

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 charm for fish lovers and as a side business. The purpose of this study is to analyze the opportunities and difficulties associated with the cultivation of neon tetra fish in order to build a policy of “Blue Economy”. The research method uses qualitative techniques, focusing on an evaluation of literature reviews and data collection techniques sourced from descriptive materials. The key elements selected were: (1) the Department of Food and Fisheries Security (DKP3), as the Board of Trustees (2) Researchers from BRIN (National Innovation Research Agency), (3) Government (Sub-districts and Kelurahan), (4) POKDAKAN (Fish Cultivation Group) and (5) LPM (Community Empowerment Institution) and Chairman of RW/RT. The conclusion of the study states that the relevant Dinas should support local policies based on nature identification that are strengthened at the national level, namely that routine human resource training needs to be improved, technology needs to be taken into account in collaboration with the private sector, and that post-harvest and market access are very important for POKDAKAN. The findings of the SWOT analysis, which is in quadrant 1, indicate that POKDAKAN is in a position for a somewhat aggressive expansion.



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1. Introduction

With a manageable sea area of 5.8 million km², Indonesia as the largest archipelagic country in the world has enormous potential for various marine and fishery resources. According to data from the Food and Agriculture Organization of the United Nations, Indonesia produced the second most seaweed, the fourth most aquaculture, and the second largest marine capture fishery in the world in 2012 (FAO). Output growth in capture fisheries has slowed recently, and is likely to have hit a plateau. This is because the maximum sustainable yield (MSY) output has been achieved, which is represented by a total Authorized Catch (TAC) of 6.5 million tons per year [1].

About 80% of global trade is carried out by water; ports and international shipping are critical to the ability of all countries to access global markets. The blue economy is a new concept that emerged from the green economy. This concept seeks to ensure the sustainability of coastal and marine resources and environments as well as to encourage economic growth in the marine and fisheries industry, considering that Indonesia is a maritime country [2].

It is important to protect marine ecology so that the nation's future generations can benefit, and to ensure the social and economic welfare of present and future generations while restoring and maintaining diversity, productivity, resilience, basic functions, and values inherent in marine ecosystems. This should be based on eco-friendly technology, clean energy sources, and circular material flow, all of which will help reduce waste and encourage recycling. The business sector is required for effective management of maritime resources. This insight highlights the difficulties Small Island Developing Countries (SIDS) and Least Developed Countries (LDCs) face when trying to manage their blue economies more effectively [3].

An example of cooperation is the Ministry of Maritime Affairs and Fisheries of the Republic of Indonesia (KKP-RI) and the Food and Agriculture Organizations of the United Nations (FAO) in “Developing an Effective and Inclusive Food Value Chain. Project Program in ASEAN Member States,” which was held in North Lombok Regency during 2018–2019 [4]. Another is the Asia-Pacific Economic Cooperation (APEC), which also supports the industrialization of Indonesia’s marine and fishery industry. “Blue economy” is the paradigm used by the Asia-Pacific Economic Cooperation (APEC) that supports industrial expansion concerning Indonesia’s maritime affairs and fisheries [5].

The thriving aquaculture sector in this area uses an off-base approach to growing seaweed. The growth of the seaweed cultivation industry in the Nusa Penida area has increased the economy of coastal communities [6]. The step in establishing and developing a runoff collection system in each catchment system is the identification of suitable locations to collect runoff, according to a study by [7].

Digital technologies impacting aquaculture include 3D printing, robotics, drones, sensors, artificial intelligence, augmented reality (AR), virtual reality (VR), and blockchain, according to the literature. Many industries modify and use these technologies [8].

2. Materials and Methods

Excellent prospects exist for neon tetra fish, which are increasingly popular due to their appeal to collectors of ornamental fish. It can be run as a side business, and it also has a promising domestic and international market. An ornamental fish species with significant commercial potential, the neon tetra *Paracheirodon innesi* (Family Characidae) has experienced a relatively rapid increase in export value in recent years.

The following problems arise: (1) How to develop a blue economy? How to determine strategy through SWOT analysis? The purpose of writing the paper is: (1) To analyze how to develop a blue economy. (2) To identify problems and solutions using SWOT analysis.

The research method uses qualitative techniques, focusing on an evaluation of literature reviews and data collection techniques sourced from descriptive materials. The informants of this research as data sources are: (1) the Department of Food and Fisheries Security (DKP3), as the Board of Trustees (2) Researchers from BRIN (National Innovation Research Agency), (3) Government (Sub-districts and Kelurahan), (4) POKDAKAN (Fish Cultivation Group) and (5) LPM (Community Empowerment Institution) and Chairman of RW/RT.

Figure 1 shows a map of the city of Depok in the West Java Province. It has a total size of 200.29 km² and is divided into “11 sub-districts,” including Sawangan, Bojongsari, Cipayung, Sukmajaya, Cilodong, Cimanggis, Tapos, Beji, Limo, and Cinere. With an area of 33.26 km², Tapos is the largest district, and Cinere is the smallest with an area of 10.55 km². Depok City is surrounded by the following geopolitical lines: DKI Jakarta Province is located to the north. Tangerang City, southwest of South Bogor Regency. The East Bogor Regency is to the east.

The Bojongsari District is shown on the map in Figure 2, and this is where the study is being conducted. With a total area of 19.30 km², Kecamatan Bojongsari ranks after Tapos District as the largest subdistrict in Depok City. Bojongsari Subdistrict is divided into seven “Kelurahan,” or areas, namely Bojongsari Lama, Bojongsari Baru, Serua, Pondok Lightning, Curug, Duren Mekar, and Duren Seribu.

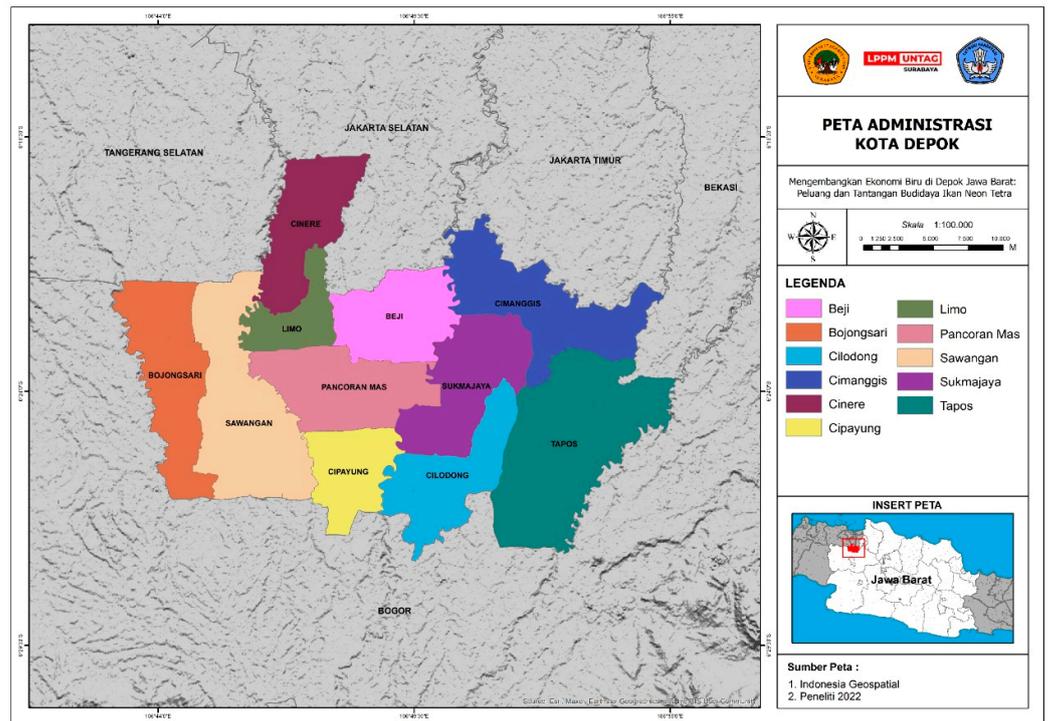


Figure 1. Location map for Depok in West Java, Indonesia.

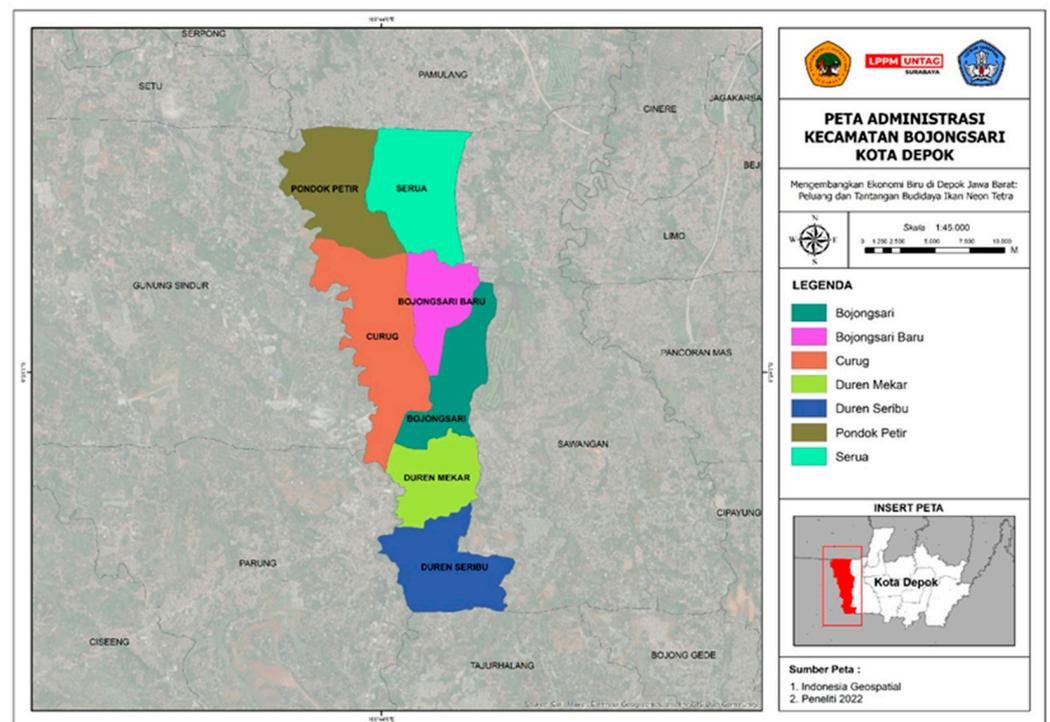


Figure 2. A map of the research location is Bojongsari Depok in West Java, Indonesia.

According to the spatial structure plan, the Bojongsari Subdistrict is a City Service Center (PPK) that serves as a Tourism and Recreation Center. The core center is situated in the Bojongsari interchange junction area and its surroundings, and the main activities there include trade, services provided on a regional level, and tourism. Parties involved in POKDAKAN Bojongsari Depok’s blue economy implementation are what provided information for the study. The following is a diagram of the study’s respondents:

According to Figure 3, all of the cultivators are men, and there are no female cultivators. Figure 4 shows the percentage of informants by profession out of a total of 14 (fourteen) informants, with the contributions from LPM contributing 29%, DKP-3 contributing 7%, POKDAKAN contributing 43%, the government contributing 14%, and BRIN contributing 7%.

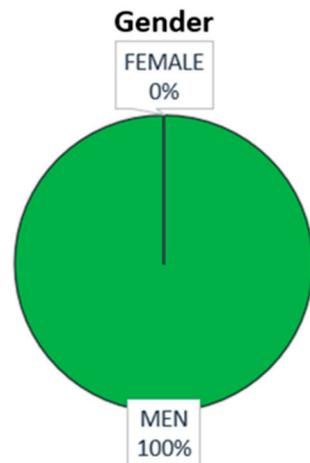


Figure 3. Gender Chart.

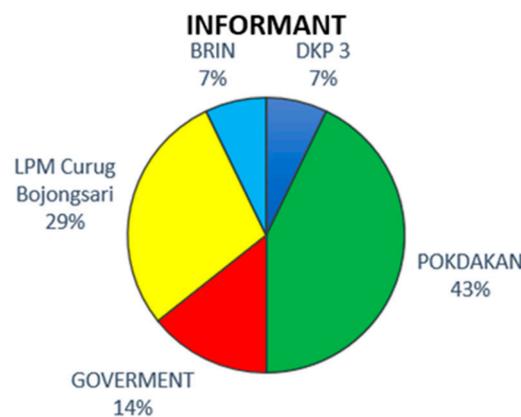


Figure 4. Informants' Chart.

3. Research Results

3.1. How to Develop a Blue Economy

In accordance with the policy framework for the utilization of fish resources in Indonesia as stated in the Decree of the Minister of Maritime Affairs and Fisheries, the potential and level of utilization of fish resources are utilized to identify opportunities [9]. Depok, West Java, has local fishermen in the Republic of Indonesia Marine Fisheries Management Area (WPP RI) 712-Java.

According to empirical data, neon tetra *Paracheirodon innesi* (family Characidae) is an ornamental fish species that has considerable economic potential and recently has undergone a fairly rapid increase in export value (since 2007). Neon tetra fish is one of the freshwater ornamental fish with a fairly large market [10]. This fish is quite tough because it needs to maintain its pH and temperature. However, these fish can be very difficult to spawn if environmental conditions are not ideal. Neon tetra ornamental fish were successfully produced by one of the POKDAKAN (Fish Cultivation Group) in Curug Jaya, Kec. Bojong Sari, Depok City. The main export from Indonesia today is ornamental fish commonly known as neon tetra fish. This fish comes from the Amazon River and Peru. The neon tetra's body is a striking blue color that shines from the tip of the mouth to the

base of the tail. In Indonesia, especially in the Sawangan area, Depok-West Java, tetra fish are widely cultivated [11].

There are differences between small-scale and industrial-scale fisheries, especially the socioeconomic elements that would make small-scale fisheries more suitable for achieving some of the stated blue economy goals [12]. The blue economy in a broad sense is still a work in progress, but should be guided by clear governance objectives that support small-scale fishers [13].

The blue economy is very important and its implementation in the near future would be useful; it needs to be reviewed and improved regularly so that in the long term it will have a positive impact on expanding the proportion of the fishing industry [14].

3.2. SWOT Analysis Techniques (Strengths, Weaknesses, Opportunities, Threats)

The Figure 5, above, is based on the results of SWOT analysis data processing; strengths and weaknesses are shown on the X axis with a value of (+) 1.74, while opportunities and threats are on the axis Y with a value of (+) 2.20. So it can be concluded that, according to the SWOT analysis, POKDAKAN is in the quadrant 1 position, which is 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.

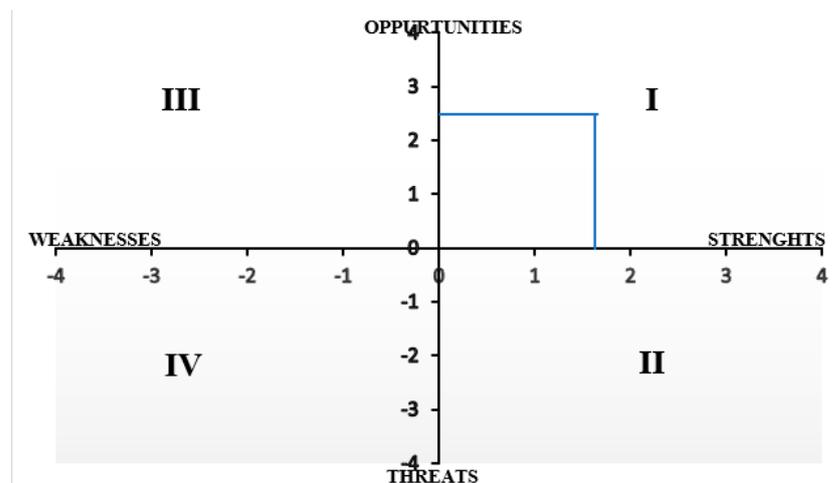


Figure 5. SWOT Diagram.

It is important to determine a diagram that explains how POKDAKAN’s possibilities, dangers, and strengths and weaknesses are combined to develop alternate solutions for implementing the idea of a blue economy.

The SWOT matrix is presented in the following Tables 1 and 2:

Table 1. SWOT Matric (1).

Opportunity	Strategy S–O	Strategy W–O
a. Export to foreign countries. b. Neon tetra ornamental fish can only live in Depok. c. Good cooperation with exporters. d. The number of requests. e. Creation of empowerment/jobs.	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.	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.

Table 2. SWOT Matric (2).

Threat	Strategy S–T	Strategy W–T
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.	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.	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.

4. Discussion

The concept of a “blue economy” was coined at the 2012 United Nations Conference on Sustainable Development, according to study author [15]. Potentially boosting the Indonesian economy, by limiting dangerous fishing activities, preventive measures can be taken through various community outreach programs, said researcher [16]. Similar to green bonds, blue bonds are issued to raise funds and investment for ongoing initiatives and new projects with environmental benefits. Preventive actions can be taken to reduce destructive fishing activities through a number of community outreach activities that increase community involvement. In coastal areas, local blue economy initiatives efficiently address the link between poverty and the environment, according to research by [17]. Between 2012 and 2018, scientific research was conducted as part of the Kimberley Marine Research Program by [18]. The results show that there is basic knowledge that is sufficiently accessible to understand, monitor, and manage remote and relatively educated areas (KMRP). The interaction between various social factors, according to the researcher [19], can balance the demands and pressures placed on marine ecosystems, which power is exercised, the values that are taken into account, and the image of which government dominates in the minds of all of the people.

One of the components of the blue economy, according to [20], is to increase the institutional and legal components of maritime surveillance in Indonesia. In addition, another component is to improve the welfare of fish cultivators and fishermen. Other components are building renewable energy power plants that cooperate with each other, converting to electric vehicles and machines, and, of course, working together to reduce energy use. Otherwise, Indonesia will experience serious energy problems by 2050.

The aim of the study of marine spatial planning, according to the researcher Smith [21] is the allocation of blue economy resources as a component of institutionalism and income generation for national countries. According to [22] it has the potential consequences of inadequate action, which will not ameliorate the ongoing socio-ecological challenges associated with aquaculture in Canada and around the world.

The case study of the Shandong Peninsula Blue Economic Zone (SPBEZ), exemplifies two main factors that influence the growth of China’s blue economy. First, government policies are the basis for the creation and growth of SPBEZ. For the development of the blue economy, the PRC government has provided guidance and support through policies. Central and municipal governments have sponsored the SPBEZ program and provided substantial financial and technological support. Blue finance has developed with government assistance as a result of public partnerships in the blue economy. Second, SP has a focus on creating industrial clusters and plans to do so. The government owns a BEZ that takes full advantage of the industrial advantages of the Shandong Peninsula to distribute and restructure local industries to support the growth of the blue economy in the SPBEZ. The “blue economy”, also known as scientific and technological research and development, has helped SPBEZ establish industrial clusters. In addition to integrating different sectors, these industrial clusters assist the integration of local regional economies in the Shandong Peninsula [23].

4.1. An Alternative Approach to Implementing the Blue Economy Concept Is the SO (Strength Opportunity) Strategy. POKDAKAN Is in Charge of Maintaining the Quality Standards of Neon Tetra Fish Production with Good Fish Cultivation (CBIB) in Order to Expand the Target Market

In identifying the target market, such as the importance of focus, identifying clients, and advertising [24]. According to the argument put forward by [25] buyers in this market have the same desire because they function as the market that the company goes to for the sale of its goods. When a company has a successful product that reaches the maturity stage in its life cycle, the goal is to persuade happy customers to try new (better) items because they have had positive experiences with the organization's existing products or services. Strategies are often used to achieve long-term goal. Examples of corporate strategies include geographic expansion, diversification, acquisitions, product development, market penetration, tightening, divestment, liquidation, and joint ventures. [26] Similarly, [27] defines strategic management as a collection of managerial decisions and actions that affect the long-term performance of the organization.

Empirically, SWOT activities in digital ecosystem scenarios demand much attention when developing and marketing new strategies from various industry scenarios within an integrated project management framework is necessary because of the enterprise's complicated operations [28].

Kulonprogo SMEs are urged to pay special attention to the seven elements of business management in order to gain a sustainable competitive advantage. The first of the seven components is a business strategy followed by people, information technology, goods, promotions, collaboration, and corporate social responsibility (CSR) [29].

This is in line with research that explains the concept of urban metabolism, the methods used to measure it (such as Emergy Analysis, Material Flow Analysis, Ecological Footprints, etc.), as well as how the proposed methodology is assessed using SWOT analysis and Analytical Hierarchical Processes by considering several analyses [30].

4.2. Another Way to Implement the Blue Economy Idea Is to Implement a Business Finance Strategy with Limited Losses: WO (Weak Opportunity) Strategy

Based on project size and industry, financial managers should incorporate the following key elements into their financial plans according to the concepts of Return on Invested Capital (ROIC) and Weighted Average Cost of Capital (WACC): costs of launching new companies as well as those launched by existing businesses; costs of purchasing new production equipment, packaging, marketing techniques; competitive analysis: investigating how competition affects revenue; and ongoing costs, such as labor costs; expected income: By choosing defensive tactics, as [26]. Cost rationalization (savings) occurs when a company restructures by reducing costs and assets to increase sales returns and reduce profitability.

Empirically, the elements in each SWOT dimension, namely strengths, weaknesses, opportunities, and threats are categorized using the Gray Additive Ratio Assessment (ARAS-Grey) approach [31]. SWOT analysis offers an opportunity to strategically examine upcoming calibrations [32].

4.3. By Providing Easy Services to Clients Such as Online Reservation and Delivery of Ornamental Fish to Their Location, the ST (Strength Threat) Strategy Increases Brand Perception among Customers as an Alternative to the Implementation of the Blue Economy Concept

The business unit should theoretically be able to generate value and profit from its interactions with clients, under the notion of marketing strategy proposed by [33]: a marketing strategy used to achieve marketing objectives containing a specific target market plan, positioning, marketing mix, and budget for marketing. Branding is very important for POKDAKAN Bojongsari Depok, West Java, to compete with other companies because it has been a brand for more than 20 years. The purpose of branding is to gain customer empathy and trust. As a result of branding, it is hoped that POKDAKAN will have a special place in the hearts of consumers.

Empirically, marketing performance that is not influenced by marketing strategy is more influenced by internal and external factors of the company compared to marketing

strategy. A company's ability to control internal factors has a greater impact on its marketing strategy and performance, as indicated by the dominance of the internal strategy performance path [34].

4.4. An Alternative Approach to Implementing the Blue Economy Concept Is the WT (Weakness Threat) Strategy, Which Includes Every POKDAKAN Member, including the Chairperson, as a Training Participant

According to [25], strategic human resource management is a method for deciding organizational plans and schemes related to employment relations and policies as well as the implementation of recruitment, training, development, performance management, rewards, and employee relations.

Empirically it is proven that an aggressive strategy, which refers to a development strategy in a very good situation because there are strengths that can be utilized to seize profitable opportunities, is the best action to realize the implementation of E-Government and achieve service quality [35]. Resource efficiency, zero waste, social care, production cycle systems, innovation and adaptation, and institutions are examples of variables based on the blue economy concept [36].

5. Conclusions

The Ministry of Maritime Affairs and Fisheries (KKP) has promoted aquaculture in Indonesia through innovative programs such as minapolitan (Decree of the Minister of Marine Affairs and Fisheries Number 35/KEPMEN-KP/2013 concerning Designation of Minapolitan Areas in Indonesia), industrialization, and the blue economy [37].

The Strategic Plan (Renstra) Office of Food Security, Agriculture and Fisheries (DKP3) 2021–2026 contains information on all objectives, targets, policies, programs, and activities involved in the ongoing decision-making process. Ornamental fish production continues to increase from 2016 to 2020. The reason is the high level of market demand. Marine and fisheries refers to initiatives to improve marine and fisheries through the three pillars of national development: human resources, leading sectors, and regions. These incorporate a policy direction that implements the idea of managing competitive and sustainable fishery resources as well as initiatives to increase empowerment, competitiveness, and independence in maintaining the sustainability of the fishery business. The Decree of the Mayor of Depok No.523/278/Kpts/DKP3/Huk/2020 concerning the determination of the location for the development of ornamental fish insights that among them are: a) The location of the development of the ornamental fish area is Bojongsari District covering 7 "Kelurahan", namely bojongsari lama, Bojongsari Baru, Curug, Serua, Pondok Petir, Duren Mekar and Duren Seribu [38].

Utilizing the idea of a blue economy (BE) for marine and fishery development is an important step in practicing marine and fishery development. BE's goal is to create an environmentally friendly industry so that natural resources can be managed sustainably. In general, Indonesian fisheries have not been running well or sustainably. This is indicated by the fact that Indonesia still lacks ethical (long-term) fishing companies. The national fisheries sector still faces many obstacles that are difficult to overcome. The main obstacle for Indonesian fisheries to run in a sustainable manner is the inadequacy of the fishery management framework, both for capture and aquaculture.

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

1. In order to give the greatest service to consumers, both short-and long-term plans must be made for business continuity, including the use of new technology and constant maintenance of fish quality.
2. To be able to remain competitive with competitors, it is necessary to increase the skills possessed, especially human resources, in this case cultivators who are always directly concerned with the results with regard to 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.

Additional data can be found in Supplementary Materials.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/su142013028/s1>, Figure S1: Results of interview data; Figure S2: The square position of the strategy; Table S1: Results of interview data reduction with POKDAKAN; Table S2: Coding with rating values; Table S3: Calculation of the Weight of Internal Factors; Table S4: Calculation of the weight of external factors; Table S5: IFAS (Internal Strategic Analysis Summary); Table S6: EFAS (External Strategic Analysis Summary); Table S7: Internal Strategic; Table S8: External Strategic Factors; Table S9: SWOT MATRIC (1); Table S10: SWOT MATRIC (2).

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