



Strategies and stakeholders of the artisanal fisheries management in Tegal City, Indonesia

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Abstract. Tegal City has a large potential for capture fishery. In 2021, 38,925,330 kg of capture fishery was sold at the Tegal City Fish Auction Place (FAP). Small-scale or artisanal fishing using outboard motorboats dominates the capture fishery industry in Tegal City. Artisanal fishermen suffer from low-income levels due to inadequate management efforts by policymakers. This study used SWOT analysis to analyse the development strategies for artisanal fishing in Tegal City and stakeholder analysis to identify the role of each stakeholder. This study was conducted in September 2022–January 2023. The data for this study was collected through Focus Group Discussions (FGD) and questionnaires. The respondents in this study were determined through a purposive sampling of 100 respondents. A cluster sampling was used for data collection, where each respondent was grouped according to their work type. The SWOT analysis shows that artisanal fishing in Tegal City needs a change of strategy and suggests increasing awareness of sustainable fishing, providing hygienic FAPs and implementing environmentally friendly fishing policies. The stakeholders involved in the management of small-scale fisheries in Tegal City include the fishermen's groups, Ministry of Marine Affairs and Fisheries (MMAF), cooperatives, NGOs, Agency for National Unity and Politics, Regional Development Planning, Research and Development Agency, local government, lecturers, and students.

Key Words: artisanal fisheries, development strategy, stakeholder, SWOT, Tegal City.

Introduction. In Indonesia, small-scale fisheries involve about 90% of the total number of fishermen and generate significant employment for coastal communities (Sari et al 2021). They provide close to 90% of all aquatic products captured and are crucial to the lives and livelihoods of many people in Indonesia. Small-scale fisheries play a crucial role in the socio-economic development of Indonesia. The sector provides direct and indirect employment to millions of people, especially in coastal communities, where alternative sources of livelihood are limited. Moreover, small-scale fisheries have significant cultural and traditional value in Indonesia, as fishing has been a way of life for many coastal communities for generations. These fisheries also support local trade and markets, providing affordable and fresh seafood for both urban and rural consumers (Stacey et al 2021).

The small-scale or artisanal fishery is characterized by using conventional fishing gears. These include beach seine nets, set nets, drifting gillnets, and hook and line. These gears are usually operated from dug-out canoes (Antwi 2023). Artisanal fishermen typically live below the poverty line due to their subsistence fishing conditions, small capital, simple techniques, and one-day fishing. However, despite their strategic position in the country's economy, small-scale fisheries in Indonesia face numerous challenges. Overfishing, climate change, unsustainable fishing practices, and inadequate policy and management frameworks are some of the major issues that threaten the sustainability of these fisheries (Purwanti et al 2023). Additionally, small-scale fishermen often lack access to financial resources, technology, and infrastructure, which further exacerbates their vulnerability and limits their potential for growth (Md Shah & Ibrahim 2020; Oladimeji & Abdulsalam 2013; Rahim & Dwi Hastuti 2018; Wijayanto et al 2022).

Several studies have attempted to answer the challenges faced by small-scale fisheries in Indonesia. One of the methods commonly used is SWOT analysis. A study by

Ayunda et al (2018) investigated the performance of small-scale fisheries in relation to sustainable fish exploitation in Indonesia. They focused on small-scale fisheries that use hook and line and gillnet to catch eastern little tuna, skipjack tuna, red snappers, blue line sea bass, and halibut. The study recommended an improvement of the regulation related to the small-scale fishing activities, by limiting the fishing days and gears used. Another study by Susanto et al (2021) suggested a managed access to sustain small-scale fisheries in southeast Sulawesi, Indonesia. The study elaborates on the establishment of managed access to the reserves in Kolono Bay, Indonesia, as an example of community-based small-scale fisheries management.

Northern Coast of Java is one of the regions that is dominated by small-scale fisheries. Their intensive activity leads to overfishing, raising concerns about the future sustainability of fish resources. This situation creates uncertainty in the livelihoods of small-scale fishermen. According to Minister of Marine Affairs and Fisheries Regulation Number 18 of 2014, the Java Sea is part of the State of the Republic of Indonesia Fisheries Management Area (FMA) 712. About 44% of the national production of capture fisheries come from this area (Avrionesti & Putri 2018). Tegal City, located on the northern coast of Java Island, has a significant potential for capture fisheries, landing fish through the Coastal Fishing Port (CFP) Tegalsari. In 2021, the fish production sold at the Tegal City Fish Auction (FAP) reached an impressive 38,925,330 kg (Department of Maritime Affairs and Fisheries, Agriculture and Food of Tegal City 2022). This production accounts for 17.53% of Central Java's total catch of 222,048,868 kg in 2021, making Tegal City the second-largest capture fisheries producer in Central Java, surpassed only by Rembang Regency.

Small-scale fishermen in Tegal City face tough competition from large boats and fishing gear, as their fishing grounds are located near the CFP Tegalsari. Additionally, the fisheries sector in the region has been impacted by the recent increase in fuel prices and the lifting of fuel subsidies. Since diesel fuel is the primary fuel for boat engines, an increase in fuel prices can significantly impact the operating costs of fishermen. As a result, small-scale fishermen who have limited capital may be unable to go to sea, leading to a decline in their income and potentially causing an increase in unemployment and poverty among fishing families. Success in small-scale fisheries management depends on the involvement of stakeholders (Muliawan et al 2014), which are expected to build a strategic view of the agents involved in the process and their relationships, in order to avoid issues. Referring to Government Regulation in Lieu of Law No. 2 of 2022, the government at the Provincial level has the authority to manage fish resources within a radius of 0-12 nautical miles. This implies the obligation of the Provincial Regional Government to establish a Regional Regulation for the Zoning Plan of Coastal and Small Island Regions.

Vibriyanti (2014) revealed that the policies formulated in Tegal City are not effectively addressing the problems faced. Policies that were formulated without clear priorities, directions, and targets within existing resource and financial limitations did not generate significant added value for the successful development of marine fisheries. The involvement of stakeholders in efforts to develop artisanal fishing fisheries in Tegal City is an interesting aspect to explore. It is expected to provide a sustainable management strategy that encompasses a balanced proportion of dimensions in the fisheries management system, as described above. This study aimed to identify artisanal fisheries development strategies in the city of Tegal, especially in the CFP Tegalsari, using SWOT analysis, and to investigate the role of stakeholders in its management.

Material and Method

Description of the study sites. This research was carried out at the Tegalsari Coastal Fishing Port (CFP) of Tegal City, from September 2022-January 2023. The detailed research locations can be seen in Figure 1.

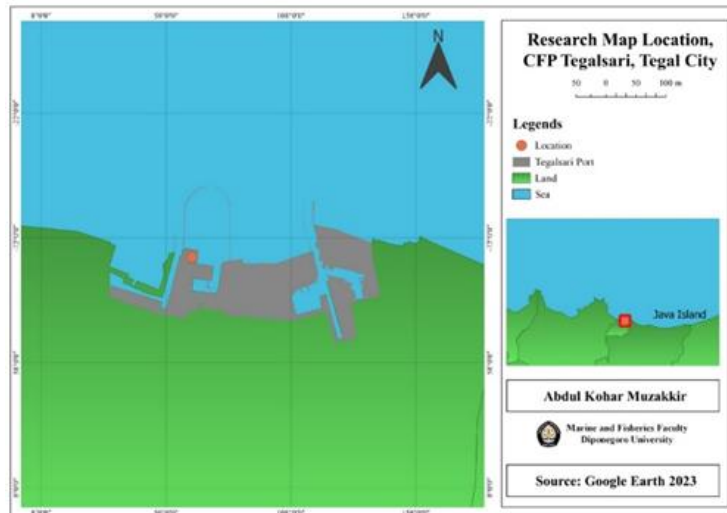


Figure 1. Research map location (Google Earth 2023).

Data collection. This research used a descriptive method with a qualitative approach and a focus on the case study analysing the artisanal fisheries management strategies and the role of stakeholders. The sampling method used in this study was purposive sampling. The criteria for selecting respondents in this study were to belong to the fishing communities in Tegal City, to be aged 17 years minimum and to be involved in artisanal fisheries management in Tegal City. We conducted a series of Focus Group Discussions (FGD) with approximately 100 participants representing various stakeholders, including fisherfolk, government officials, fisheries experts, and institutional representatives. These FGD sessions were categorized based on participants' roles or affiliations within the fisheries sector. The main objective of the FGDs was to collect qualitative data for a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis. While qualitative in nature, the FGDs provided invaluable SWOT analysis data. Simultaneously, structured questionnaires were distributed to artisanal fishers and stakeholders in during FGD to gather additional qualitative data, which further contributed to the SWOT analysis. Reed et al (2009) developed the framework followed for the stakeholder analysis by collecting information on demographic details, fishing practices, compliance with regulations, awareness of local fisheries management policies, and stakeholders' views on the effectiveness of current management measures.

Data analysis

SWOT analysis. In our study focused on formulating a development strategy for artisanal fisheries management in Tegal City, we employed a robust SWOT analysis approach that integrated the concepts of External Factors Analysis Summary (EFAS) and Internal Factors Analysis Summary (IFAS). EFAS and IFAS are instrumental in defining management strategies for artisanal fisheries in Tegal City, as they offer a comprehensive assessment of both external and internal factors. EFAS identifies external economic, social, environmental, and regulatory influences, enabling strategies that adapt proactively to external changes. Meanwhile, IFAS assesses internal strengths and weaknesses, guiding decisions on resource allocation and process improvement. The SWOT analysis formulation goes through the following stages: 1) creating an internal-external matrix; column 1 organizes all the factors owned by the company by dividing them into two parts, namely internal or "IFE" (Internal Factor Evaluation) and external factors or "EFE" (External Factor Evaluation); 2) assigning a weight to each factor in column 2, 0.20 = Very strong, 0.15 = Above average, 0.10 = average, 0.05 = below average, 0.00 = not affected; 3) column 3 is filled with rating calculations of these factors, based on their impact on artisanal fisheries in Tegal City. The rating range is 1 to 4 (1 = very weak, 2 = not too weak, 3 = fairly strong, 4 = very strong); 4) column 4 is filled by multiplying the weight in column 2 with the rating in column 3; and 5) the total of the weighted scores for each of the internal and external factors is calculated.

The position (quadrant) on the map that will be assigned to the alternative strategies of the parties involved to the artisanal fisheries management in Tegal City was determined based on the results of calculating scores from internal factors and external factors. The detailed steps are outlined as follows:

1. Determine the X axis by plotting the internal factor scores, namely strengths and weaknesses.
2. Determine the Y axis by plotting external factors, namely opportunities and threats.
3. Determine the quadrants based on the SWOT matrix. Quadrant I is the SO strategy, quadrant II is the WO strategy, quadrant III is the WT strategy, and quadrant IV is the ST strategy.
4. Determine the priority of the strategy based on the resulting points plotted from the X axis and Y axis.

Stakeholder analysis. Stakeholder analysis is a tool used in policy studies to understand the interests and influence of stakeholders in each issue. It involves categorizing stakeholders based on their interests and power to influence the issue. Interest refers to a stakeholder's concern or attention to the problem at hand, while power refers to their ability to impact policy and regulation decisions (Balane et al 2020; John et al 2004; Reed et al 2009). Reed et al (2009) stated that the stages in conducting a stakeholder analysis are as follows:

1. Identification of stakeholders and their roles
2. Distinguish and categorize stakeholders based on their interests and influence. Stakeholders are mapped into a stakeholder analysis matrix based on their interests and influence. The amount of influence is assessed based on the instrument and the source of power (influence) owned by each stakeholder.
3. Defining the relationship among stakeholders, the relationship among stakeholders will be defined through a questionnaire distributed in the FGD with key informants.

The results were arranged in a matrix with quadrants in the form of subject, key player, crowd, and contest setters shown in Figure 2.

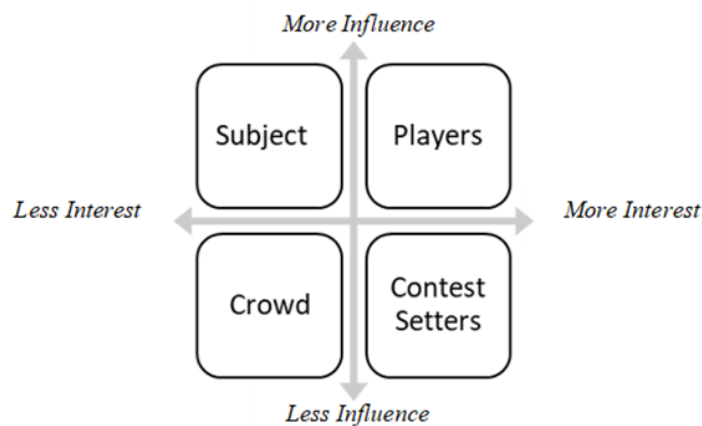


Figure 2. Stakeholder role analysis matrix (Reed et al 2009).

Results. Fishermen in Tegal City tend to group themselves based on their fishing gear and boat size, which is often an indicator of their income level. This grouping was identified through interviews conducted with the fishermen in Tegal.

a. Artisanal fishermen

Artisanal fishermen are fishermen who use boats with a capacity of 1–10 GT. The fishing area for small fishermen of 3-5 GT is only around 2-3 miles from the coast. The fishing gear usually used by small groups of fishermen are trammel nets and beach seines. The catch from these fishing activities is usually marketed through traditional channels, such as auctions at fish markets, or by direct selling to traders. The sales value of the catch is relatively low, and the profit margin is small, due to the high cost of fishing gear and fuel.

b. Medium fishermen

This group uses vessels with a capacity of 11-30 GT. The fishing area of this type of fishermen is more than 5 miles offshore. The fishing gears used are trawl and badong. The types of fish caught include jerbung prawns, dogol prawns, flying fish, layur fish. One net fishing boat consists of 2-5 people, using a proportional or balanced profit-sharing system. This group of fishermen use larger vessels and sail further out to sea to catch a variety of fish species.

c. Large fishermen

These fishermen use boats with a tonnage of 30 GT and above. The fishing area reaches 60-100 miles from the coast. In general, it is carried out for a longer time and is farther away from the target area of fishing has a lot of possibilities for obtaining more catches (production), and certainly provides greater income compared to fishing close to the coast. The types of fish caught include bottom fish (demersal), crustaceans, grouper, rays, sharks, and others. This group uses sophisticated fishing gear such as purse seine, long line, and trap.

From the results of FGDs, it is known that small fishermen are starting to lose their fishing grounds. The increasing number of small fishermen has narrowed the capture area and overfishing sea conditions have reduced the production of small fishermen (Hidayati 2021). The income of Tegal city fishermen also varies based on the type of fishing gear and boat used. The income of small fishermen who use trammel net fishing gear reaches around USD 3.2 to USD 9.5 day⁻¹, with expenses of around USD 2.5 to 6. On the other hand, the income of large fishermen using trawl gear can reach around USD 1,000 to 1,500 trip⁻¹, with costs of around USD 100-500 trip⁻¹. They typically fish for several days a week. The differences in income among small and large fishermen are quite significant, this is due to the differences in fishing gear, fishing area, the number of trips and the volume of catches (Kasperski & Holland 2013; Sulistyono et al 2021; Wake et al 2022).

Artisanal fisheries management based on SWOT analysis. Based on the gathered data, the information was compiled into relevant sections, as shown in Figure 3 (strengths, weaknesses, opportunities, and threats).



Figure 3. Internal and external factors in artisanal fisheries management in Tegal City.

Once the data is divided into sections, the calculation process of internal and external weights begins. This involves identifying the strengths, weaknesses, opportunities, and threats based on the conditions of artisanal fisheries management in Tegal City. The scoring obtained from this process is then used to determine the primary strategy for developing artisanal fisheries management in Tegal City, as shown in Tables 1-2.

Table 1

Results of internal factor score calculation

No.	Strength strategy factor	Weight	Ratings	Score
1.	S1: Use of environmentally friendly fishing gear	0.10	4	0.38
2.	S2: The role of formal organization	0.10	4	0.38
3.	S3: Supervision of capture fisheries management	0.10	3	0.29
4.	S4: There is government support in management	0.10	3	0.29
5.	S5: Has a long coastline	0.07	3	0.22
Total strengths' weight		0.45	17	1.56
Weakness strategy factors				
1.	W1: Lack of counselling and socialization related to fisheries management	0.09	4	0.36
2.	W2: Lack of supervision and facilities for monitoring capture fisheries activities	0.12	4	0.48
3.	W3: The fishermen's education level is low	0.09	3	0.27
4.	W4: Most fishermen do not carry out the fish auction process at FAP	0.06	3	0.18
5.	W5: Fishermen's participation in capture fisheries is low	0.12	3	0.36
6.	W6: There is a conflict among fishermen, especially users of arad nets	0.06	3	0.18
Total weaknesses' weight		0.55	20	1.85
Internal factors weight		1.00		

Table 2

Results of external factor score calculation

No.	Opportunity strategy factor	Weight	Ratings	Score
1.	O1: Potential fish resources	0.10	4	0.40
2.	O2: Fishermen compliance	0.10	4	0.40
3.	O3: Development of mangrove forests as marine tourism areas	0.08	3	0.23
4.	O4: There is a fishing gear replacement program	0.08	3	0.23
5.	O5: FAP and PPI facilities and infrastructure are sufficient	0.08	3	0.23
6.	O6: There is regional autonomy	0.08	3	0.23
Total opportunities' weight		0.5	20	1.70
Threat strategy factors				
1.	T1: Overfishing	0.10	4	0.40
2.	T2: Use of fishing gear that is not environmentally friendly	0.08	4	0.30
3.	T3: There are extreme weather changes	0.10	3	0.30
4.	T4: Decreased carrying capacity of the environment	0.08	3	0.23
5.	T5: The role of the formal organization is not optimal	0.08	3	0.23
6.	T6: Competition among fishermen from other areas who catch in the sea waters of Tegal City	0.08	3	0.23
Total threats' weight		0.5	20	1.68
External factors weight		1.00		

Based on internal and external factors, the strength score is 1.56, the weakness score is 1.85, the opportunity score is 1.70, and the threat score is 1.68. Furthermore, to determine the quadrant position, the calculation results will be as follows:

$$\frac{\text{Strength Score} - \text{Weakness Score}}{2} \cdot \frac{\text{Opportunity Score} - \text{Threat Score}}{2} = \frac{1.56 - 1.85}{2} \cdot \frac{1.70 - 1.68}{2} = (-0.145: 0.01)$$

The results of the SWOT analysis obtained a plotted value of (-0.145; 0.01) as shown in Figure 4. These results indicate that artisanal fisheries management in Tegal City is in Quadrant III (change strategy). Based on the results of the SWOT test, the strength value is smaller than the weakness and the opportunity value is greater than the threat.

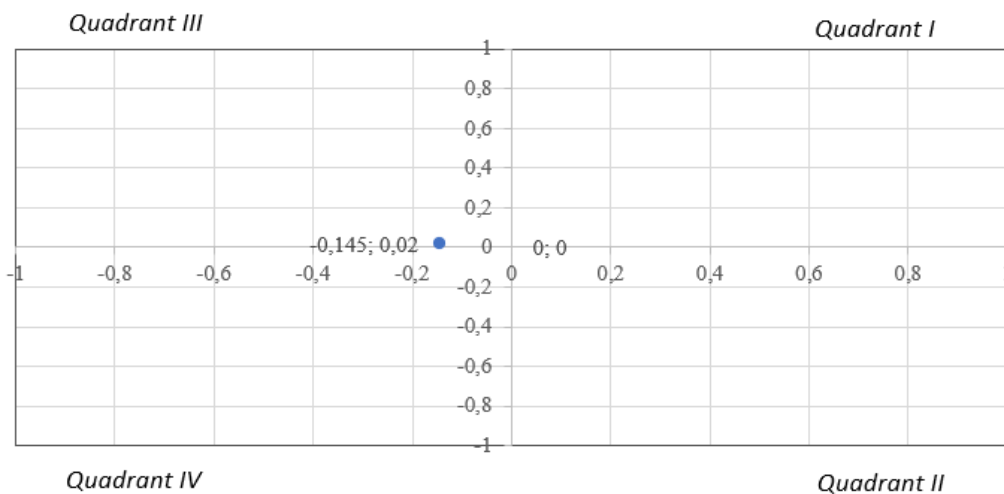


Figure 4. SWOT diagram.

The next step in the strategic analysis process, following the calculation of scores in the EFAS and IFAS matrix, is to define the strategies. These matrices provide valuable insights into the organization's or project's internal strengths and weaknesses as well as external opportunities and threats. With these insights in hand, the organization can develop a set of strategies to leverage its strengths, mitigate its weaknesses, capitalize on opportunities, and counteract threats (Table 3).

Table 3

SWOT matrix

<p>External factors</p> <p>Internal factors</p>	<p>Strength (S) S1: Use of environmentally friendly fishing gear S2: The role of formal organization S3: Supervision of capture fisheries management S4: There is government support in management fisheries resources S5: Has a long coastline</p>	<p>Weakness (W) W1: Lack of counselling and outreach related to fisheries management W2: Lack of supervision and facilities for monitoring activities of capture fisheries W3: The fishermen's education level is low W4: Most fishermen do not carry out the tender process fish in FAP W5: Fishermen's participation in sustainable capture fisheries is still low W6: There is a conflict among fishermen, especially users of arad nets</p>
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<p>Opportunity (O) O1: Potential human resources O2: Fishermen Compliance O3: Development of mangrove forests as marine tourism areas O4: There is a fishing gear replacement program O5: FAP and PPI facilities and infrastructure are sufficient O6: There is regional autonomy</p>	<p>SO</p> <ul style="list-style-type: none"> • Implementing environmentally friendly fishing in SDI utilization • Conduct human resource development for fishermen and wholesalers through skill improvement with training programs and management in a directed manner • Carry out development by improving facilities and infrastructure to increase FAP production • Developing mangrove areas into ecotourism 	<p>WO</p> <ul style="list-style-type: none"> • Increasing socialization related to sustainable fisheries management • Empowering FAP Hygienic to wholesalers and providing socialization about the functions and benefits of FAP Hygienic • Develop policies related to the use of arad nets in fishing
<p>Threat (T) T1: Overfishing T2: Use of fishing gear that is not environmentally friendly T3: There are extreme weather changes T4: Decreased carrying capacity of the environment T5: The role of the formal organization is not optimal T6: Competition among fishermen from other areas who catch in the sea waters of Tegal City</p>	<p>ST</p> <ul style="list-style-type: none"> • Conduct a persuasive approach in the form of counselling to fishermen related to knowledge in the field of fisheries • Providing operational convenience for local fishermen so that they can compete with fishermen from other regions 	<p>WT</p> <ul style="list-style-type: none"> • Improve coordination among the port and fishermen • Carry out maintenance and complete surveillance facilities at the Port • Strengthening the port management by training programs in order to realize an excellent service

Stakeholder analysis of artisanal fisheries management in Tegal City. Based on the results of research in the field, it was found that in the management of artisanal fisheries in Tegal City there are several parties that are directly or indirectly involved. From the results of the interviews, it was concluded that the parties involved can be grouped into educational institutions, government agencies, communities, non-governmental organizations, professional groups, and business entities. The results of the identification of stakeholders from each group, related to the management of artisanal fisheries in Tegal City, are shown in Table 4 and Table 5.

The stakeholder mapping in artisanal fisheries management in Tegal City is determined based on 2 levels, namely the level of influence and the level of interest (Tables 6 and 7). The results of the mapping according to the level of influence and interest can be seen in the matrix Figure 5.

Table 4

Identification of stakeholders

<i>No</i>	<i>Category</i>	<i>Stakeholders</i>
1	Academic institutions	Lecturer Student
2	Government agencies	Ministry of Maritime Affairs and Fisheries District Government Regional planning agency
3	Public	National Unity and Politics Agency Community/Community Leaders
4	Non-governmental organization	NGO
5	Professional group	Fishermen group in Tegal City
6	Business entity	Cooperative

Table 5

Role identification of each stakeholders

<i>No</i>	<i>Stakeholders</i>	<i>Role</i>
1	Lecturer	Serves as an educator who is involved in primary and secondary education of artisanal fishing communities in Tegal City
2	Student	Acts as research and education implementer
3	Regional Government (District)	Act as a protector, accommodate, manage, channel the aspirations of the community
4	Ministry of Marine Affairs and Fisheries (MMAF)	In charge of making regulations in the management of artisanal fisheries in Tegal City
5	Regional planning agency	In charge of making studies related to artisanal fisheries management in Tegal City
6	National Unity and Politics Agency	In charge of providing outreach to the community
7	Community/Community Leaders	Managing the direct supervision and protection of the area
8	Community Institutions	Act as observer, facilitator, and mediator
9	Fishermen group	Managing in the utilization of available resources in the City of Tegal
10	Cooperative	Acts as a provider of capital (credit), equipment, and the daily needs of fishermen

Table 6

Level of stakeholder influence of artisanal fisheries management in Tegal City

<i>No</i>	<i>Stakeholders</i>	<i>Score</i>					<i>Total score</i>
		<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>	
1	MMAF	3	2	3	3	5	16
2	Lecturer	2	2	2	2	4	12
3	Fishermen group	3	2	2	4	4	15
4	NGO	3	1	3	4	4	15
5	Student	1	1	1	3	1	7
6	Local Government (District)	2	2	3	3	3	13
7	Community/Community Leaders	3	3	4	5	3	18
8	Regional planning agency	2	3	3	4	3	15
9	National Unity and Politics Agency	3	3	3	3	2	14
10	Cooperative	4	1	2	5	5	17

Criteria: I=Condition; II=Personality; III=Compensation; IV=Eligibility; V=Organization.

Table 7

Level of stakeholder interest of artisanal fisheries management in Tegal City

No	Stakeholders	Score					Total score
		I	II	III	IV	V	
1	MMAF	4	5	4	4	3	20
2	Lecturer	2	2	2	2	4	12
3	Fishermen group	4	5	4	4	4	21
4	NGO	3	4	4	4	2	17
5	Student	1	1	2	3	2	9
6	Local Government (District)	2	3	2	2	2	11
7	Community/Community Leaders	2	5	5	1	2	15
8	Regional planning agency	3	2	2	1	1	9
9	National Unity and Politics Agency	5	5	3	4	3	20
10	Cooperation	5	4	2	5	5	21

Criteria: I=Benefits; II=Dependence level; III=Engagement; IV=Work program presentation; V=Role.

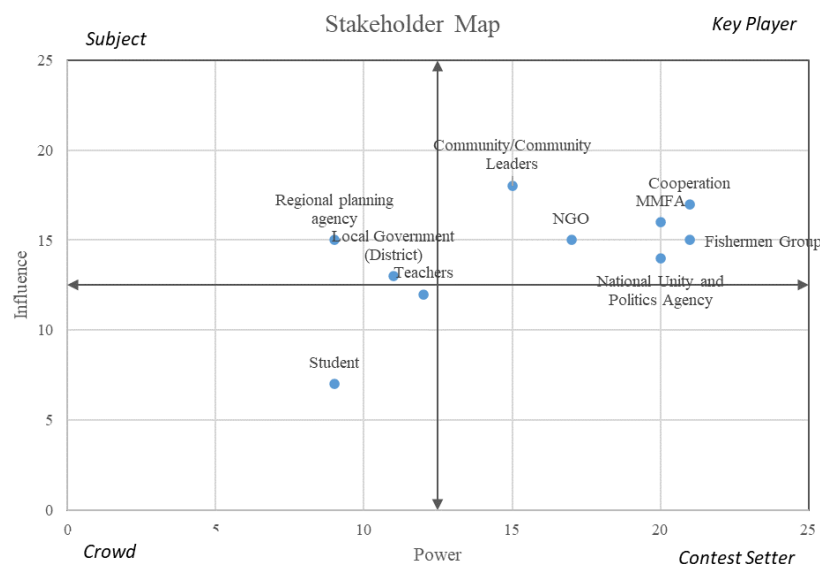


Figure 5. Stakeholders map.

Discussion

Strategies to develop artisanal fisheries management based on SWOT analysis.

After conducting a SWOT analysis, we obtained the values of internal factors (IFAS) and external factors (EFAS). Based on these factors, we can arrange them in the SWOT matrix in Table 3. According to the SWOT calculation, the score showed that the opportunity is greater than the existing weaknesses ($W < O$). Therefore, we recommend a change in the strategy for managing artisanal fisheries in Tegal City. Although the current conditions are difficult, there is potential for development with the existing opportunities. The recommended strategy is the WO Strategy, which involves using existing opportunities to overcome weaknesses (Table 3). The strategies that can be made based on the SWOT analysis are based on economic attributes which include the level of subsidy, the size of fishery marketing, the nature of ownership of fishing equipment, and alternative jobs and income. The amount of subsidy given to the fisheries sector will lead to an even greater level of activity, which means that the exploitation of fisheries resources will also be higher (Schuhbauer et al 2020).

The government can support the fishing industry by offering better subsidies, promoting the improvement of fishing gear, and providing alternative job opportunities for fishermen. Additionally, enhancing the marketing system for fishery products can boost the income of fishermen and contribute to the sustainability of the industry. To manage

fishing activities, policies can be put in place to regulate the number of boats and the size of fishing gear used, along with a system for monitoring and controlling fishing activities. It is crucial to involve all stakeholders in the decision-making process to ensure that their interests and needs are considered. Another important aspect is the use of fishing gear. Directly educating and discussing with fishing industry players about environmentally friendly fishing gear materials, regulations regarding such gear, and protection of certain fish species in Indonesia are necessary. This can be reinforced through Village Fishing Regulations, that establish specifications for fishing gear allowed to operate in village waters, as proclaimed by the village fishing community (Astuti Palupi 2019).

Regulations regarding the prohibition of trawl fishing gear are a form of government concern for the sustainability of marine ecosystems (Intyas et al 2023). Trawl fishing gear is operated by pulling the net with the boat running so that the demersal fish are carried along. If it continues to operate, small fishermen will be eliminated due to reduced fish stocks (Dharmawan et al 2022; Hanafi et al 2019; Hendrayana & Hartanti 2018). Furthermore, to seize the opportunities that exist, the government need to maximize the role of FAP (Fish Auction Place) in the process of marketing fishery products in Tegal City. FAP, as a place for marketing fish, will affect fishermen's income considering the perishable nature of fishery products (Nurfadillah et al 2022). If the quality of marine products decreases due to a poor marketing system, the selling price will decrease, so that fishermen's income decreases. FAP plays a role in maintaining the physical quality of fish and prices for fishermen.

Stakeholders' influence and interest in Tegal City artisanal fisheries management.

It was identified that, in the management of artisanal fisheries in Tegal City, several parties are directly or indirectly involved. From the results of the interviews, it was concluded that the parties involved can be grouped into Educational Institutions, Government Agencies, Communities, Non-Governmental Organizations, Professional Groups, and Business Entities. The results of the identification of stakeholders from each group related to the management of artisanal fisheries in Tegal City are presented in Table 4. After the identification of the stakeholders involved and their roles, the analysis continued with the mapping of the influence and the interest of stakeholders in Tegal City artisanal fisheries management. Stakeholder mapping with their levels of influence and interest is shown in Tables 6 and 7; the results of the mapping according to the level of influence and interest can be seen on the map. The stakeholders' role in the management of artisanal fisheries in Tegal City is classified, based on the level of influence and importance, into four categories, namely subjects, key players, other followers (crowd), and contest setters, as shown in Figure 5.

Subject. Stakeholders who have a high level of interest, but low influence are classified as subjects. In the management of artisanal fisheries in the City of Tegal, the regional planning agency and the Regional Government (District) fall into the subject category. These stakeholders have a low capacity to achieve goals but can become influential by forming alliances with other stakeholders. It is essential to maintain a good relationship with these stakeholders, as they can provide valuable support. The scoring interval in this subject category is between the values of importance, 12.5-25, and the values of influence, 0-12.5. It is crucial to note that the management of artisanal fisheries in Tegal City involves various stakeholders with different levels of influence and interest. Understanding the roles and relationships of these stakeholders can help ensuring the success of management programs and policies (Maguire et al 2012). The involvement of local communities is particularly important, as they have a direct stake in the fishery and can provide valuable insights and information about the resource. Studies have shown that effective management of artisanal fisheries requires collaboration and partnerships among multiple stakeholders, including the fishing communities, government agencies, NGOs, and private sector companies (Freed et al 2016). This approach can enhance the capacities of individual stakeholders and achieve better results in terms of fishery sustainability and resource management. The findings of these studies are in line with the situation in the City of Tegal, where the regional planning agency and the Regional Government have a low capacity to

achieve their goals but can become more influential by forming alliances with other stakeholders. By working together, the stakeholders in Tegal can overcome their individual limitations and implement effective management strategies for the artisanal fishery.

Key players. Stakeholders with high levels of interest and influence are classified as key players. In the management of artisanal fisheries in Tegal City, those included in the category of key players are community/community leaders, NGOs, cooperatives, MMAF, fishermen's groups, and the National Unity and Politics Agency. These stakeholders should be more actively involved, including in evaluating new strategies. The scoring interval in this key player category is between the value of importance and the value of influence, namely 12.5-25. As key players, they have a high capacity to drive change and can greatly impact the success of the management efforts. Maintaining good relationships with these stakeholders is crucial for the success of the artisanal fishery management in Tegal City. Involving key players in the evaluation of new strategies and in the decision-making process is essential to ensure that the management efforts are in line with their interests and needs. Their active participation can lead to the development of effective, practical, and inclusive management strategies that consider the different perspectives and priorities of the stakeholders. Furthermore, the key players have a significant influence on the fishing communities and can help to raise awareness and build support for management efforts. By collaborating with the fishing communities and other stakeholders, the key players can help to foster a sense of ownership and responsibility for the fishery, which is crucial for the long-term success of the management efforts (Sari et al 2021). Building strong relationships with these stakeholders and ensuring their ongoing participation in the decision-making process is essential for ensuring that the artisanal fishery is managed sustainably for the benefit of all stakeholders.

Crowd. Stakeholders with low levels of interest and influence are classified as crowds. In the management of artisanal fisheries in Tegal City, students and lecturers are included in this category. Therefore, little consideration is needed to involve these stakeholders further because their interests and influence usually change over time. Stakeholders must be monitored and communicated well. The scoring interval for this other follower category is among the value of importance and the value of influence 0-12.5. Stakeholders with low levels of interest and influence, also known as "crowds," usually have a limited impact on the management of artisanal fisheries in Tegal City. Nevertheless, it is important to keep them informed and monitor their changing interests over time, as their involvement and influence may grow in the future. Engaging with the "crowds" can also be beneficial in raising awareness and building support for the management efforts. By providing educational programs and opportunities for engagement, stakeholders with low levels of interest and influence can learn about the importance of sustainable fishing practices and the role they play in supporting the fishery (Malik et al 2019). This can lead to a more informed and engaged community, which can be valuable in the future as their influence and involvement may grow. It is also important to note that while these stakeholders may have low levels of interest and influence at present, their needs and perspectives should not be ignored. By involving them in the management process and keeping them informed, their voices can be heard, and their needs can be taken into account. This can help to build trust and foster a more inclusive and collaborative approach to management.

Contest setters. Stakeholders with a low level of interest but have high influence are classified as Contest Setters. In the management of artisanal fisheries in Tegal City, there are no parties included in the supporting category. The scoring interval in this supporting category is among the value of importance 0-12.5 and the value of influence 12.5-25. This means that there are no stakeholders with a low level of interest having a high influence, hence no action is required for this category. It is important to monitor the presence of such stakeholders, as they can greatly impact the management of artisanal fisheries in Tegal City if they become active in the future. The absence of contest setters in the management of artisanal fisheries in Tegal City presents an opportunity for the key players and the crowds to take a more active role in the management efforts. However, it is

important to regularly monitor the situation and assess whether any new stakeholders have emerged as contest setters, as their involvement can greatly impact the management of the fishery.

Conclusions. Based on the SWOT analysis, it is known that the current condition of artisanal fisheries management in Tegal City is in Quadrant III, which means changing strategy. Among the several strategies that can be carried out, there are: rising awareness on sustainable fisheries management, providing hygienic FAP to fishermen, rising awareness on the functions and benefits of hygienic FAP, and developing policies related to fishing practices. According to the stakeholder analysis, the key players are the community, fishermen's groups, MMAF, cooperatives, NGOs, and National Unity and Politics Agency; the subjects are the regional planning agency and the local government (district); the crowd consists of lecturers and students, while no party is classified as a contest setter. Thus, to support the artisanal fisheries management in Tegal City, collaboration among key players such as the community, fishermen's groups, MMAF, cooperatives, NGOs, and the National Unity and Politics Agency is crucial. Optionally, the regional planning agency, local government, lecturers, and students can be involved to increase awareness of the importance of sustainable fishing practices. Furthermore, developing policies related to fishing practices and providing hygienic fish auction places can also help improving the current condition of artisanal fisheries management in Tegal City.

Acknowledgements. The authors would like to express our sincere gratitude to all those who have contributed to this research. Their participation has made this research a meaningful and valuable endeavor. The authors would also like to thank Tegal City Government for providing the necessary resources to make this work possible.

Conflict of interest. The authors declare no conflict of interest.

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Received: 12 December 2023. Accepted: 22 January 2024. Published online: 08 February 2024.

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How to cite this article:

Mudzakir A. K., Boesono H., Suherman A., 2024 Strategies and stakeholders of the artisanal fisheries management in Tegal City, Indonesia. *AAFL Bioflux* 17(1):180-194.