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Strategy for the Development of Sustainable Vannamei (*Litopenaeus vannamei*) Shrimp Culture in Plastic Ponds in Tegal Regency, Central Java

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Abstract

Vannamei shrimp culture is a fishery sub-sector promoted by the Indonesian government which makes many farmers carry out these businesses. However, if the business is carried out in an environmentally unfriendly way, sustainability will stop. The purpose of this study is to determine the correct strategy for the development of vannamei shrimp culture in plastic ponds in Tegal Regency, Central Java. The research method is the survey with purposive sampling, the respondent sampling technique is non-probability sampling and data collection with interviews, questionnaires, observation and documentation. The data were analyzed descriptively and SWOT. The number of respondents was 38 people. The results indicated that the production of vannamei shrimp has decreased in the last three years due to the Acute Hepato Pancreatic Necrosis Disease outbreak. A calculation matrix factor strategy internal (IFAS), strength (S) biggest are good and correct culture SOPs (0.349) and the calculation of the external strategy matrix (EFAS), opportunities (O) the largest is the large market goose p (0,293). Relationship factors occupy cell V, from the effort the describe the situation growth and stability which means that the business is in a relatively stable condition and growth is likely to occur. Based on the SWOT analysis, the ranking of alternative strategies obtained is the SO strategy with a total score of 3,602. The priority alternative strategy used is optimizing the quality and quantity of products by using good and correct SOP, using technology, available infrastructure and availability of adequate seeds to produce quality and quantity of products so that continuity is maintained, so as to meet high market and consumer demand.

INTRODUCTION

Pacific white shrimp or vannamei shrimp (*Litopenaeus vannamei*) culture in Indonesia is the main aquaculture sector and become a priority for aquaculture

development in Indonesia to improve the national economy. From 2012 – 2019, the contribution of shrimp export value to Indonesian fishery export value reached 36.27% (BPS, 2020). This means that shrimp commodities have a very significant role in the export performance of fishery commodities in Indonesia.

Tegal Regency has a long coastline of 30 km, three sub-districts bordering the sea coast, namely the sub-districts of Kramat, Suradadi and Warurejo having considerable fishery potential, one of which is the culture of vannamei shrimp in plastic ponds. The development of its aquaculture needs to be carried out so that the shrimp farming business vannamei can run smoothly and can produce in large quantities, so supply and demand can be stable. The vannamei shrimp culture activity in Tegal Regency requires a strategy development to increase production by considering the environmental conditions so that vannamei shrimp culture can be sustainable. The problem in the development of vannamei shrimp culture in plastic ponds in Tegal Regency at this time is the decline in shrimp production in the last three years caused by Acute Hepato Pancreatic Necrosis Disease (AHPND).

The decrease in the environmental quality was caused by the improper waste management of aquaculture waste. The plastic ponds culture system in Tegal Regency is on average intensive ponds that stimulate the production of shrimp through high stocking density which is enough to produce a large amount of waste. The decline in environmental quality is due to overutilization of input and improper water management which is not sustainable nor to existing factors in aquaculture wastewater discharge during operations (Farkan, 2016). In addition, the production costs of vannamei shrimp with this system have increased every year. On the contrary, the gate prices of the shrimp harvest at the farm level are very low which resulted in small profit margins.

Vannamei shrimp culture activities in plastic ponds in Tegal Regency currently have not fully implemented good fish farming methods (CBIB), especially the lack of ponds that have wastewater treatment facilities so a lot of aquaculture waste is dumped directly into the canal. This is suspected to have caused the decline in water quality and the environment. Another factor is the handling of shrimp when exposed to the disease. The farmers do not isolate the shrimp affected by the disease so it will spread to uninfected shrimp ponds. Whereas in CBIB, it is necessary to eradicate the moribund shrimps. Precautions are taken for infected shrimp by giving chlorine in the ponds to prevent the spread of disease to the others pond and to the environment (Lestantun *et al*., 2020).

Vannamei shrimp culture activities have strength and opportunity. In addition, there are also obstacles that are certain to arise, namely in the form of weakness or threats (Prakoso *et al*., 2016). It also faces various kinds of problems both internal and external in order to meet the target production. Therefore, we need the right strategy for the development of shrimp culture to minimize the existing problems and be able to increase production by taking into account environmental conditions so that vannamei shrimp culture can be sustainable. In the present study, SWOT analysis was used. The purpose of the study was to determine the right strategy for the development of vannamei shrimp culture in plastic ponds in Tegal Regency.

METHODOLOGY

Place and Time

The research was conducted from July to December 2021 on the vannamei shrimp farm located in Kramat, Suradadi and Warurejo Districts on the coast of Tegal Regency.

Work Procedure

Data used is data primarily through observation, interviews with farmers, and related stakeholders using a questionnaire. Whereas secondary data was obtained from literature such as books, journals, theses, dissertations, and other academic resources. Related agencies such as the Statistics agency, Fisheries agency, Government Research and Development Agency, and the Tegal Fisheries Education and Training Institute and other stakeholders. Respondents were determined through the purposive sampling method where the respondents were chosen deliberately based on some criteria and the technique of taking respondents is non-probability sampling. From 200 shrimp farmers, a total number of 38 respondents were used for SWOT analysis consisting of 30 shrimp farmers and 8 respondents from government agencies.

Data Analysis

The research data collected was then processed and analyzed using descriptive analysis and SWOT analysis based on the internal factor (Strengths and weaknesses) and external factors (Opportunities and threats). Activities carried out for the development of shrimp farming vannamei on plastic ponds in Tegal Regency, namely by identifying internal and external factors so that later it can be formulated into a strategy through SWOT analysis.

RESULTS AND DISCUSSION

Vannamei shrimp culture activities in plastic ponds in Tegal Regency have implemented SOPs well, but have not implemented good fish farming methods (CBIB) optimally. The location of culture is close to industry, this is because the northern coast of Tegal Regency is an industrial area per regional regulation number 10 of 2012 concerning the spatial plan of Tegal Regency in 2012-2032.

Shrimp farming waste management is not yet accommodated with good. Not there is WWTP in area culture so water waste at the time of siphoning and total harvesting is discharged directly into waterways that empty into the sea. This will cause beach pollution, even though the water source used is for culture originating from the beach. Cultural activities carried out by vannamei shrimp farmers in Tegal Regency have not yet conceptualized sustainable environmentally friendly shrimp farming that disposes of culture waste into "natural toilets" of mangrove forests so that they do not pollute the environment. Even though intensive ponds spur the production of shrimp through stocking fry with density tall and quantity good feeding large enough to produce a large amount of waste a reservoir is needed to settle the dirt before it is dumped into the public canal.

Current Status of Vannamei Shrimp Culture in Tegal

Vannamei shrimp culture activities in the coastal area of Tegal were started in 2013 and cover three sub- districts including Kramat District (Dampyak, Padaharja, Munjungagung, and Maribaya Villages), Suradadi District (Purwohamba and Suradadi Villages), Warurejo District (Demangharjo and Kedungkelor Villages). The number of vannamei shrimp farmers in Tegal is approximately 200 people/ group with a pond area covering 332.5 ha (BPS Kabupaten Tegal, 2021). Farmers in this area, who were originally engaged in milkfish culture, then changed the ponds to vannamei shrimp culture. Milkfish ponds covering an area of 0.5 – 1.0 hectares were used as plots with an area of 700 – 1,000 m^2 for vannamei shrimp culture.

Table 1. Data on land area and vannamei shrimp farmers.

Subdistrict	Area (Ha)	Number of Farmers
Kramat District	132.0	80 farmers
Suradadi District	25.5	10 farmers
Warurejo District	175.0	110 farmers
Amount	332.5	200 farmers

Based on data from the Tegal Statistics office, in 2020 the land area is 332.5 hectares and the number of farmers is 200 people, whereas in 2013 the land area for vannamei shrimp culture in Tegal it is only 2.5 ha in 3 sub-districts. Vannamei shrimp farming activities in Tegal applied the Busmetic technology (mini-scale shrimp farming with plastic ponds) with culture methods ranging from intensive to super-intensive. At the beginning of farming era, the vannamei shrimp farming business in Tegal was very profitable, in one cycle the profit margin was 80-90% of the production cost so many people carried out culture activities by opening new land. The increase in land area was followed by the production volume of vannamei shrimp. In 2013, the production volume of shrimp was 3.8 tons and increased to 1,245 tons in 2020 (**Error! Reference source not found.**). However, vannamei shrimp production in Tegal has decreased in the last 3 (three) years (DKPP Kabupaten Tegal, 2020).

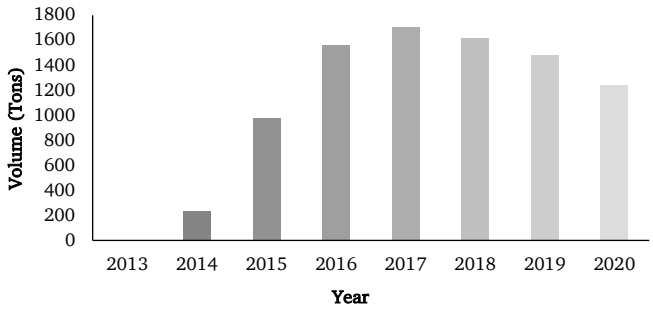

Figure 1. Vannamei shrimp production in tons from 2013 to 2020 in Tegal Regency.

The production volume peaked in 2017 with 1,708 tons of shrimp harvested but decreased in the following years, this was caused by many farmers experiencing crop failure caused by AHPND. This disease was characterized by sudden death at <40 days after stocking, pale shrimp color and empty digestive tract, and hepatopancreas visibly shrinking and pale when dissected (DKP Jawa Tengah, 2020). Crop failure caused by disease indicates that the culture environment has been polluted which causes shrimp to experience stress and condition weak so that very easily attacked disease. Most vannamei shrimp ponds in Tegal do not have a wastewater management installation or sedimentation reservoir for wastewater due to the limited land for the ponds, so many farmers dispose of wastewater directly into rivers or pond channels. Whereas applied busmetic technology carries environmentally friendly vannamei shrimp culture, shrimp culture technology always considers the sustainability of natural resources. Nature or environment waters and empties on continuity of the shrimp farming business. The sustainability of the aquaculture system is determined by several aspects including technological aspects (production), social and economic aspects, and environmental aspects (Farkan, 2016). In principle, the concept of sustainable development is a development that integrates environmental /ecological, economic, and social issues (BAPPENAS, 2016).

Development is needed in the shrimp farming system so that shrimp farming can run stably and can produce in large quantities, therefore it requires synergy between factors such as power land, institutional, economic, environmental, and social support. The integration between these sectors will be analyzed using SWOT so that obtained priority activities in determining the strategy of developing vannamei shrimp culture in sustainable plastic ponds.

SWOT Analysis of Vannamei Shrimp Farming

Strategy and development of shrimp culture in plastic ponds in Tegal was carried out by analyzing the strategic factors of the business with a SWOT analysis, then the first step is to identify internal factors (strengths and weaknesses) as well as external (opportunity and threat). These factors will be used as the basis for formulating a strategy for developing shrimp farming by maximizing strengths and opportunities as well as minimizing existing weaknesses and threats.

The results of the identification of internal factors originating from within the plastic pond vannamei shrimp farming activities in Tegal are in the form of strengths and weaknesses, indicators of internal factors in the form of strengths include: (1) land potential, (2) seed availability, (3) number of workers, (4) available production facilities and infrastructure, (5) technological developments, (6) good and correct SOP. While the weaknesses are (1) decreased pond production, (2) decreased water quality, (3) low quality of human resources, (4) lack of WWTP, (5) low understanding of sustainable shrimp farming and (6) high production costs.

Indicators of external factors in the form of opportunities include: (1) a large market share, (2) cooperation networks with other parties, (3) increased consumer references on fish ponds, (4) support from capital institutions, (5) good business prospects, (6) government support. While the threats are (1) natural disasters, (2) disease outbreaks, (3) fluctuating shrimp prices, (4) implementation of quality standardization of pond products, (5) product competition, and (6) environmental pollution.

Internal Factor Evaluation (IFE) Analysis

Based on the response of the respondents, the IFE assessment was conducted by multiplying the rates. The weight was calculated from 0.0 (not important) to 1.0 (very important). The total weight for strength and weakness is 1.00. The matrix analysis of Internal Factor Evaluation (IFE) is presented in Table 2.

Table 2. Matrix Analysis of Internal Factor Evaluation (IFE).

Internal factors	Weight	Rating	Score
Strength			
Land potential	0,102	3.079	0.315
Availability Adequate seeds _	0.104	3.132	0.326
Adequate number of workers (HR)	0,102	3.053	0.310
Production facilities and infrastructure available	0,103	3.105	0.321
Technological development	0.104	3.132	0.326
Good and correct culture SOP	0.108	3.237	**0.349**
Sub-Total	**0.623**		**1.948**
Weakness			
Decreased pond production	0.062	1.868	0.116
Decreased water quality	0.063	1.895	0.119
Low HR quality	0.063	1.895	0.119
Lack of WWTP	0.064	1.921	**0.123**
Low understanding of sustainable shrimp farming	0.063	1.895	0.119
High production cost	0.061	1.842	0.113
Sub-Total	**0.377**		**0.710**
Total	**1.000**		**2.658**

Based on the IFE analysis matrix presented in Table 2, the main strength that exists in culture activities of vannamei shrimp in Tegal is good and correct culture SOP with a score of 0.349 while the main weakness is the lack of WWTP with a score of 0.123. Results analysis to factor strength obtained score total score as big as 1,948 and the total score for the weakness factor is 0,710. So, the total score of internal factors (strengths and weaknesses) is 2,658. Vannamei shrimp farming activities in Tegal have a main strength in good and correct culture SOPs, but this main strength is not balanced by the application of good shrimp farming practices (CBIB), it is the lack of WWTP reservoirs which is the main weakness in internal factors. According to Prakoso *et al*. (2016), management of aquaculture waste that is not following Good Aquaculture Practices principles and the lack of green belts in the culture area will lead to the accumulation of organic matter in water quality. The lack of mangrove plants in the culture area and the lack of ponds that have WWTPs at the research sites indicate that the farmers have not yet fully implemented good fish farming practices.

External Factor Evaluation (EFE) Analysis

Based on the response of the respondents, the EFE assessment was conducted by multiplying the rates. The weight was calculated from 0.0 (not important) to 1.0 (very important). The total weight from opportunity and threat is 1.00. The following matrix analysis of EFE is presented in Table 3.

Table 3. Matrix Analysis of External Factor Evaluation (EFE).

External Factors	Weight	Rating	Score
Opportunities			
Big market share	0.090	3,237	**0,293**
Networking cooperation with other parties	0.088	3,132	0.274
Increased consumer reference p on fishpond products	0.085	3,053	0.260
Capital institution support	0.087	3.105	0.269
Great business prospect	0.088	3,132	0.274
Government Support	0.089	2,184	0.283
Sub-Total	**0.526**		**1,654**
Threats			
Natural disasters	0.079	2,842	0.226
Disease attack	0.081	2,895	**0.234**
Shrimp prices fluctuate	0.076	2.737	0.209
Enforcement of quality standardization of pond products	0.078	2,789	0.217
Product competition	0.079	2,816	0.222
There is environmental pollution	0.080	2,868	0.230
Sub-Total	**0.474**		**1.338**
Total	**1,000**		**2.992**

Based on the EFE analysis matrix in Table 3, the main opportunities that exist in culture activities of vannamei shrimp are a large market share with a score of 0.293 while the main threat is a disease with a score of 0.234. Results analysis to factor opportunity obtained score total score as big as 1,654 and the total score for the threat factor is 1,338. So, the total score of external factors (opportunities and threats) is 2,992. Key factors of strengths, weaknesses, opportunities and threats that exist in culture activities of vannamei shrimp in Tegal were then analyzed using the IE matrix to determine position effort on quadrant nine cells.

Based on the results of the calculation of the total weighted average IFE on the (x) axis and the total weighted average of EFE on the (y) axis, the total score for IFE is 2,658 and the total score for EFE is 2,992. So that the IE Matrix can be described based on its value, namely the (x) = 2.658 and (y) axis = 2.992 and the position of the relationship between internal factors and external factors occupies cell V as presented in Figure 2. Therefore, based on the results of the IE Matrix analysis on vannamei shrimp farming business in plastic ponds in Tegal Regency, then the position of cell V of the business is in the (Hold and Maintain) position. According to Rangkuti (2015), the implications of the strategy in cells III, V, and VII are (Hold and Maintain) with the general strategies used being market penetration, product development, and market development.

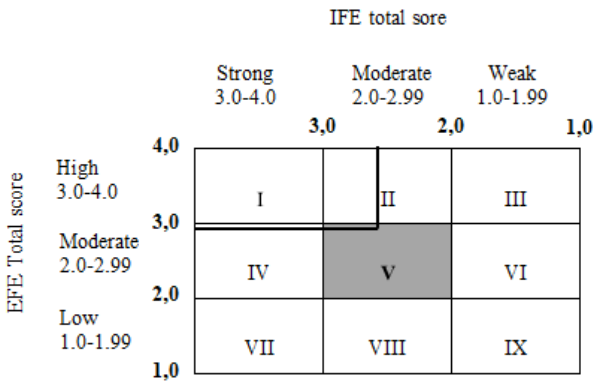

Figure 2. Internal - External Analysis Matrix of vannamei culture using plastic pond in Tegal Regency.

Even though in conditions of declining production and fluctuating shrimp prices, vannamei shrimp farmers in Tegal Regency are still optimistic to carry out aquaculture activities, with the hope that conditions can return to normal by using existing strengths, namely optimizing production through strengthening good and correct aquaculture SOPs and commitments. application and implementation of good aquaculture practices (CBIB). In addition, vannamei shrimp culture still obtains a profit margin compared to milkfish and tilapia farming.

SWOT Matrix

After all the data components used to create a SWOT matrix (identification of internal factors, identification of external factors, IFE matrix, EFE matrix) are collected, the next step is to create a SWOT matrix and determine alternative strategies. The SWOT matrix from the research results is presented in Table 4.

Table 4. SWOT Matrix of vannamei shrimp farming in Tegal.

	STRENGTHS	**WEAKNESS**
INTERNAL FACTOR / **EXTERNAL FACTOR**	1. Land potential (S1) 2. Availability Adequate seeds (S2) 3. Adequate number of workers (S3) 4. Production facilities and infrastructure available (S4) 5. Technological development (S5) 6. SOP for good and correct culture (S6)	1. Decreased pond production (W1) 2. Decreased water quality (W2) 3. Low HR quality (W3) 4. Lack of WWTP (W4) 5. Low understanding of sustainable shrimp farming (W5) 6. High production cost (W6)
OPPORTUNITY	**S – O**	**W - O**
1.Big market share (O1) 2.Networking cooperation with other parties (O2) 3.Increased consumer reference to fishpond products (O3) 4.Capital Institution Support (O4) 5.Great business prospect (O5) 6.Government Support (O6)	1. Optimizing product quality and quantity to meet demand (S2, S3, _S4, S5, S6 , O1 , O3 , O5)	2. Utilizing government support to improve human resources (W 3 , W5 , _ O2 , _ O 6) 3. Building a network of cooperation to support culture activities (W4 , W6, O1 , O2, O4, O5)
THREATS	**S – T**	**W- T**
1.Natural disasters (T1) 2.Disease attack (T2) 3.of shrimp fluctuates (T3) 4.Enforcement of quality standardization of pond products (T4) 5.Product competition (T5) 6.The presence of environmental pollution (T6)	1. Optimizing product quality to keep prices good (S2, S3 , _ S4, S5, S6 , T3) 2. Utilizing the potential of the land as well as means and infrastructure which there is for push competition product (S1, S4, T5)	1. Applying CBIB to use minimize appearance disease (W1, W2, T1, T2, T4 , T6)

Results analysis SWOT show that based on factors strategic in the form of strength, weakness, opportunity as well as threat obtained 6 (six) alternative strategy which could be applied to culture vannamei shrimp in plastic ponds in Tegal Regency.

O strategy was determined by optimizing product quality and quantity to meet demand. Products with good quality are produced from the correct culture method, to meet the high market demand, products with quantity and continuity are needed on an ongoing basis. The factor which influences the number of Requests is quality as well as the continued availability of the product by continuity to motivate cultivators to increase the quality of vannamei shrimp (Sa'adah and Milah, 2019). The application of good and correct SOPs for culture under CBIB is expected to produce quality products, by utilizing technology for vannamei shrimp culture activities, quantity and continuity of products will be available properly. Commitment to keep a quality product offered as well as capable Fulfill standard needs Request from market Becomes wrong on the strength of vannamei shrimp farmers in plastic ponds in Tegal Regency in optimize chance number request can be fulfilled.

WO strategies that might be implemented were utilizing government support to improve human resources and building a network of cooperation to support culture activities. Human resources (HR) is a valuable asset in an organization. In vannamei shrimp culture farming in Tegal, the quality of the human resource is a weakness, to increase technical knowledge about vannamei shrimp culture for farmers in Tegal, take advantage of opportunities from the government can support these activities. Government support in this case related to agencies such as the Department of Marine Affairs, Fisheries and Livestock (DKPP Kabupaten Tegal) and the Tegal Fisheries Training and Extension Center (BPPP) which provides technical training so that farmers are skilled and qualified in vannamei shrimp culture activities.

Technical training is given such as processing management water quality, feed management, shrimp health, and probiotics application. Increase soft skills again shooter suspected could push weaknesses in vannamei shrimp farming activity. Increased knowledge of the farmers affects the results production (Sitorus, 2017) and soft skills in the form of counseling, and training for cultivators are very effective in improving culture skills and technology vannamei shrimp (Mansyur and Rangka, 2008). So, the existence of addition knowledge for farmers from the soft skill training that is followed is expected to help change better shrimp farming system.

Taking advantage of opportunities to cover weaknesses in culture vannamei shrimp plastic ponds in Tegal Regency, can be done by expanding cooperation with other parties to support culture activities. Network development for the creation of cooperation between farmers and between farmers and capital institutions for the development and expansion of business networks. This collaboration between farmers is carried out through groups of fish farmers, the form of this collaboration is changing the management of the pond aquaculture business from a partial to a clustering pattern by applying area-based culture management.

Area-based aquaculture management is the management of shrimp farming in one area with technical and business management that is managed jointly to minimize failure and increase productivity while remaining friendly to the environment (KKP, 2018). Cooperation between farmers can be done by using WWTP together and planting mangroves as a green belt so that a weakness in culture can be overcome by optimizing cooperation between farmers.

In addition to cooperation with farmers, building cooperation with capital institutions is very necessary, this is because the vannamei shrimp culture in plastic ponds requires large capital, therefore cooperation between capital institutions and farmers is needed, by taking advantage of existing opportunities so that the business can develop. Socialization from capital institutions on procedures for obtaining capital has been carried out by Bank Indonesia and the

Financial Services Authority (OJK) at the Tegal branch office, but so far farmers have not borrowed from capital institutions, farmers prefer to borrow additional capital from shrimp baskets and feed agents.

ST strategies that might be implemented were optimizing product quality to maintain good prices and utilizing the potential of the land as well as the means and infrastructure which are there for pushing competition products. The price of shrimp is determined by the market, but by maintaining the quality of the product, farmers can offer it at a good price. Efforts made by vannamei shrimp farmers in plastic ponds in Tegal Regency in producing quality products to get good prices are by carrying out shrimp farming activities by good SOPs. According to Supono (2017), to get quality products in intensive system culture activities, attention must be paid to the application of good aquaculture practices (GAP) and the arrangement of standard operating procedures (SOPs) and biosecurity. Vannamei shrimp farmers in Tegal have the power to produce high quality products, to keep shrimp prices stable they can develop the market by selling directly to consumers.

ST strategy depends on strength of internal to face threats that are expected. With this strategy, the shooter can anticipate existing conditions with the strengths they have and improve shrimp management. Utilizing the potential of the land as well as existing facilities and infrastructure to suppress product competition. Land use too must notice carrying capacity so as minimize the possibility of pollution environment and its impacts such as shrimp disease, and cultivar competition, and also for the efficiency of the funds spent. Vannamei shrimp culture activities in Tegal use intensive to super intensive technology, this is to stimulate the production of shrimp through stocking fry with density tall and quantity good feeding large so that it produces a large amount of waste, but if the management of aquaculture waste is not following Good Aquaculture Practices and the lack of a green belt in the culture area will cause an accumulation of organic matter in water quality (Prakoso et al., 2016). So, in utilizing the land as well as existing facilities and infrastructure to suppress product competition must still pay attention to the carrying capacity of land and the environment.

Implementing Good Fish Culture Methods is part of WT's strategy. To prevent disease outbreaks, farmers had to implement Good Fish Culture Methods. Commitment to implementing CBIB is the key to success in vannamei shrimp culture activities, these activities start from selecting aquaculture locations, preparation of culture, land processing, and management maintenance until after harvest (Kurniawan, 2021).

The goal of CBIB for cultivators is to produce guaranteed safe fishery products food free from appearance pollution or disease that has an impact on the quality/quality of the product fisheries (Kusyairi *et al*., 2019). Vannamei shrimp farming activities in Tegal have not fully implemented CBIB and this can be seen from several existing parameters, such as the lack of WWTP, the location of culture being close to the industry and there is no isolation of diseased shrimp.

Socialization of the implementation of CBIB on vannamei shrimp culture activities in Tegal, BBPBAP Jepara and the Department of Marine Affairs, Fisheries and Livestock of Tegal Regency has not received the information, besides that there has been no follow-up from farmers and related agencies to implement the implementation of CBIB.

Priority Strategy Determination

Priority alternative strategy in research feasibility analysis and development strategy of shrimp farming sustainable vannamei in plastic ponds in Tegal Regency can be seen by adding up the scores from SO, ST, WO, and WT. Based on the weighting carried out, it can be seen the strategic priorities are based

on rank SWOT. Rank alternative shrimp farming development strategy sustainable vannamei in plastic ponds in Tegal Regency can be seen in Table 5.

Table 5. Ranking of alternative strategies for developing sustainable plastic ponds vannamei shrimp farming in Tegal Regency.

Alternative Strategy	Score	Total Score	Rank
Strength - Opportunities (SO)	1,948 + 1,654	3,602	1
Strength - Threats (ST)	1,948 + 1.338	3,286	2
Weakness - Opportunities (WO)	0.710 + 1.654	2,364	3
Weakness - Threats (WT)	0.710 + 1.338	2.048	4

Based on the order of alternative SWOT strategies in **Error! Reference source not found.**, the alternative strategy that becomes the priority with the highest value weight is the strength of opportunities. This can be translated as a strategy of using strengths to take advantage of existing opportunities (Rangkuti, 2015). The strategy for developing vannamei shrimp farming in Tegal can be divided into SO, WO, ST, and WT strategies. Each strategy has different advantages and priorities. An alternative to the strength-opportunities (SO) strategy is optimizing the quality and quantity of products to meet the number of requests. Optimizing product quality and quantity, namely by using good and correct SOPs by using technology, available infrastructure and availability of adequate seeds to produce product quality and quantity so that continuity is maintained, to meet high market and consumer demand.

CONCLUSION

Based on the calculation of the internal factor evaluation (IFE) matrix, the biggest strength (S) is the SOP for good and correct cultivation (0.349) and the biggest weakness (W) is the lack of WWTP (0.123). Based on the calculation of the external factor evaluation (EFE) matrix, the biggest opportunity (O) is a large market share (0.293) and the biggest threat (T) is a disease attack (0.234). Based on the Internal External Matrix the business is in a position (Hold and Maintain) to maintain and maintain with the general strategies used are market penetration, product development and market development. There are six alternative strategies for developing vannamei shrimp culture in plastic ponds in Tegal Regency, the main strategy is the SO (strength – opportunities) strategy, namely optimizing the quality and quantity of products to meet the number of requests.

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