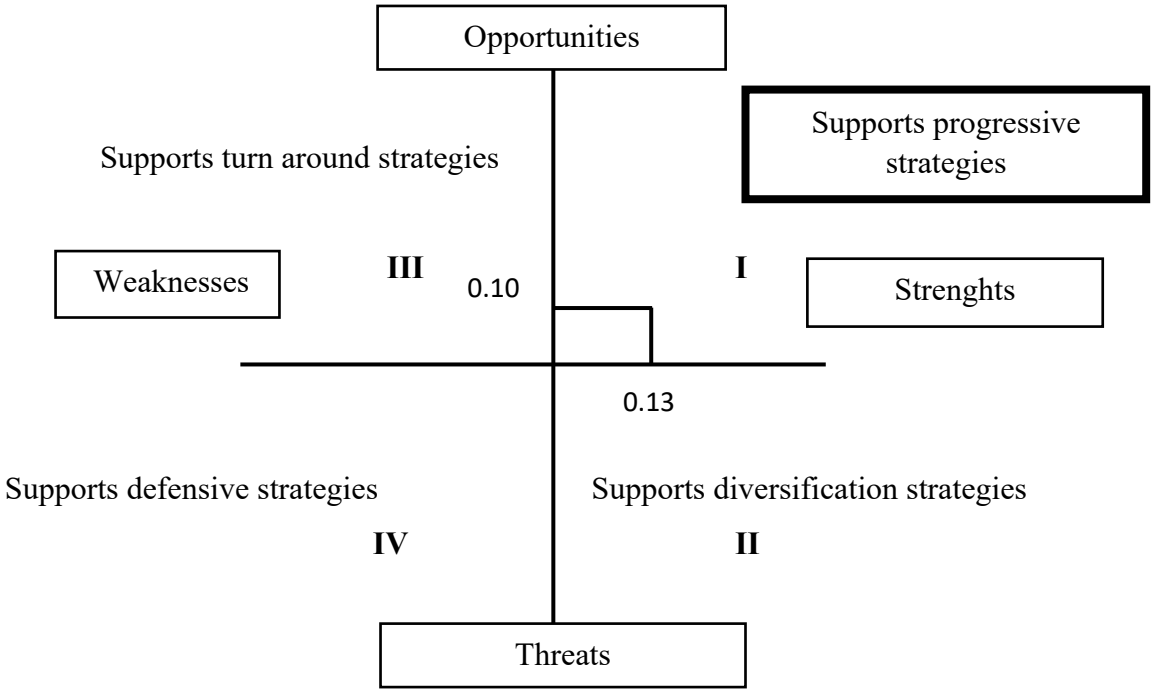

Figure 2. Grand Strategy Matrix Analysis Results

DISCUSSION

IFAS and EFAS Analysis

1. Strength

Strengths include the high level of public interest in seaweed cultivation, easy access to labor, simple seaweed cultivation equipment, availability of large seaweed cultivation areas and maintenance and harvesting can be arranged. Seaweed cultivation is a cultivation with fast turnover because the harvest time is only 25-40 days, so many people have an interest in cultivating seaweed (Widyastuti, 2013). The workforce for seaweed cultivation in Lontar Village comes from the community or family, usually women who do seaweed labor (Salim *et al*., 2023). Simple seaweed cultivation technology consisting of used bottles (buoys), bamboo and polyethylene rope at a low price. The seaweed cultivation area in Lontar Village is 148.5 hectares, this area is on the coast of Lontar Beach.

2. Weaknesses

Weaknesses include a lack of knowledge and skills in seaweed cultivation, seaweed are often affected by disease and pests, a lack of quality seeds, no seaweed processing industry and poor water quality which affects the harvest. Most seaweed farmers lack knowledge and skills in seaweed cultivation, especially in terms of controlling seaweed pests and diseases. Seaweed in Lontar Village is often affected by disease and pests which are influenced by bad weather. Diseases that often infect include ice-ice, while pests include fish and jellyfish. The quality and quantity of seeds that farmers get is not good because they are not observant. Lontar Village does not yet have a seaweed processing industry that can increase the selling value of the seaweed. The water quality in the seaweed cultivation area in Lontar Village is influenced by weather, household waste and factory waste that flows into the ocean.

3. Opportunities

Opportunities for seaweed cultivation activities in Lontar Village include exporting seaweed, becoming a superior product for government programs, the seaweed processing industry, seaweed cultivation technology, and improving facilities and infrastructure. The market potential for seaweed in Lontar Village is very wide, the harvest has been distributed

to almost all regions in Indonesia and has export potential. Lontar Village is a village that has a program from the government, namely "Aquaculture Village" so that it can develop quickly. Local institutions support and assist seaweed cultivation activities, a form of support and assistance in the form of providing seaweed seeds and boats to the seaweed cultivation group in Lontar Village. The abundant results of seaweed cultivation can be developed in the processing sector to increase sales value. Seaweed cultivation and drying technology needs to be developed and is an opportunity in the future to increase production. Facilities and infrastructure for seaweed cultivation in the future will continue to be evaluated and improved to support seaweed cultivation activities (Wantasen, 2012).

4. Threats

Threats from seaweed cultivation activities in Lontar Village include climate change, there is no training from extension workers, seaweed prices fluctuate, there are fewer seaweed cultivators and assistance from the government does not meet the needs of cultivators and is not evenly distributed. Climate change is a major threat to seaweed cultivators, bad weather causes cultivators not to stock seaweed which affects income (Burdames & Ngangi, 2014). Seaweed cultivators in Lontar Village have not received training from extension workers regarding how to cultivate seaweed properly and in accordance with SNI. Fluctuations in the selling price of seaweed in Lontar Village occur due to the quality of the harvest which is influenced by weather and demand. Selling prices are high from January to March because the weather is good so the harvest is good and this month is approaching the month of Ramadan so the demand for seaweed is high. The loss of generations of seaweed farmers is also a threat to seaweed cultivation in Lontar Village. Most of the people in Lontar Village are now currently working abroad, such as in Malaysia, Korea and Saudi Arabia, the reason is because they get a large salary. This is a threat because it can make the young generation of Lontar Village think that they prefer to become foreign workers rather than seaweed cultivators. Assistance from the government has not been in line with the needs of seaweed cultivators so this assistance has not been effective. Apart from that, assistance from the government is not evenly distributed, even people who do not cultivate seaweed receive this assistance.

IFE and EFE Matrix Analysis

Based on the IFE and EFE calculations, it shows that there are 5 factors for each internal component (strengths and weaknesses) and external components (opportunities and threats). Each factor has a different value. Strengths include high public interest in seaweed cultivation with a score of 0.30, easy to find labor with a score of 0.48, simple seaweed cultivation equipment with a score of 0.43, availability of large seaweed cultivation areas with a score of 0.28 and maintenance and harvest can be regulated with a score value of 0.42. The total score value for strength is 1.90. Weaknesses include lack of knowledge and skills in cultivation with a score of 0.24, seaweed is often affected by disease and pests 0.41, lack of quality seeds 0.29, no seaweed processing industry 0.35 and poor water quality which influences the harvest with a score of 0.36. The total score for weakness is 1.65. This IFE value is used to determine the X axis in the grand strategy matrix.

EFE includes opportunities and threats each consisting of 5 factors. Opportunities include exporting seaweed with a score of 0.41, becoming a superior product for government programs with a score of 0.31, seaweed processing industry with a score of 0.32, seaweed cultivation technology with a score of 0.37 as well as improving facilities and infrastructure with a score of 0.35. The total score value for the odds is 1.76. Threats include the threat of climate change with a score of 0.40, the absence of training from extension workers with a score of 0.31, seaweed prices experiencing fluctuations with a score of 0.38, seaweed cultivators decreasing with a score of 0.12 and assistance from The government has not met the needs of cultivators and is not evenly distributed with a score of 0.35. The total threat

score value is 1.56. This EFE value is used to determine the Y axis in the grand strategy matrix.

Grand Strategy Matrix Analysis

Based on the results of the grand strategy matrix analysis (Figure 2), the X axis (0.13) and Y axis (0.10) are in quadrant I, so the appropriate strategy to apply to the seaweed cultivation business in Lontar Village is the S-O (Progressive) strategy. The S-O (Progressive) strategy is a strategy that utilizes Strengths and Opportunities. The following are S-O strategies that can be applied to seaweed cultivation businesses in Lontar Village:

1. Optimizing cultivation area and amount of seaweed production (S4, S5, O1, O2)

Seaweed cultivators in Lontar Village cultivate 2 species of seaweed, namely *Gracilaria* sp. and *Eucheuma cottonii*. However, in the last 1 year the seaweed *Gracilaria* sp. it is not cultivated due to dry conditions which cause drought in ponds in Lontar Village, so cultivators prefer to cultivate the *Eucheuma cottonii* species. Apart from that, the *Eucheuma cottonii* species has easier and simpler cultivation techniques than the *Gracilaria* sp., for example there is no need to buy or rent cultivation land because it uses coastlines that can be used (open access) and cultivation equipment is cheap and easy. The government is optimizing cultivation by creating a "Aquaculture Village" program with Lontar Village's superior commodity, seaweed *Eucheuma cottonii*, so that development needs to be carried out. Cultivation of seaweed (*Eucheuma cottonii*) has a land use of 148.5 ha. However, currently seaweed cultivation land is only used 68.53% or around 101.8 ha. The seaweed cultivation area in Lontar Village needs to be utilized optimally. The utilization area for seaweed cultivation can be used at 46.7 ha to optimize the cultivation area and increase the amount of seaweed production. In this strategy, it is necessary to increase the cultivation area by identifying locations that have suitable environmental conditions for seaweed cultivation, such as suitable water temperature, stable salinity, and sufficient nutrient availability. The criteria for selecting a location for seaweed cultivation are that it has location characteristics and water quality that are suitable for seaweed cultivation and is not affected by waste. Routine monitoring of water quality, temperature, salinity and other environmental factors needs to be considered (Fajriah *et al*., 2019). Providing and subsidizing superior seaweed seeds such as those that have good resistance to disease and various environmental conditions. Providing information regarding weather forecasts and environmental modeling to anticipate extreme weather changes to take appropriate preventive measures to protect seaweed from damage and pest and disease attacks so as to increase the amount of seaweed production in Lontar Village.

2. HACCP training and certification for cultivators (S1, O1, O2)

HACCP training and certification is carried out so that seaweed products in Lontar Village can be exported. Seaweed exports require HACCP certification. In implementing this program, it is necessary to form an expert team consisting of marine scientists, food experts and HACCP practitioners to design a training curriculum that suits the needs of seaweed farmers. The curriculum should include a basic understanding of HACCP principles, recognition of potential hazards and risks in seaweed cultivation, as well as effective control practices. Provide training materials in a format that is easy to understand and relevant to the context of seaweed cultivation, such as group discussion learning methods, providing guidebooks, case studies, and direct practical demonstrations so that they are easy to understand and can illustrate the application of HACCP principles in seaweed cultivation. Include practical training sessions in the field where participants can directly apply HACCP principles in a seaweed farming setting. After training, conduct a knowledge and skills test to assess participants' understanding and ability to apply HACCP principles. After successfully completing the training and passing the exam, provide certification to participants as proof of success in implementing HACCP principles in seaweed cultivation. Ensure that the

certification is recognized by the relevant authorities and accredited by a trusted institution. Conduct ongoing monitoring and evaluation of the effectiveness of the HACCP training program. Implementing feedback to participants to help them improve their understanding and skills and monitoring program performance to adjust and improve training programs. Collaborate with educational institutions, government and the private sector to expand access and improve the quality of training programs (Tarigan *et al*., 2018).

CONCLUSION

Based on the research results, the following are the conclusions in this research:

1. Based on the results of the IFAS and EFAS analysis, internal and external factors have 5 factors. Strength factors include the high level of public interest in seaweed cultivation, easy access to labor, simple seaweed cultivation equipment, availability of large seaweed cultivation areas and maintenance and harvesting can be arranged. Weakness factors include a lack of knowledge and skills in cultivation, seaweed, seaweed is often affected by disease and pests, a lack of quality seeds, no seaweed processing industry and poor water quality which affects the harvest. Opportunities in the seaweed cultivation business include exporting seaweed, becoming a superior product for government programs, the seaweed processing industry, seaweed cultivation technology and improving facilities and infrastructure. Threats from seaweed cultivation include the threat of climate change, lack of training from extension workers, seaweed prices fluctuating, seaweed cultivators decreasing and assistance from the government not meeting the needs of cultivators and not being evenly distributed.
2. Based on the results of the SWOT analysis, it shows that the X axis (0.13) and Y axis (0.10) are in quadrant I, so the appropriate strategy to apply to the seaweed cultivation business in Lontar Village is the S-O (Progressive) strategy. The S-O (Progressive) strategy is a strategy that utilizes Strengths and Opportunities. The S-O (Progressive) strategy consists of optimizing the cultivation area and amount of seaweed production (S4, S5, O1, O2), the use of technology in seaweed cultivation accompanied by training (S1, S3, O4, O5) and HACCP training and certification for farmers (S1, O1, O2).

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