

Article

Developing a Blue Economy in Depok West Java, Indonesia: Opportunities and Challenges of Neon Tetra Fish Cultivation

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Abstract: Due to the prospective local and international markets, the neon tetra fish breeding industry has its own allure for fish lovers and as a side business. The goal of the study was to analyze the opportunities and difficulties associated with neon tetra fish farming in order to build a "Blue Economy" policy. "Dinas Ketahanan Pangan, Pertanian dan Perikanan" (DKP3) program was implemented with the help of key informants who were chosen based on the following criteria: 1) DKP3 as the Board of Trustees of the Fish Farming Group (POKDAKAN), 2) Researchers from the BRIN (Badan Riset dan Inovasi Nasional), 3) Practitioners/Extension Workers, and 4) POKDAKAN. The SWOT analysis's findings, which are in quadrant 1, show that the firm is in a position for rather aggressive expansion. The study's conclusions state that the relevant DKP3 must support local policies based on natural identification that are strengthened at the national level, that routine human resource training needs to be improved, that technology needs to be taken into account in collaboration with the private sector.

Keywords: Blue Economy; Neon Tetra; SWOT

1. Introduction

Currently, the utilization of fish resources in Indonesia has led to control efforts and tends to the over-fishing stage. If this condition continues in the long term, it is feared that there will be a decrease in the stock of fish resources, which in turn will threaten the sustainability of these resources and make fishermen more impoverished. (Prof. Dr. Ali Suman, 2014).

The term *Blue Economy* is a thought or paradigm that gives birth to a new concept with the aim of generating a stream of economic growth while ensuring the preservation of resources and protecting the environment in the marine and fisheries sector. (Minister of Marine Affairs and Fisheries Syarif C. Sutardjo, 2012). An economic approach model produced by the *blue economy* no longer relies on development that is destructive or overexploiting of resources. This means that the *blue economy* is a new understanding that encourages changes in the pattern and structure of development through the use of the environment so that this is a steep step for development and a new leap to improve the economic conditions of the community. Through the plan to abandon economic practices with short-term benefits and use a *low carbon economy* or a low-carbon economy so that the model and concept of the *blue economy* is later expected to be able to minimize the interdependence between ecosystems and the economy and overcome negative impacts such as climate change and global warming which are the result of economic activity. As a new concept in marine and fisheries development, the *blue economy* utilization of marine resources *optimal*.

In principle, the application of the *blue economy* in coastal areas will provide more points and influence national development, besides that the development of self-reliance and national food security is the main basis that is expected to be realized. *The Blue Economy* is believed to be able to encourage economic growth and provide a large portion for the community if the government is able to provide empowerment for people who live and live in the coast by enjoying natural resources without destroying the existing ecosystem values. In other words, the *Blue Economy* is not only *environmental friendly*, but also *multiple cash flow*, which means there are multiple economic benefits because through this concept, waste can be used as an economic value to produce other products. From the related explanation, Indonesia can pay attention to the problems and opportunities that exist in the field of community empowerment.

According to researcher Abd. Asis (2021), preventive measures can be implemented through various community socializations, enhancing community engagement to reduce destructive fishing operations. According to study author Godfrey (2016), the 2012 United Nations Conference on Sustainable Development held in Rio de Janeiro gave rise to the idea of the "blue economy." Given that 60% of Indonesians are employed as fisherman in the fishing industry, this program is thought to have the potential to enhance Indonesia's income.

The blue economy is a paradigm promoted by the Asia-Pacific Economic Cooperation (APEC), which also promotes the development of Indonesia's marine and fisheries industry (Rani and Cahyasari, 2015). The understanding that cooperation on a scale never before accomplished between nation-states, the public and commercial sectors, is necessary for the sustainable management of maritime resources. This insight highlights the difficulties faced by Small Island Developing Countries (SIDS) and Least Developed Countries (LDCs) as they attempt to manage their blue economies more effectively. (The Development, 2017). The collaboration between the Ministry of Marine Affairs and Fisheries of the Republic of Indonesia (KKP-RI) and the Food and Agriculture Organizations of the United Nations (FAO) working on the "Effective and Inclusive Food Value Chain Development Project Program in ASEAN Member States" that was held during 2018-2019 in North Lombok Regency is the outcome of his research, according to Chandra, Rustam, and Safitri (2021).

Acorn CCS is a carbon capture and storage (CCS) project that aims to overcome the high capital costs of CCS deployment. According to researcher Karen Turner et al. (2021), the project's goal is to put up an Acorn Hydrogen plant by 2025 and catalyze net growth in the area more generally. According to Chen & Bruyne's research, local blue economy initiatives in coastal communities effectively address the link between poverty and the environment. In the meantime, scientific exploration was conducted between 2012 and 2018 as part of the Kimberley Marine Research Program, according to PuttenbS.FieldfT. et al. (2021), and the findings of his research indicate that sufficient basic information is available to understand, monitor, and manage this remote and relatively understudied area (KMRP).

A phase in establishing and developing runoff collection systems in each catchment area system is the identification of suitable sites for collecting runoff, according to the study by Hamidy, Alipur, Nasab, Yazdani, and Shojaei (2016). According to the researcher LópezGómezb (2021), disputes and requests are settled in court, opening up a crucial new area for social science research on maritime policy. According to researcher Schutter (2020), interactions between many societal aspects can balance the demands and stresses placed on marine ecosystems. Comparing how people feel about the fundamental elements of governance sheds light on the way power is exercised, reveals the values that are taken into consideration, and reveals which picture dominates peoples' perceptions of governance.

Additionally, according to researcher Smith-Godfrey (2021), a review of marine spatial planning is being done in order to allocate Blue Economy resources as part of institutionalism and to generate revenue for national states. Potential implications of insufficient action, which will not resolve the persisting socio-ecological issues associated to aquaculture in Canada and worldwide, are the findings of his research, according to LopezGómezb, Melanie G. et al. (2021). The most likely conclusion of these disputes and demands is that they will be settled in court, opening up a

crucial new arena for social science study on maritime policy.

Digital technologies that have an impact on aquaculture include 3D printing, robotics, drones, sensors, artificial intelligence, augmented reality (AR), virtual reality (VR), and blockchain, according to the literature. Numerous industries modify and employ it. (Setiyowati, H., et.al., 2022).

The government uses it to not only focus on being environmentally friendly but also to become a multiple cash flow, which indicates that there are economic benefits multiplied by turning garbage into products with added value. However, while having a strong reliance on coastal resources, coastal communities in real life still do not enjoy prosperity. This is evident in the low education level of the population as well as the still-ugly residential area. In order to implement this strategy, the government, stakeholders, and coastal communities must work together (Prayuda and Sary, 2019).

A component of the blue economy, according to Sitorus (2018), is to enhance the institutional and legal components of marine oversight in Indonesia. Additionally, it is to enhance the welfare of fish growers and fishermen. Building renewable energy power plants in collaboration with one another, converting to electric vehicles and engines, and, of course, working together to reduce energy use. Otherwise, Indonesia would experience a serious energy problem in 2050.

2. Materials and Methods

The aims of the paper for Neon Tetra Aquaculture in Depok, West Java are 1) Analyzing ways to develop a Blue Economy 2) Identifying opportunities 3) Analyzing challenges. The research techniques that served as the foundation for the creation of this work were normative or qualitative descriptive legal research techniques that placed an emphasis on the evaluation of literature reviews and data gathering techniques derived from descriptive materials. Sources of data in this study are informants, 1) DKP3 Officials, such as the Board of Trustees of the Fish Farming Group (POKDAKAN), 2) Researchers from the BRIN (Badan Riset dan Inovasi Nasional), 3) Practitioners/Extension Workers, and 4) POKDAKAN, who are directly involved in day-to-day operations.

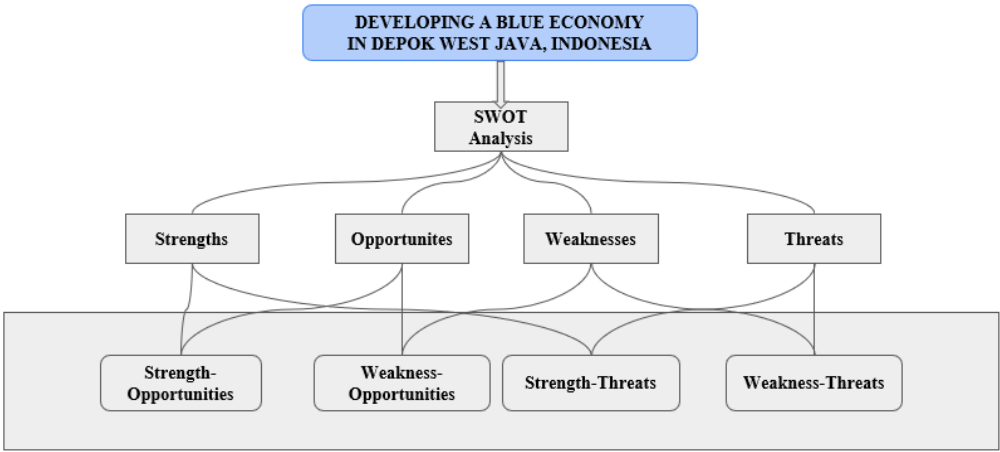


Figure 1 : Developing a Blue Economy in Depok West Java, Indonesia

3. Results

The "Fish Farming Group" abbreviated as POKDAKAN consists of 10-15 people, there are the roles of chairman, secretary, treasurer, and marketing. The establishment of POKDAKAN with the issuance of decrees by the local "Kelurahan" office and "sub-district" offices. "Dinas Ketahanan Pangan, Pertanian dan Perikanan" (DKP3) as the Board of Trustees will provide education through training and counseling on fish and assistance such as aquariums and fish food throughout POKDAKAN. Also a special water filter (Aerator Recirculation System) for POKDAKAN was selected

as a pilot.

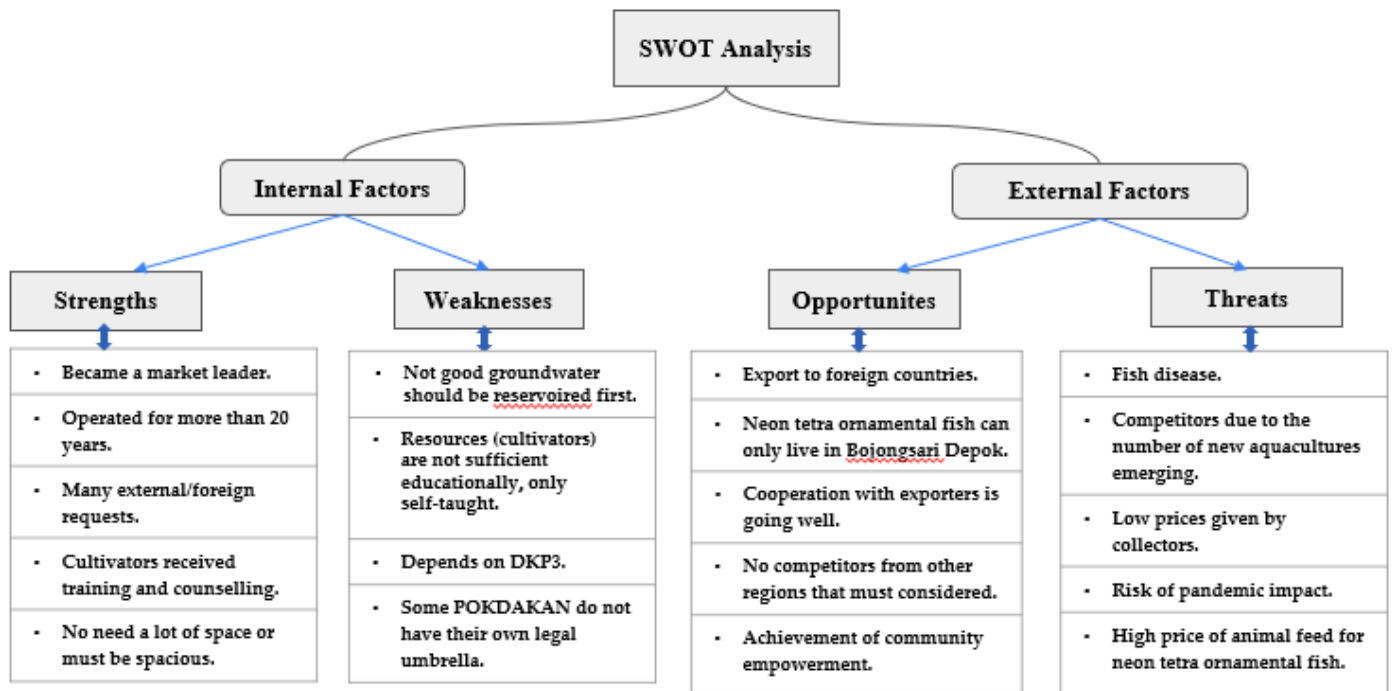


Figure 2 : Results of interview data

The second stage after doing data reduction is coding. Researchers coded by giving symbols to statements such as the table below.

Table 1. Coding with rating values

Rating	1	2	3	4	5
Description	Strongly disagree	Disagree	Neutral	Agree	Strongly agree

In addition to providing a rating assessment which will later be included in the IFAS and EFAS tables, data coding can also be performed on assigning a weight value with a scale of 0 – 1 based on internal and external strategic factors that have the most influence on the company. The weight calculation according to Rangkuti (2008:24) can be formulated as follows:

$$\text{Weight} = \frac{\text{assessment}}{\text{total assessment}} \times 1$$

Table 2. Calculation of the Weight of Internal Factors

No.	Internal Variables	5	4	3	2	1	Assessment	Weight
Strength (S)								
1.	Became a market leader.	x					5	0,12

2.	Operated for more than 20 years.		x				4	0,09
3.	Many external/foreign requests.	x					5	0,13
4.	Cultivators received training and counselling.		x				4	0,11
5.	No need a lot of space or must be spacious.		x				4	0,10
Weakness (W)								
1.	Not good groundwater should be reservoir first.			x			3	0,12
2.	Resources (cultivators) are not sufficient educationally, only self-taught.		x				4	0,13
3.	Depends on DKP3.		x				4	0,09
4.	Some POKDAKAN do not have their own legal umbrella.				x		2	0,11
Total							35.00	1.00

Table 3. Calculation of the weight of external factors

No.	Internal Variables	5	4	3	2	1	Assessment	Weight
Opportunity (O)								
1.	Export to foreign countries.	x					5	0,12
2.	Neon tetra ornamental fish can only live in Bojongsari Depok.		x				4	0,11
3.	Cooperation with exporters is going well.			x			3	0,09
4.	No competitors from other regions that must be considered.	x					5	0,08
5.	Achievement of community empowerment.	x					5	0,17
Threats (T)								
1.	Fish disease.				x		2	0,13

2.	Competitors due to the number of new aquacultures emerging.			x			3	0,09
3.	Low prices given by collectors.		x				4	0,07
4.	Risk of pandemic impact.					x	1	0,04
5.	High price of animal feed for neon tetra ornamental fish.			x			3	0,08
Total							37,00	1,00

IFAS and EFAS calculations in SWOT analysis can be seen in the table below.

Table 4. IFAS (Internal Strategic Analysis Summary)

No.	Internal Variable	Rating	Weight	Weight x Rating
Strength (S)				
1.	Becoming a market leader.	5	0,12	0,6
2.	Operating for more than 20 years.	4	0,09	0,36
3.	Number of external/foreign requests.	5	0,13	0,65
4.	Cultivators receive training and counseling	4	0,11	0,44
5.	No need a lot of space or must be spacious	4	0,1	0,4
Weaknesses (W)				
1.	Not good groundwater should be reservoir first.	3	0,12	0,36
2.	Resources (cultivators) are not sufficient educationally, only self-taught.	4	0,13	0,52
3.	Depends on DKP3.	4	0,09	0,36
4.	Not have its own legal umbrella.	2	0,11	0,22
Total		35	1	3,91

Table 5. EFAS (External Strategic Analysis Summary)

No.	Internal Variable	Rating	Weight	Weight x Rating
Opportunity (O)				

1.	Export to foreign countries.	5	0,12	0,6
2.	Neon tetra ornamental fish can only live in Bojongsari Depok.	4	0,11	0,44
3.	Cooperation with exporters is going well.	5	0,09	0,45
4.	No competitors from other regions that must considered.	5	0,08	0,4
5.	Achievement of community empowerment.	5	0,17	0,85
Threats (T)				
1.	Fish disease.	2	0,13	0,26
2.	Competitors due to the number of new aquacultures emerging.	3	0,09	0,27
3.	Low prices given by collectors.	4	0,07	0,28
4.	Risk of pandemic impact.	1	0,04	0,04
5.	High price of animal feed for neon tetra ornamental fish.	3	0,08	0,24
Total		37	1	3.83

The IFAS and EFAS tables above are calculated by multiplying the rating column by the weight. The results obtained are that the IFAS table scores 3.91 while the EFAS table scores 3.83.

After knowing the value of the X rating weight, the next step is to calculate the difference between internal factors (strengths - weaknesses) and differences in external factors (opportunities - threats).

Calculations in detail can be seen in the table below.

Table 6. Internal Strategic

No	Strategy factors	Weight X Rating
Strength Rating (S)		

1.	Became a market leader.	0,6
2.	Operated for more than 20 years.	0,36
3.	Many external/foreign requests.	0,65
4.	Cultivators received training and counselling.	0,44
5.	No need a lot of space or must be spacious.	0,4
Weaknesses (W)		
1.	Not good groundwater should be reservoir first.	0,36
2.	Resources (cultivators) are not sufficient educationally, only self-taught.	0,52
3.	Depends on DKP3.	0,36
4.	Some POKDAKAN do not have their own legal umbrella.	0,22
Description: Strength = (+) 2,45 Weakness = (-) 1,46		

The calculation results of table above can be seen that internal strategic factors company is
 $2.45 - 1.46 = (+) 0,99$

Table 7. External Strategic Factors

No	Variables	Weight X Rating
Opportunity (O)		
1.	Export to foreign countries.	0,6
2.	Neon tetra ornamental fish can only live in Bojongsari Depok.	0,44
3.	Cooperation with exporters is going well.	0,45
4.	No competitors from other regions that must considered.	0,4
5.	Achievement of community empowerment.	0,85

No	External Variables	Weight X Rating
Threat Rating (T)		

1.	Fish disease.	0,26
2.	Competitors due to the number of new aquacultures emerging.	0,27
3.	Low prices given by collectors.	0,28
4.	Risk of pandemic impact.	0,04
5.	High price of animal feed for neon tetra ornamental fish.	0,24
Description: Opportunity = (+) 2,74, Threat = (-) 1,09		

The results of the calculation of table 8 above can be seen that the company's internal strategic factors are the results of calculations $2,74 - 1,09 = (+) 1,65$.

Based on the calculation results of the two data processing above, it can be seen that external strategic factors, internal and external strategic factors, are known to be strengths and weaknesses on the (X) axis with a value of (+) 0,99 while opportunities and threats are on the (Y) axis with a value of (+) 1,65.

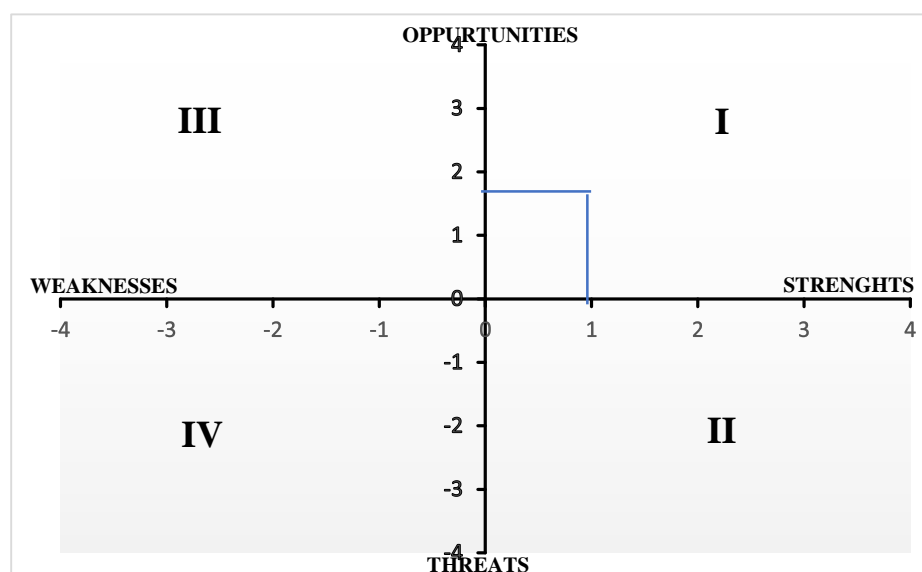


Figure 3. SWOT Quadrant

The figure above is based on the results of SWOT analysis data processing, it can be seen that the strengths and weaknesses on the (X) axis with a value of (+) 0,99 while opportunities and threats are on the axis (Y) with a value of (+) 1,65. So it can be concluded that, according to the SWOT analysis of *POKDAKAN* is in quadrant 1 position, namely the quadrant that supports aggressive growth policies, meaning that companies must be more active in determining sustainable competitive strategies. *POKDAKAN* as seen from the SWOT diagram above, has opportunities and strengths so that it can take advantage of existing opportunities. To determine alternative strategies for implementing the blue economy concept by creating a matrix that clearly describes how the opportunities and threats faced by *POKDAKAN* are combined with the company's strengths and weaknesses to produce an alternative strategy for implementing the blue economy concept.

4. Discussion

The Amazon River in Latin America is the source of the neon tetra fish, *Paracheirodon innesi*. The neon tetra fish farming industry has great potential and is increasingly in demand from prospective individuals for the domestic and international markets. This fish's unique scales are what make it remarkable. The scales of each of these fish create flashes of blue-red neon color that run from the middle of the body to the base of the tail as they travel in flocks. The consequence is that the fish appear spectacular and vivid even in low-light conditions. In order to coexist in an aquarium with other fish species, neon tetra fish also possess redeeming features.

The company's strategic factors that have been identified are arranged in a SWOT matrix to determine the company's alternative sustainable competitive strategy. The SWOT matrix is presented in the following table:

Table 8. SWOT MATRIC

Opportunity a. Export to foreign countries. b. Neon tetra ornamental fish can only live in Bojongsari Depok. c. Good cooperation with exporters. d. The number of requests. e. Creation of empowerment/jobs.	Strategy S – O a. Ornamental Fish Cultivation Group (POKDAKAN) maintains the quality of neon tetra fish. b. Pay attention to good business management c. Although many POKDAKAN competitors play a role in creating jobs.	W-O Strategy a. Carry out business while paying attention to the surrounding environment. b. Improve human resource skills well through training activities. c. Implement knowledge sharing with the surrounding community.
Threat a. Fish disease. b. Competitors are intense, many new cultivations are popping up. c. Low prices given by collectors. d. The risk of the impact of the pandemic. e. The high price of neon tetra ornamental fish feed.	Strategy S – T a. Improve services to consumers, such as fish quality is maintained. b. Using promotional media that does not require high costs, through social media, as an alternative to sales.	Strategy W – T a. Involve all members to participate in training. b. With the occurrence of the POKDAKAN pandemic, it is mandatory to carry out health protocols to the maximum. c. Alternative animal feed is being considered.

Based on the SWOT analysis, the blue economy concept strategy was obtained through interviews with several informants, as follows:

1. By doing several things related to short-term and long-term plans for business continuity, including utilizing new technology, always maintaining the quality of fish in providing services to consumers. .
2. To be able to remain competitive with competitors, it is necessary to increase the skills possessed, especially Human Resources in this case are cultivators who are always directly related to the results of their fish.
3. This is what POKDAKAN does with long-term efforts such as continuing to create jobs for the surrounding

community.

4. Strong motivation is needed from POKDAKAN by participating in continuous training.
5. Good HR management will be very beneficial for POKDAKAN, because it will save costs, improve performance, accelerate the achievement of goals, and at the same time will create a good relationship between Members and the Chairperson of POKDAKAN.

5. Conclusions

The results of the SWOT analysis, which are located in quadrant 1, demonstrate that the company is in a position for rather aggressive expansion. The relevant DKP3 must endorse local policies based on natural identification that are strengthened at the national level.

Researchers' suggestions for the development of the blue economy in Depok, West Java, are : 1) Pokdakan is a home-based business that falls under MSMEs. In order to support, particularly in terms of finance and distribution of neon tetra fish breeding results, the Office of Cooperatives and MSMEs participates. 2) Technology must be taken into account in working with private parties, such as when buying water filters to increase fish productivity. 3) Reduce disappointments such as fish ready for sale suddenly die from illness. There should be an increase in knowledge of how to treat fish that are sick and can recover.

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