

THE IMPLEMENTATION STRATEGY OF THE SUSTAINABLE FISHING PORT CONCEPT AT CILACAP OCEAN FISHING PORT

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ABSTRACT

The ecoport concept, or environmentally port management, is a sustainable development approach that integrates social, economic, and environmental aspects. This concept has been adopted in several developed and developing countries. In Indonesia, the ecoport concept has been applied to fishing ports, known as eco-fishing ports since 2013. However, the Cilacap Ocean Fishing Port (PPS Cilacap) was not selected as a pilot site that year, despite having adequate infrastructure and active fishing operations that meet the assessment parameters outlined in the National Fishing Port Master Plan. This study aims to identify the strengths, weaknesses, opportunities, and threats (SWOT) related to environmental management and the socio-economic conditions of the local community, in order to formulate strategies for implementing a sustainable eco-fishing port at PPS Cilacap. Strategy development was carried out using a SWOT analysis based on observations, interviews, and questionnaire surveys. The results indicate that PPS Cilacap possesses strengths such as good environmental conditions and competent human resources, but it also faces challenges, including poorly maintained facilities, waste management issues, and limited financial resources. In conclusion, although PPS Cilacap demonstrates favorable environmental conditions and skilled personnel, improvements in maintenance, waste handling, and budget allocation are needed. Enhancing infrastructure, fostering partnerships, and advancing sustainability initiatives will be crucial to the successful implementation of the eco-fishing port concept.

Keywords: Cilacap Ocean Fishing Port, eco fishing port, opportunities, strengths, threats, weaknesses

INTRODUCTION

The concept of eco-friendly port management involves applying sustainable development principles that integrate social, economic, and environmental aspects in a balanced manner in the management of fishing ports (Puig *et al.* 2017). Developed and developing countries have adopted this concept due to global trends, such as developing regional ports (Akgul 2017; Philipp *et al.* 2021). In the capture fisheries and fishing port sector, Mbay *et al.* (2014) defines the eco-fishing port (EFP) as a port management framework to balance environmental aspects and economic or commercial benefits to

support sustainable fisheries management. The priorities or indicators of environmental standards for a port in the development of a fishing port include energy consumption levels, noise levels, air quality, water quality, excavation practices, waste and sewage management, port development and land availability, port interaction with the surrounding community, waste or discharge from ships and climate change (Lincoln *et al.* 2022; Puig *et al.* 2017; Teerawattana and Yang 2019).

The formulation and initiation of the eco-fishing port concept in Indonesia were first carried out through collaboration between the Government of Indonesia and France in 2013

at six fishing port locations: the Bungus Fishing Port (FP), the Belawan Fishing Port, the Nizam Zachman Fishing Port, the Kendari Fishing Port, the Bitung Fishing Port, and the Palabuhanratu Fishing Port (Mbay *et al.* 2014; Zebblon *et al.* 2016). Several fishing ports, such as the Nizam Zachman FP and the Bitung FP, have attempted to implement eco-fishing ports in their development. However, many aspects of eco-fishing ports still need to be implemented well in these locations (Zebblon *et al.* 2016). Although this concept has only been applied to several ports in Indonesia, there are several studies on the development of eco fishing ports such as in Karangantu Fishing Port, Barek Motor Fishing Port, and Pondokdadap (Hamzah and Rahmawati 2021; Purbani and Aisyah 2019; Wicaksono *et al.* 2019).

The Cilacap Fishing Port (CFP) is an ocean-class fishing port that was not a location for implementing the eco-fishing port in 2013. However, the CFP has been a fishing support location with complete facilities since the 1980s. In addition, business activity and fisheries production in CFP are very high, especially for tuna fisheries (Nariyono *et al.* 2017). A high level of fishery business activity is expected to impact the sustainability of the environmental and social conditions of the community around the CFP.

The CFP has various facilities to support activities at the port, and environmental sustainability and the quality of fishery products require attention. Currently, The CFP has three anchorage pools and eleven piers under excellent and adequate conditions. However, shallowing of the port basin due to household waste and mud sedimentation must be monitored. This household waste comes from waste dumped in the Kaliyasa River (Pancawati 2015). The need for clean water at CFP is met using well water and PDAM, which is facilitated by water tanks and installations covering an area of 89 m³ for sanitation, ship logistics, processing, and household office purposes. Another facility is the Fish Auction Place (FAP), which is in fairly good condition, spacious, and clean. However, several improvements are needed to make FAP hygienic. FAP does not have supporting facilities such as roller conveyors, cool boxes, or ice crushers, some of which are damaged, which interferes with the transportation of fish. Air ventilation is problematic because it does not have air circulation aids such as fans or air conditioning.

CFP facilities in the form of existing facilities and infrastructure need to be fixed, such as drainage, which is not smooth because of flow blockages by solid waste or liquid waste disposal from activities at the port. The decline in environmental quality due to community activities that do not pay attention to the environment makes the environment dirty and smelly. Apart from problems with facilities and infrastructure, the environmental quality of fishing ports is greatly influenced by the behavior of fishing communities because of the need for more awareness of the processing waste generated from fishing business activities. The main activity of the fishing port, namely, the fish auction site (FAP), still needs to pay more attention to sound waste processing. Fish processing and handling waste from FAP is disposed of directly without processing, usually in the form of pieces or fragments of fish bodies, fish scales, fish slime, and water used to rinse FAP floors (Santosa 2018). Ship activities, such as washing ship floors and docking or ship repairs, produce oily liquid and liquid waste containing detergents.

The National Fishing Port Master Plan explains that fishing ports that have provided basic facilities can develop the application of eco-fishing port principles in fishing port operations. Based on a study by the FDA and the KKP in 2013, there are several standard parameters for eco-fishing ports. These parameters consist of physical environmental aspects (water quality, processing of solid waste and liquid waste, and availability of clean water), socio-economic aspects (community income, labor, and user perceptions), catch aspects (fishery exports and catch quality), and institutional and supervisory aspects (Muninggar *et al.* 2020).

Based on the problems mentioned above, in order for CFP to be assessed as a sustainable and environmentally friendly fishing port, it is necessary to formulate an appropriate management strategy. Therefore, this study aims to: 1) identify the strengths, weaknesses, opportunities, and threats of environmental management as well as the social and economic conditions of the Community, and 2) formulate a strategy for implementing a sustainable fishing port or eco-fishing port in CFP.

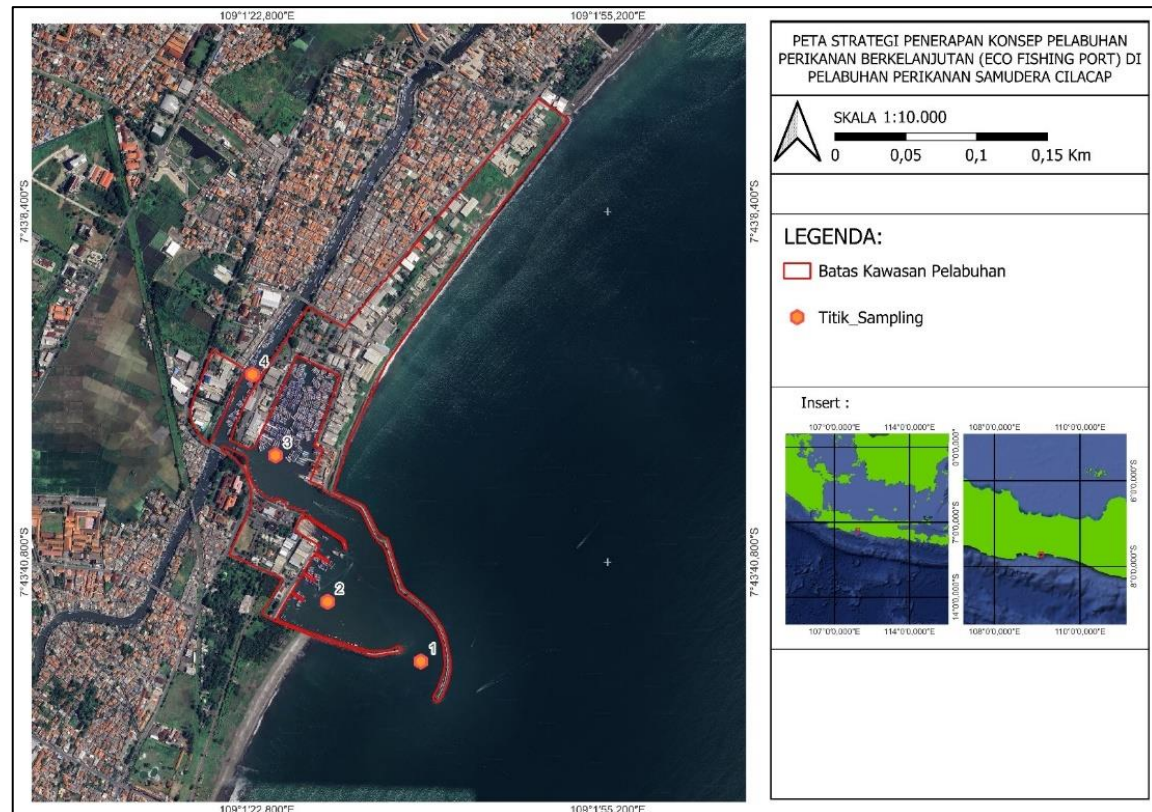


Figure 1 Location of Cilacap Fishing Port, Central Java Province (Indonesia) in the south of Java Island.

METHODS

Time and Location

Data were collected from January to March 2024 in Cilacap Fishing Port, Province of Central Java, Indonesia. The research location map is shown in Figure 1.

Data Types and Collection

The data used in the research were secondary data from fishing port statistical reports and primary data from interviews and questionnaires with 110 fishers and experts. Primary data consisted of strengths, weaknesses, challenges and opportunities in implementing the eco-fishing port concept. Secondary data consists of the types of facilities at CFP and the competence of its human resources. Meanwhile, primary data obtained from respondents were used to understand the perceptions of users and experts regarding the current conditions at CFP and their relationship to sustainable fishing ports. The data used in the research consisted of secondary data from fishing port statistical reports, which included existing data on infrastructure and facilities, the availability of sanitation and waste management facilities, the availability of human resources for environmental management, and

environmental documents. Primary data from interviews and questionnaires with 110 fishers and experts included questions about environmental conditions, opinions on facilities at CFP, strengths and weaknesses of CFP, the impact of CFP on the social and economic conditions of fishers, and future expectations regarding the implementation of an eco-fishing port. A total of 110 fishermen selected as respondents are fishermen who operate various fishing gears in CFP, namely tuna longline, gillnet, payang, handline, purse seine, squid, trammel net, and transport boat fishermen. The 110 fishermen represent a total of 9095 fishermen with the Slovin formula (Sugiyono 2016), are:

$$n = \frac{N}{1 + Ne^2} \dots \dots \dots (1)$$

With:

n = Total Respondents

N = Total Population

e = estimation error (0,1)

Researchers conducted direct observations and interviews and distributed questionnaires to fishers to identify weaknesses, strengths, opportunities, and threats from environmental management and socioeconomic conditions at CFP. Meanwhile,

for strategy development, the researchers administered questionnaires to experts.

Expert respondents were selected based on their expertise regarding fishing activities at fishing ports and their understanding of the concept of eco-fishing ports for the sustainability of fishing ports. Respondent involvement can help researchers and decision-makers determine stakeholder perceptions regarding fishing port management (Custodio *et al.* 2022). The respondents were classified into four groups; from each group, two to three people were selected, and nine respondents were obtained. This group division aims to find out the perceptions of each stakeholder who can provide an assessment of the SWOT analysis to determine the formulation of policy strategies. The four groups are (1) two academic respondents, (2) two business respondents, (3) three government respondents, and (4) two Non-Government Organization respondents. Academics are considered to know the concept of eco-fishing ports to provide input for its development at CFP. Business actors were chosen as respondents because they are users of fishing ports and have a role and impact in implementing eco-fishing ports. The government was selected as the respondent because it can determine policies for implementing eco-fishing ports. In this case, the respondents chosen were the Directorate of Fisheries Ports of the Ministry of Maritime Affairs and Fisheries, the Ministry of Environment and Forestry, and the technical management unit of CFP. Non-governmental organizations at CFP were chosen as respondents because they know the conditions at the port and can provide suggestions for developing an eco-fishing port.

Data analysis

The SWOT analysis assumes that an effective strategy can maximize strengths and opportunities and reduce weaknesses and threats (Astuti and Ratnawati 2020). This method identifies the strengths, weaknesses, opportunities, and threats to the development strategy of the eco-fishing port-based fishing port in CFP. SWOT analysis can help to determine development strategies that are effective and appropriate for the environmental, social, and economic conditions that occur in the field. There are three stages: identifying internal and external factors, weighing these factors, and determining the formulation of alternative strategies and priorities (Amarala *et al.* 2019).

Identifying internal factors consists of strengths and weaknesses in CFP, while external factors include opportunities and threats when CFP implements the eco fishing port. These factors are weighed by scoring them in the internal factor evaluation (IFE) and external factor evaluation (EFE) matrices. IFE consist of strengths and weaknesses, while EFE consist of opportunities and threats. Scoring is obtained by multiplying the rating and weight to produce the required score value. The higher the score, the more critical the problem is. Determining the weight value starts from 1.0 to 0.0; the higher the value, the more influential the factor is. Meanwhile, the rating calculation uses a scale of 1 (poor) to 4 (outstanding), which is determined based on the influence of these factors. The rating value given to the strength and opportunity factors is positive; the greater the strength and opportunity, the higher the rating value. However, the opposite is true for the weakness and threat factors. The final stage is to determine a strategy based on the analysis results.

RESULTS

The formulation of a strategy for developing a sustainable fishing port based on the eco-fishing port concept at CFP was formulated a SWOT analysis by considering the strengths, weaknesses, opportunities, and threats of internal and external factors at CFP. The factors used in the SWOT analysis consist of internal factors, including strengths (S) and weaknesses (W), and external factors, including opportunities (O) and threats (T), in implementing sustainable fishing port development in the CFP. The explanation of internal and external factors at CFP is as follows. This SWOT analysis is intended for Cilacap Fishing Port to implement an eco-fishing port development strategy.

Internal Factor Analysis

Internal factors consist of strengths and weaknesses, based on the results of observations at the CFP. Seven strengths and six weaknesses were identified in this study. Identify strengths of CFP for the sustainable development of fishing ports:

1. Adequate hygiene and sanitation facilities and infrastructure are available

The CFP has adequate hygiene and sanitation facilities and infrastructure. Based on the analysis of facility management that has been carried out, it can be seen that CFP has drainage, rubbish bins at many points in the port environment, seawater reverse

osmosis (SWRO), wastewater management installations (IPAL), toilets and toilets (MCK), waste processing in every fish processing unit, temporary rubbish dump, rubbish-free signs, and rubbish transport motorbikes. CFP also provides cleaning staff who can help fishers after loading and unloading fish at the FAP or tidying up rubbish in the fish market.

2. Environmental conditions are still good

The environmental conditions at CFP are still good because users are educated to keep the environment clean. Fishers are accustomed to throwing rubbish in rubbish bins, disposing of oil in oil dumps, and cleaning harbor ponds after loading and unloading fish. Managers and owners of fish processing units also have an awareness of environmental management by not discarding processed fish waste before it is processed.

3. The existence of competent human resources

Environmental management at CFP is supported by competent human resources. By the end of 2022, the number of employees at the Cilacap Ocean Fishing Port will be 96, comprising 65 state civil servants (ASN) and 31 contract workers (TKK). Port employees work in several sections, namely, the general subsection, finance, port operations group, port harbormaster group, business services group, and facilities and infrastructure management group. All employees were given the opportunity to carry out education and training, courses, appreciation, and workshops organized by the Ministry of Maritime Affairs and Fisheries. This increase in competency includes the implementation of an environment-friendly fishing port using the eco-fishing port concept. The CFP management collaborates with the fishers' association to maintain environmental cleanliness and order in the CFP. Fishing port managers provide outreach and counseling to fishers about occupational safety, security, and health (K3), which can increase fishers' competency at work. The K3 outreach provides an understanding for fishers to be careful in their work and maintain their health with an awareness of protecting the environment. In 2022, CFP will certify 30 fishers and fishing boat crews (Cilacap Fishing Port 2022). This certification can increase fishers' competency.

4. There are clear regulations regarding the implementation of eco-fishing ports

Based on the 2022 CFP annual report, the fishing port will improve its facilities

through the Improvement of Fisheries Facilities Program Project Outer Ring Fishing Port Development (Eco Fishing Port) to increase the capacity of the port pool, maintain damaged facilities, and create a fishing port that is environmentally friendly and has a high level of traceability of fish catches (fisheries traceability) in Fishing Ports in the French AFD program. This year, regulations for implementing eco-fishing ports are available and will continue to be implemented.

5. Fishing ports implement ISO 14001:2015

CFP already has an ISO 14001 certificate that is currently valid until September 26, 2024. The ISO 14001 certificate is routinely renewed after it has expired. The implementation of ISO 14001 at CFP was conducted in the hygienic port office and FAP areas. ISO 14001 environmental management is implemented by handling solid waste, electricity use, and water use.

6. Availability of waste processing facilities

CFP has a wastewater treatment plant (IPAL) as a functional facility with an area of 140 m². The IPAL at the CFP has been available since 2000 and is still usable, although it requires rejuvenation.

7. Availability of greenery in all fishing ports

Green open spaces (RTH) must be filled with environmentally friendly fishing ports or eco-fishing ports. CFP management actively provides guidance to all users to protect the environment, and asks fish processing unit owners and workshop entrepreneurs to carry out greening in the yards of their businesses.

Identify weaknesses in CFP for sustainable development of fishing ports, namely:

1. The condition of the fishing port facilities and infrastructure is poorly maintained

The infrastructure condition is related to fishers' needs, because if the condition is good, then fishers' needs will be met. Based on the results of interviews and questionnaires with 110 fishers, 46 fishers stated that the infrastructure was good or met fishers' needs, ten people stated that it was sufficient to meet fishers' needs, and 54 stated that the infrastructure was lacking or did not meet fishers' needs. Some fishers said that the fishing port infrastructure needed improvement and addition to support fishing activities. It is hoped that repairs can be made in the port basin because it is too shallow and needs to be dredged. Fishers also hope that the management can expand docks and

mooring pools to make loading and unloading fish catches easier so as not to hinder ships from mooring and anchoring. Fishers need additional facilities for lighting, toilets, prayer rooms, clean water, dredging equipment, and additional cleaning facilities.

2. The cleanliness of the fishing port area is poorly maintained

The cleanliness of the fishing port area can be determined based on the opinions of fishers who are port users. If the environment is not clean, it causes a smell from the garbage or waste produced. Based on a survey involving 110 fishers, 73 respondents thought that the CFP land environment produced odors, six respondents said there was a smell in the CFP environment, and 31 respondents felt there was no smell in the CFP land environment. The source of smell at CFP comes from rubbish, fish remains, wastewater drains around the Fish Auction Place (FAP) and fish market, toilets, oil, diesel, and dock basin. A total of 84 respondents stated that smell affected their activities, while 26 other respondents felt that smell did not affect their activities. The lack of maintenance in this area causes inconvenience for CFP users.

3. There is a build-up of waste at the fishing port and its surroundings

Waste generation at CFP can be observed on ships near the port and docking area. The rubbish near the port basin is fish remains and wastewater, whereas the rubbish at ship docking is the remains of ship-building materials such as wood, paint, resin, and matt.

4. The internal environmental management budget at CFP is inadequate

CFP has a budget provided by the central government, in this case the Ministry of Maritime Affairs and Fisheries. This budget is used for various operational activities at fishing ports. The division of the budget for various activities requires a particular budget for environmental management at the CFP.

5. There are already regulations regarding eco-fishing ports, but these have not been implemented by fishing port managers.

There are regulations regarding eco-fishing ports, but they are yet to be comprehensively implemented by fishing port managers. This is because the eco-fishing port programme has just begun and is still in preparation.

6. Supervision is not optimal for perpetrators who throw rubbish or waste carelessly

Fishing port managers supervise environmental management; however, the number of employees assigned to inspect or go around is small. This results in suboptimal supervision of perpetrators of littering or careless waste.

External Factor Analysis

External factors consist of opportunities and threats based on observations at CFP. Seven opportunities and six threats are identified. Identify opportunities at CFP for the sustainable development of fishing ports

1. There is a multiplier effect on the community around the port by implementing an eco-fishing port.

Implementing the eco-fishing port at CFP can have multiple impacts on the community around the fishing port. An environmentally friendly port will attract users' interest so that it can create new jobs and absorb labor. The surrounding community can perceive the social and economic benefits of implementing an environmentally friendly fishing port.

2. There is support from the community and fishers for the environmental management of fishing ports

If the community and fishers already know the benefits that will arise from environmental management of fishing ports, there will be much support. Support from the community and fishers is critical for facilitating the implementation of the eco-fishing port at the CFP.

3. There is support from the Directorate of Fisheries Ports, Ministry of Maritime Affairs and Fisheries

Support from the Directorate of Fisheries Ports of the Ministry of Maritime Affairs and Fisheries is critical, because it will make it easier for fishing port managers to convey their aspirations to the central government. CFP managers can convey needs and consult quickly if there is support from the central government.

4. Awards are given to port users who implement environmental pollution prevention

Awards from fishing ports increase the motivation of users to protect the environment and prevent environmental pollution. An award received by a user can also spread a positive spirit to all users at the CFP to continue to protect the environment.

5. The public's image of CFP is getting better

The image of CFP in society will improve if an eco-fishing port is implemented. People feel comfortable visiting the port because it looks clean, well maintained, does not smell bad, and is pleasant.

6. The competitiveness of the CFP at the national and global levels will increase owing to the implementation of the eco-fishing port.

CFP, as a type A fishing port or the most significant type of fishing port in Indonesia, can increase its competitiveness if it implements an eco-fishing port. This competitiveness is essential to become an example for other fishing ports at national and global levels.

7. Trust in other countries who buy fish through CFP is increasing

Implementing the eco-fishing port at CFP will increase trust in countries that import fishery products. Other countries will have more confidence in obtaining quality fish products because fishing ports focus on environmental sustainability. Several fishery product-exporting countries have high ecological management standards.

Identification of threats at CFP for sustainable development of fishing ports, namely:

1. Participation of fishers and communities around fishing ports

Minimal participation of fishers and communities around fishing ports is a threat to the implementation of eco-fishing ports. If fishers and communities do not want to support environmental management at fishing ports, eco-fishing ports will not be realized.

2. Difficulty in obtaining ISO 14001: 2015 certification

Fishing ports currently have ISO 14001:2015 certification, which is expected to end in September 2024. Recertification is not easy because fishing ports must collect several documents to be assessed as appropriate or not as a certification requirement. If one of these requirements is not met, ISO 14001 certification cannot be issued.

3. There was a warning from the Directorate of Fisheries Ports, Ministry of Maritime Affairs and Fisheries

Suppose that CFP does not manage the environment well. In this case, it is feared that there will be a warning from the Directorate of Fisheries Ports of the Ministry of Maritime Affairs and Fisheries. This warning is a threat because it could result in sanctions or reduce the budget for CFP.

4. There is a long-term risk of rubbish and waste pollution in fishing ports.

The presence of detergent waste, oil, fish unloading remains, and other waste in the water and land of CFP poses a risk of pollution. Environmental pollution can affect the aquatic biota that live in harbor ponds because the ecosystem is disturbed. In the long term, it can also have an impact on human health, such as acute respiratory infections, diarrhea, and dengue fever, because the environment is smelly and dirty, causing pathogenic bacteria in the fishing port environment.

5. The lack of APBN for budget allocation for implementing environmentally sound fishing ports

Budget allocation is significant for implementing an environmentally friendly fishing port, because improving facilities requires a large budget. The IPAL and port basin at the CFP must be repaired, and a drip is required.

6. Reduced social and economic benefits for fishers and communities around fishing ports

Failure to implement an environmentally friendly fishing port can threaten the social and economic conditions of the community around the port. The management of fishing ports will prevent fishers and the community from losing their jobs because users are not interested in visiting CFP.

SWOT Analysis

1. IFE Matrix Analysis

The internal factor evaluation (IFE) matrix explains the internal factors of CFP, which were compiled based on the results of interviews and respondent questionnaires. Respondents provide assessments, which can be calculated in weights and ratings to create the IFE Matrix. Table 1 shows the results of the CFP IFE matrix analysis for the development of a sustainable fishing port using the eco-fishing port concept.

Table 1 CFP IFE Matrix

No	Internal strategic factors	Bobot (B)	Rating (R)	Score (B x R)
Strength				
1	Adequate hygiene and sanitation facilities and infrastructure are available	0.09	4	0.36
2	Environmental conditions are still good	0.08	4	0.28
3	The existence of competent human resources	0.09	4	0.34
4	There are clear regulations regarding the implementation of eco fishing ports	0.08	4	0.30
5	Fishing ports implement ISO 14001:2015	0.08	4	0.28
6	Availability of waste processing facilities	0.09	4	0.34
7	Availability of greenery in all fishing ports	0.08	3	0.26
Total strength				2.15
Weakness				
1	The condition of the fishing port facilities and infrastructure is poorly maintained	0.08	4	0.30
2	The cleanliness of the fishing port area is poorly maintained	0.07	3	0.20
3	There is waste generation at the fishing port and its surroundings	0.06	2	0.16
4	The internal environmental management budget at CFP is inadequate	0.07	3	0.20
5	There are already regulations regarding eco fishing ports but they have not been implemented by fishing port managers	0.07	2	0.22
6	Supervision is not optimal for perpetrators who throw rubbish or waste carelessly	0.07	3	0.22
Total Weakness				1.13
Total		1		3.28

The strength factor of CFP consisted of seven conditions with a total score of 2.15, while the weakness factor of CFP consisted of six conditions with a total score of 1.13. Based on the evaluation results of the CFP internal factors, the total score obtained was 3.28, which is above the average. This total score shows that CFP is above average in its overall strategic position to utilize its strengths and overcome existing weaknesses if necessary. The results of the data analysis in Table 1 show that the dominant strength factor that must be maintained in the development of the CFP for sustainable fishing ports is the "availability of adequate hygiene and sanitation facilities and infrastructure," with a score of 0.36. Meanwhile, the main weakness that must be corrected in the development of the CFP is that "the condition of the fishing port facilities and infrastructure is poorly maintained," with a score of 0.30.

2. EFE Matrix Analysis

The external factor evaluation (EFE) matrix explains the internal factors of CiFP, which were compiled based on the results of interviews and respondent questionnaires. Respondents provided assessments that could be calculated using weights and ratings to create the EFE Matrix. Table 2 shows the

results of the CFP EFE matrix analysis for the development of a sustainable fishing port using the eco-fishing port concept.

The CFP opportunity factor consists of seven conditions with a total score of 2.01, whereas the CFP threat factor consists of six conditions with a total score of 1.27. Based on the evaluation results of CFP external factors, the total score obtained was 3.28, which was above the average. This total score shows that CFP is above average in its overall strategic position to take advantage of its opportunities and overcome existing threats, if necessary. The results of data analysis in Table 4.10 show that the dominant opportunity factor that must be utilized in developing the CFP for sustainable fishing ports is "There is support from the Directorate of Fisheries Ports of the Ministry of Maritime Affairs and Fisheries" with a score of 0.32. The main weakness factor that must be avoided in developing the CFP is "the long-term risk of trash and waste pollution in the fishing port environment," with a score of 0.25.

3. SWOT Matrix for Implementing The Concept of A Sustainable Fishing Port (Eco Fishing Ports) In The Cilacap Fishing Port

Table 2 CFP EFE Matrix

No	External strategic factors	Bobot (B)	Rating (R)	Score (B x R)
Opportunity				
1	There is a multiplier effect for the community around the port by implementing an eco fishing port	0.08	4	0.28
2	There is support from the community and fishers for environmental management of fishing ports	0.08	4	0.30
3	There is support from the Directorate of Fisheries Ports, Ministry of Maritime Affairs and Fisheries	0.08	4	0.32
4	Awards given to port users who implement environmental pollution prevention	0.08	3	0.26
5	The public's image of CFP is getting better	0.08	4	0.30
6	The competitiveness of CFP at the national and global levels will increase due to the implementation of the eco fishing port	0.08	4	0.30
7	Trust in other countries buying fish through CFP is increasing	0.08	4	0.28
Total opportunity				2.01
Threats				
1	Participation of fishers and communities around fishing ports	0.07	3	0.20
2	The difficulty of obtaining ISO 14001: 2015 certification	0.06	2	0.13
3	There was a warning from the Directorate of Fisheries Ports, Ministry of Maritime Affairs and Fisheries	0.07	3	0.20
4	There is a long-term risk of rubbish and waste pollution in the fishing port environment	0.08	3	0.25
5	The lack of APBN for budget allocation for implementing environmentally friendly fishing ports	0.08	3	0.24
6	Reduced social and economic benefits for fishers and communities around fishing ports	0.07	3	0.24
Total threats				1.27
Total		1		3.28

The factors used in the SWOT matrix consist of IFE and EFE matrices. Cilacap's FP internal factors consist of strengths and weaknesses, whereas CFP external factors consist of opportunities and threats. These factors were matched to produce various alternative strategies. The following SWOT matrix shows an alternative strategy for developing CFP as a sustainable fishing port (Table 3).

Based on matching internal factors and external factors in the SWOT matrix (Table 3), there are ten strategies that can carry out by CFP for sustainable port development with the eco fishing port concept. The strategy is divided into four parts, which are composed of a combination of strengths and opportunities (SO), weaknesses and opportunities (WO), strengths and threats (ST) and weaknesses and threats (WT). The description of these strategies is as follows:

1. SO Strategy

- 1) Improving the quality of infrastructure, cleanliness, green open spaces, and waste processing in CFP

- 2) Establishing and strengthening partnerships with stakeholders for the development of the CFP Ecofishing Port
- 3) Intensify publication and promotion of the implementation of eco fishing ports at CFP through social media and international fisheries product bazaars.

2. WO Strategy

- 1) Increase user awareness by routine monitoring and providing rewards and punishments to protect the CFP environment.
- 2) Increase the budget for developing CFP as an eco-fishing port

3. ST Strategy

- 1) Providing counseling and outreach to fishers about the importance of implementing eco-fishing ports at CFP.
- 2) Increase the intensity of communication with the Ministry of

Maritime Affairs and Fisheries to explain the needs and constraints of CFP in implementing eco-fishing ports.

4. WT Strategy

- 1) Establish regular communication with fishers associations to find out their needs regarding CFP facilities

- 2) Building community self-reliance to manage the CFP environment

- 3) Routine environmental inspections are carried out according to the requirements of ISO 14001:2015 and eco-fishing ports, and actively improve port conditions that do not meet the criteria.

Table 3 SWOT Matrix for Implementing The Concept of A Sustainable Fishing Port (Eco Fishing Ports) In The Cilacap Fishing Port

<p>Internal environment</p>	<p>Strength – S</p> <ol style="list-style-type: none"> 1. Adequate hygiene and sanitation facilities and infrastructure are available (S1) 2. Environmental conditions are still good (S2) 3. The existence of competent human resources (S3) 4. There are clear regulations regarding the implementation of eco fishing ports (S4) 5. Fishing ports implement ISO 14001:2015 (S5) 6. Availability of waste processing facilities (S6) 7. Availability of greenery in all fishing ports (S7) 	<p>Weakness – W</p> <ol style="list-style-type: none"> 1. The condition of the fishing port facilities and infrastructure is poorly maintained (W1) 2. The cleanliness of the fishing port area is poorly maintained (W2) 3. There is waste generation at the fishing port and its surroundings (W3) 4. CFP's internal environmental management budget is inadequate (W4) 5. There are already regulations regarding eco fishing ports but they have not been implemented by fishing port managers (W5) 6. Supervision is not optimal for perpetrators who throw rubbish or waste carelessly (W6)
<p>External environment</p> <p>Opportunity – O</p> <ol style="list-style-type: none"> 1. There is a multiplier effect for the community around the port by implementing an eco-fishing port (O1) 2. There is support from the community and fishers for environmental management of fishing ports (O2) 3. There is support from the Directorate of Fisheries Ports, Ministry of Maritime Affairs and Fisheries (O3) 4. Awards given to port users who implement environmental pollution prevention (O4) 5. The public's image of CFP is getting better (O5) 6. The competitiveness of CFP at the national and global levels will increase due to the implementation of the eco fishing port (O6) 7. Trust in other countries who buy fish through CFP is increasing (O7) 	<p>SO – Strategi</p> <ol style="list-style-type: none"> 1. Improve the quality of infrastructure, cleanliness, green open spaces and waste processing at CFP (S1, S2, S6, S7, O2, O3) 2. Establish and strengthen partnerships with stakeholders for the development of the CFP eco fishing port (S2, S5, O2, O3, O4, O6) 3. Intensify publication and promotion of the implementation of eco fishing ports at CFP through social media and international fishery product bazaars (S3, S4, S5, O3, O5, O6, O7) 	<p>WO – Strategi</p> <ol style="list-style-type: none"> 1. Increase user awareness by routinely monitoring and providing rewards and punishments to protect the CFP environment (W1, W2, W3, W5, W6, O1, O2, O4) 2. Increase the budget for developing CFP as an eco-fishing port (W4, O3, O5, O6, O7)

Threat – T	ST – Strategi	WT – Strategi
<ol style="list-style-type: none"> 1. Participation of fishers and communities around fishing ports (T1) 2. Difficulty in obtaining ISO 14001: 2015 certification (T2) 3. There was a warning from the Directorate of Fisheries Ports, Ministry of Maritime Affairs and Fisheries (T3) 4. There is a long-term risk of rubbish and waste pollution in the fishing port environment (T4) 5. The lack of APBN for budget allocation for implementing environmentally sound fishing ports (T5) 6. Reduced social and economic benefits for fishers and communities around fishing ports (T6) 	<ol style="list-style-type: none"> 1. Providing counseling and outreach to fishers about the importance of implementing eco-fishing ports at CFP (S1, S2, S3, S4, S7, T1, T4, T6) 2. Increase the intensity of communication with the Ministry of Maritime Affairs and Fisheries to explain the needs and constraints of CFP in implementing eco-fishing ports (S4, S5, S6, T2, T3, T5) 	<ol style="list-style-type: none"> 1. Establish regular communication with fishers associations to find out their needs regarding CFP facilities (W1, W2, W3, W6, T1, T4, T6) 2. Building community self-reliance to manage the CFP environment (W4, W5, W6, T5) 3. Carry out routine environmental inspections according to the requirements of ISO 14001: 2015 and eco-fishing ports and actively improve port conditions that do not meet the criteria (W1, W2, W3, W5, W6, T2, T3)

DISCUSSION

The research produced ten alternative strategies based on identifying internal factors in the form of strengths and weaknesses and internal factors in the form of opportunities and threats at CFP. The first strategy is to improve the quality of infrastructure, cleanliness, green open spaces, and waste processing at the CFP. Ports implementing eco-ports must pay attention to the quality of infrastructure in providing services to the user community and balancing it with ecosystem sustainability (Okada *et al.* 2021). According to Marzantowicz and Dembińska (2018), port infrastructure must also pay attention to the land, ocean, and air environment, so it is necessary to guarantee cleanliness from pollution and waste, so that green open space and waste processing must be adequate in the fishing port environment.

The second strategy is to establish and strengthen partnerships with stakeholders to develop a CFP eco-fishing port. The successful implementation of environmentally friendly ports is not only carried out by one party but must work together with organizations and institutions (Wu *et al.* 2020). According to Wu *et al.* (2020) and Nguyen *et al.* (2022), the development of environmental ports also needs to be carried out through close communication with state authorities so that the state can provide facilities and evaluation. This statement is based on the seventh strategy, namely, increasing the intensity of communication with the

Directorate General of Capture Fisheries, Ministry of Maritime Affairs, and Fisheries, to explain the needs and constraints of CFP in implementing the eco-fishing port.

The port needs to intensify its publicity and promote the implementation of the eco-fishing port at CFP through social media and international fishery product bazaars, as recommended by the third strategy. According to Tinambunan (2016), Indonesia's participation in international market-to-market fishery products must be innovative to attract foreign buyers' interest. It is important to maintain the quality of marketed fishery products. The fourth strategy is to increase user awareness through routine monitoring and to provide rewards and punishments to protect the CFP environment. The awareness of port users in protecting the environment is critical because they play a crucial role in producing pollution by dumping oil in the waters, throwing away rubbish, or causing emissions from the ships they use (Munoz *et al.* 2023). The fifth strategy was to increase the budget for the development of CFP as an eco-fishing port. The budget is one of the determinants of development, so fishing port managers can prioritize the best service for their users (Custodio *et al.* 2022).

Fishing port managers need to provide education and outreach to fishers regarding the importance of implementing eco-fishing ports at CFP. Fishers need to understand that the implementation of this eco-fishing port is one of the contributions to the 6th Sustainable

Development Goals (SDGs), namely Clean Water and Sanitation, and the 14th SDGs, namely Life Below Water, which will have a sustainable impact on the future (Vega-Muñoz 2021). Fishers also need to provide an overview of the benefits of implementing an eco-fishing port, such as increasing job opportunities and income (Nurhalimah *et al.* 2017). With this understanding from fishers, the port can build community self-reliance to manage the CFP environment by using the ninth strategy.

The eighth strategy is to establish regular communication with fishers' associations to determine their needs regarding the CFP facilities. CFP communicated with the Cilacap branch of the all Indonesian Fishers' Association (HNSI) to determine their needs. However, this communication has not been widely conducted among all fishers. The hope is that routine communication can be carried out in the future because fishers' perceptions will influence the implementation of eco-fishing ports (Zebblon *et al.* 2016). The tenth strategy is to conduct routine environmental inspections according to the requirements of ISO 14001:2015 and eco-fishing ports, and actively improve port conditions that do not meet the criteria. Hamzah and Rahmawati (2021) and Manalu *et al.* (2022) stated that implementing ISO 14001:2015 is an essential component of port planning and environmental management.

Strategy for development eco fishing port in CFP is based on the opinions of four stakeholder groups. The opinions of stakeholders tend to be similar, the dominant strategy given is to improve the infrastructure of fishing ports in the implementation of eco fishing ports, massive communication to the community and fishermen for the introduction and implementation of eco fishing ports, as well as environmentally certification for fishing ports and certification of good fish handling.

CONCLUSION

The strengths of CFP are good environmental conditions, competent human resources, clear regulations, and the availability of sanitation, waste treatment facilities, and greening. The weaknesses include unmaintained facilities, poor hygiene, waste problems, insufficient budgets, weak enforcement of regulations, and lack of good supervision. The opportunities for CFP are community and government support, potential awards, improved public perception, and increased competitiveness, with the threats

faced being low community participation, challenges to obtaining ISO certification, pollution risks, limited government funding, and potential socio-economic impacts on the surrounding community.

Strategies that can be implemented are improving sanitation infrastructure, providing green open spaces, and waste management, as well as strengthening partnerships with stakeholders and fishing associations. It is also necessary to promote environmentally friendly fishing ports through social media and provide education to fishermen. In addition, routine monitoring, the application of rewards and punishments, empowerment of local communities, and improved communication with the Directorate General of Capture Fisheries, as well as routine environmental inspections in accordance with ISO 14001:2015.

SUGGESTION

Cilacap Fishing Port needs to enhance environmental management on the land areas of CFP and provide infrastructure according to the needs of fishermen based on the eco fishing port concept by improving the management of liquid waste, hazardous and toxic waste (B3), and waste management efforts using the reduce, reuse, and recycle approach. CFP needs to continuously educate port users and the surrounding community on maintaining environmental cleanliness and managing the environment to realize an eco fishing port at CFP.

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