

## Research Article

# Analysis of Stakeholders for Marine Fisheries Cultivation Through Floating Cages in Sumenep Regency's The Archipelagic Region

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**Abstract.**

The research objectives of this study are: 1) knowing the variety of stakeholders in marine fisheries cultivation, 2) knowing the role and profile of marine fisheries cultivation stakeholders, and 3) the level of importance and influence of stakeholders in marine fisheries cultivation. The method used in this research is stakeholder analysis. Stakeholder analysis is used to identify all parties that meet the definition of stakeholders including parties that may be influenced or affect the results of marine fisheries cultivation activities in Sapeken District. The results showed various stakeholders namely fishing communities (actors), government, entrepreneurs and academics with their level of interest and influence in aquaculture through floating cages. This research is expected to contribute to the development of the concept of coastal and small island economies.

**Keywords:** stakeholders, floating cage, archipelagic region

## 1. Introduction

The process of regional economic development must be carried out using methods that ensure the involvement of the region's local resources. However, development using a centralized system approach is not capable of bringing Indonesia's regions, which have diverse resource characteristics, to a better place. Therefore, through the Law on Regional Government, a decentralized approach to regional development must be implemented. In fact, in the latest Law on Regional Government, Law No. 23/2014, local governments at the smallest level, namely villages, are given the authority to organize and manage development in their areas because they are considered to know more about local resources. The development approach that is considered in accordance with the principles of decentralization and ensuring the involvement of local resources is known as local economic development (LED).

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The World Bank defines LED as a process carried out jointly by governments, entrepreneurs and non-governmental organizations to create better conditions for economic growth and employment at the local level. Malizia, Emil, et al (2021) provide a definition of LED as a development process in which stakeholders, namely local governments, entrepreneurs and community organizations are involved to encourage, stimulate and maintain job creation activities in the region. Meanwhile, the definition of LED according to the International Labor Organization (ILO, 2005) is a participatory process that encourages stakeholder partnerships between businesses, governments and communities in designing and implementing development strategies by utilizing local resources and regional competitive advantages with the aim of creating jobs and increasing local economic activity.

As a maritime country, Indonesia's marine resources have enormous potential and benefits for the welfare and progress of the nation. However, Indonesia's marine resources also face various challenges that must be overcome with the right solution. Therefore, the management of Indonesia's marine resources must be carried out optimally, sustainably and sovereignly. Some of the challenges faced include; lack of knowledge and technology to manage marine resources optimally and sustainably, lack of public awareness and participation in preserving marine resources, and lack of coordination and synergy between the central government, regions, and related sectors in managing marine resources (Syandri, H et al, 2022).

The development of the fisheries and marine sector through marine fisheries cultivation depends on the suitability of fish species and cultivation methods with the natural environment, as well as the willingness and ability of the community, entrepreneurs, government and fisheries non-governmental organizations (stakeholders) in the region to develop this sector together through partnerships (Aivaz et al, 2021). Other factors that need to be considered when cultivating fish are; first, the biological potential of the fish to be cultivated. Biological potential is said to be high if raising fish from eggs to harvest takes a relatively short time (less than one year), medium potential if the activity takes more than one year, and low potential if raising capture fish seedlings to harvest takes more than a year. Second, the marketing potential of cultured fish products in unlimited quantities and the amount of production is still below the demand; medium potential if the domestic and foreign markets are still willing to accept a limited amount and the fish product is quite famous; low potential if the current demand for the fish is low/unsold in the market (Yu J and Liu J, 2023).

Sumenep district has the largest number of islands in Indonesia. Sapeken sub-district is a pioneer of floating cage farming in the islands of Sumenep district. Sapeken sub-district is one of 3 (three) sub-districts located on Kangean Island, Kangean Islands,

Sumenep District. The area of Sapeken sub-district is 201.89 km<sup>2</sup> or 31.13 percent of the area of the Kangean islands and

21.33 percent of the area of the islands in Sumenep. The number of villages is 9 (nine) villages, namely Sapeken Village, Sabunten, Sasiil, Sakala, Sepanjang, Pagerungan Besar, Pegerungan Kecil, Paliat and Tanjung Kiaok. The sub-district has 53 islands of which 21 (40 percent) are inhabited.

In order to develop the potential of coastal and marine resources, it is necessary to analyze data and prepare economic development plans in accordance with their potential (Aftabuddin et al, 2021). Given the main potential of Sapeken Sub-district is marine fisheries, the analysis and planning are focused on developing the potential of marine fisheries, especially those based on aquaculture based on the role of stakeholders. For this reason, it is necessary to study "Analysis of Stakeholders for Marine Fisheries Cultivation through Floating Cages in the Sumenep Regency's The Archipelagic Region."

## 2. Methods

### 2.1. Data Required and Data Collection Methods

The data required are primary and secondary data. Primary data is in the form of information collected through in-depth interviews or FGDs with informants, namely representatives of stakeholders in marine fisheries cultivation in Sapeken sub-district. Primary data was also obtained from observations of the implementation team at the location of the activity, especially related to the role of stakeholders supporting marine fisheries cultivation in the sub-district. Meanwhile, secondary data were obtained from literature studies, especially those related to the best practices of marine fisheries cultivation in various places as well as supporting quantitative and qualitative data.

### 2.2. Data Analysis Technique

#### 2.2.1. Role and Profile Analysis of Stakeholders

Stakeholder analysis is one of the analyses that must be carried out in regional development with the PEL approach. Stakeholders are defined as parties, organizations, groups, or individuals who have an interest, either directly or indirectly in development activities (Bendtsen et al, 2021). Bjørkan (2022) states that stakeholder analysis is needed for several purposes. First, to identify all parties that meet the definition of stakeholders

above, including those that may be influenced or affect the outcome of the activity, in this case the cultivation of marine fisheries in Sapeken District. Second, to mobilize and provide understanding to stakeholders about the activity in the hope that they will feel interested, must be involved and take ownership of this activity. Third, to determine the target of the activity more precisely. Fourth, as a tool to predict and/or manage conflicts between stakeholders. Fifth, to understand the needs, interests and roles of each stakeholder in the activity.

TABLE 1: Plan of Research Methods in Identifying Prospects for Marine Fisheries Farming in Sapeken Sub-district.

| Objectives/Scope of Activities                                                                                         | Required data                                                                                                                                                                                                                                                                                          | Analysis Technique                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Identification of stakeholders and their role in marine fisheries cultivation in Sapeken sub-district.                 | <ul style="list-style-type: none"> <li>- A list of all parties (individuals and institutions) involved directly or indirectly in marine fisheries farming.</li> <li>- The role and resources of each stakeholder</li> <li>- List of 'samples' of each party that will be used as informants</li> </ul> | <ul style="list-style-type: none"> <li>- Analyze stakeholders through their roles and profiles.</li> </ul> |
| Identify the interests and influence of stakeholders involved in Marine Fisheries Cultivation in Sapeken Sub-district. | <ul style="list-style-type: none"> <li>- List of all stakeholders</li> <li>- Overview of stakeholder participation</li> <li>- Stakeholder engagement risk overview</li> <li>- Overview of stakeholder interests</li> <li>- Overview of stakeholder influence</li> </ul>                                | Stakeholders analysis through importance and influence (Influence and Importance Matrix)                   |

Source: Author’s draft, 2024

### 2.2.2. Analysis of Stakeholders' Importance and Importance Matrix

The stakeholder analysis tool that will be used in this activity is the Influence and Importance Matrix. According to Rahimi et al (2022) the stages carried out for stakeholder analysis using this tool are as follows:

- a) Register all stakeholders
- b) Discuss and describe the level of importance of each stakeholder in the cultivation of marine fisheries in Sapeken sub-district.
- c) Discuss and describe the level of influence of each stakeholder in the development of marine fisheries cultivation in Sapeken sub-district.
- d) Combine the importance and influence of each stakeholder in a matrix.
- e) Discuss the assumptions and risks involved in involving each stakeholder in the area development activities.
- f) Determine who the stakeholders will be, ascertain their participation (role) and how they will participate.

### 3. Results and Discussions

#### 3.1. Stakeholders of Marine Fish Farming

There are many stakeholders in the cultivation of marine fisheries in Sapeken District. In accordance with the quadro helix concept, there will be four groups of stakeholders in the development process, and if the four can work well together and support each other, then development can be successful (Salas et al, 2021). According to Noor (2022), the stakeholder groups are civil society (actors as well as objects of development), entrepreneurs (private parties), government (policy makers) and academics (data/information providers). Each group has a role in the development process.

TABLE 2: Stakeholders and their Role in Sea Fisheries Farming in Sapeken Sub-district.

| Stakeholders                                     | Resources at Hand                                                                                                                                                                                      | Role                                                                                                                                                                                      |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Community - Direct Actors</b>                 |                                                                                                                                                                                                        |                                                                                                                                                                                           |
| Capture fishermen, laborers                      | Fishing skills                                                                                                                                                                                         | Provider of small fish as bait or feed with economic value (which is sought after), as a fisherman fishing/provider of raw materials using production equipment owned by fishermen/others |
| Capture fishermen, joint venture                 | Fishing skills, some production process equipment (boat or fishing gear)                                                                                                                               | Provider of raw materials (live or dead capture fish) for entrepreneurs; cooperate with other fishermen in production                                                                     |
| Capture fisherman, owner                         | Fishing skills, overall production process equipment                                                                                                                                                   | Requires other workers/fishermen in the production process. Profit-sharing system or paying fishermen who are hired                                                                       |
| Workers in the fisheries support services sector | Labor or skills in assisting fisheries businesses                                                                                                                                                      | As workers in the fisheries business in Sapeken, such as skippers, crew members, workers in warehouses/packing fish, supervisors/maintainers of cages owned by entrepreneurs, etc.        |
| Other communities not involved in cultivation    | Demand (domestic in Sapeken)                                                                                                                                                                           | Working in the non-fisheries sector, as a (regular) consumer in Sapeken                                                                                                                   |
| <b>Private (entrepreneur)</b>                    |                                                                                                                                                                                                        |                                                                                                                                                                                           |
| Fresh (dead) fish trader/distributor             | Warehouse, fresh fish packaging, transportation/shipping equipment and vessels, catch production resources, money to purchase fish/raw materials, relationships with consumers outside the subdistrict | Buyer of fishermen's catch (in fresh condition), packs it and sells it to relations outside Sapeken.                                                                                      |

TABLE 2: Continued.

| Stakeholders                                                                                              | Resources at Hand                                                                                                                                                                                                                                                    | Role                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Private (entrepreneur)</b>                                                                             |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                         |
| Live and dead fish traders/distributors                                                                   | Warehouse, fresh fish packaging, transportation/shipping equipment and vessels equipped with holding tanks to keep fish alive during the shipping process, cages/shelters, other variable resources/capital), relationships with consumers outside the sub-district. | Buyer of catches (fresh or live), packs them and sells them to contacts outside Sapeken.                                                                                                |
| Enlargement cultivator                                                                                    | Cages/shelters, other variable resources/capital (to buy seedlings, feed, etc.)                                                                                                                                                                                      | Buyers of fishermen's catches in a live condition and not yet suitable for sale outside Sapeken, selling the results to collectors / entrepreneurs / distributors in Sapeken.           |
| Other entrepreneurs not directly involved in cultivation in Sapeken sub-district                          | Cash that entrepreneurs often need, but cannot be met by existing financial institutions                                                                                                                                                                             | As a trader who buys goods (daily necessities/merchandise) deliberately purchased by fish traders after sending production outside Sapeken. Cash provider for entrepreneurs who need it |
| Sapeken financial institutions (BPRS, cooperatives)                                                       | Cash, network of financial institutions outside Sapeken                                                                                                                                                                                                              | Cash provider, facilitator of financial transactions through banking                                                                                                                    |
| Other consumers of Sapeken seafood (mainly in Bali and Banyuwangi)                                        | Capital, demand for seafood, other consumer relations at home and abroad                                                                                                                                                                                             | Buyers of fresh or live fish from Sapeken. There are also those who act as exporters and capital providers for entrepreneurs in Sapeken.                                                |
| <b>Government</b>                                                                                         |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                         |
| Village and/or sub-district government                                                                    | Policies/regulations, other government facilities                                                                                                                                                                                                                    | Facilitator in government services in Sapeken as well as the implementation of various government programs                                                                              |
| Fisheries and Maritime Affairs Office (district, province) and Ministry of Fisheries and Maritime Affairs | Policies/regulations, programs, program funds                                                                                                                                                                                                                        | Facilitator of program implementation related to marine fisheries cultivation.                                                                                                          |
| <b>Academics</b>                                                                                          | Expertise, using research and community service program funds                                                                                                                                                                                                        | As a researcher, innovator, and apply the results and other community service activities                                                                                                |

Source: Survey Results, 2024.

### 3.2. Profile of Marine Fisheries Farming Stakeholders

Many groups or parties are involved, but not all groups can be captured in the survey. Nevertheless, most categories of actors involved in marine fisheries activities in Sapeken sub-district were captured in the survey. Table 3 shows the profile of actors and their businesses in the marine fisheries sector in Sapeken sub-district.

TABLE 3: Business Profile of Marine Fisheries Actors in Sapeken Sub-district.

| Stakeholders Status                              | Length of one production run | Fixed costs incurred                                                                                                                                           | Variable cost                                                                                                                                | Revenue (turnover) per one production run |               | Revenue (Turnover) per day (IDR) |
|--------------------------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------|----------------------------------|
|                                                  |                              |                                                                                                                                                                |                                                                                                                                              | Range (IDR)                               | Average (IDR) |                                  |
| Capture fishermen, laborers                      | 6 - 7 days                   | IDR. 0, - (provided by the capital owner                                                                                                                       | Hundreds of thousands of rupiah with an average of Rp 360,000 (fuel, stereofoam, bait); often provided by the boss                           | 900.000 - 6.500.000                       | 3.700.000     | 528.571                          |
| Capture fishermen, joint venture                 | 2 - 3 days                   | IDR. 10,512,000 (Boat and fishing rod)                                                                                                                         | Hundreds of thousands of rupiah with an average of Rp 220,000 fuel, bait)                                                                    | 1.000.000 - 5.300.000                     | 3.000.000     | 1.000.000                        |
| Capture fisherman, owner                         | 6 - 7 days                   | IDR. 16.515.000, - (boat, pamcing, GPS, Fish finder)                                                                                                           | Hundreds to Millions of rupiah with an average of IDR 720,000 (fuel, bait), Labor costs with a profit sharing system (average IDR 3,250,000. | 9.000.000 - 16.000.000                    | 12.000.000    | 1.714.286                        |
| Fresh (dead) fish trader/distributor             | 1 - 7 days                   | Tens to hundreds of millions of rupiah with an average of IDR. 350,000,000 (warehouse, storage tanks, coolers, GPS, motorboats, carts/land transporters, etc.) | Million to tens of millions with an average of 75,000,000 (fuel, packaging, fish/raw materials, labor)                                       | 47.000.000 - 66.000.000                   | 51.000.000    | 12.750.000                       |
| Live and dead fish traders/distributors          | 2 - 7 days                   | Hundreds of millions to trillions with an average of 2.5 trillion (cages, motorboats, spead boats, etc.)                                                       | Hundreds of millions with an average of IDR 230,000,000 (fuel, feed, labor, fish/raw materials, packaging)                                   | 270.000.000 - 520.000.000                 | 380.000.000   | 76.000.000                       |
| Enlargement cultivator                           | 5 - 10 months                | Tens to hundreds of millions of rupiah with an average of IDR. 56,000,000 (cages, boats, etc.)                                                                 | Million to tens of millions with an average of 36,000,000 (fuel, fish seeds, feed, labor)                                                    | 110.000.000 - 267.000.000                 | 188.000.000   | 835.556                          |
| Workers in the fisheries support services sector | 2 - 3 days                   | IDR. 0, - (provided by 'Boss')                                                                                                                                 |                                                                                                                                              | 400.000 - 760.000                         | 600.000       | 300.000                          |

Source: Processed Primary Data (Survey), 2024.

### 3.3. Analysis of Stakeholders' Level of Importance and Influence

Stakeholder analysis is conducted to determine the level of importance and influence of each stakeholder in marine fisheries cultivation (Galparsoro et al, 2020). The level of importance means how high the actors can be involved or have an interest in marine fisheries cultivation. According to Yu & Yin (2019), actors who really need marine fisheries cultivation will have a higher level of importance, and vice versa. The level of influence means how much the actor influences the success or unsuccessfulness of the marine aquaculture development program. Influence can be identified with the strength or power of the actor. The combination of the level of interest and influence will determine the policy or strategy of their level of involvement in any program or activity of marine fisheries cultivation in Sapeken Sub-district.

TABLE 4: Analysis of the Level of Importance and Influence of Stakeholders of Marine Fisheries Cultivation through Floating Cages.

| Stakeholders                                     |            | Level     |           | Description                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------|------------|-----------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  |            | Interests | Influence |                                                                                                                                                                                                                                                                                                                                                                                                               |
| Community - Direct Actors                        |            |           |           |                                                                                                                                                                                                                                                                                                                                                                                                               |
| Capture laborers                                 | fishermen, | High      | Low       | When marine fish farming occurs, capture fishermen tend to lose out because there is less demand for their fish products, so their interest in farming is very high. Fishers are the losers (if not involved) and can be the main actors (if involved). However, with very limited resources, their influence on success is relatively low if there is no support from other parties, such as the government. |
| Capture fishermen, joint venture                 |            | High      | Low       |                                                                                                                                                                                                                                                                                                                                                                                                               |
| Capture owner                                    | fisherman, | High      | Low       |                                                                                                                                                                                                                                                                                                                                                                                                               |
| Workers in the fisheries support services sector |            | Medium    | Medium    | The development of this group of actors depends on the development of the fisheries business they support. They are not directly involved in but complementary to marine fisheries farming.                                                                                                                                                                                                                   |
| Other communities not involved in cultivation    |            | Low       | Medium    | People outside the fishery should have no interest in or influence over marine fisheries farming. However, given that the program requires an environmental carrying capacity that is directly or indirectly influenced by the community as a whole, these actors also have their own level of influence.                                                                                                     |
| Private (entrepreneur)                           |            |           |           |                                                                                                                                                                                                                                                                                                                                                                                                               |
| Fresh (dead) fish trader/distributor             |            | High      | High      | This group has a high importance and influence on the empowerment of marine fisheries. Cultivators are the main actors, while traders/collectors are the partners who will market their products. Without the cooperation of these parties, the success of the program will be difficult to achieve.                                                                                                          |



TABLE 4: Continued.

| Stakeholders                                                                                              | Level      |             | Description                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------|------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                           | Interests  | Influence   |                                                                                                                                                                                                                                                                                                                              |
| Live and dead fish traders/distributors                                                                   | High       | High        |                                                                                                                                                                                                                                                                                                                              |
| Enlargement cultivator                                                                                    | High       | High        |                                                                                                                                                                                                                                                                                                                              |
| Other entrepreneurs not directly involved in cultivation in Sapeken sub-district                          | Low        | Medium      |                                                                                                                                                                                                                                                                                                                              |
| Sapeken financial institutions (BPRS, cooperatives)                                                       | Low        | Medium/high | Farmers need institutions that help manage the flow of money for their production process. Although these institutions do not have a direct interest, their presence and ability to fulfill the flow of funds is needed.                                                                                                     |
| Other consumers of Sapeken seafood (mainly in Bali and Banyuwangi)                                        | Medium     | High        | Farmers need a market for their products. Given that the suppliers of fish products are not only from Sapeken, it is possible that the entrepreneurs who demand fishery products have no direct interest in fish farming. However, they will have a major influence because they are the market for Sapeken's fish products. |
| Government                                                                                                |            |             |                                                                                                                                                                                                                                                                                                                              |
| Village and/or sub- district government                                                                   | Medium     | Medium      | The government has an interest in improving the welfare of its people equally, although there must be prioritization given the size of the area to be taken care of. They also have moderate to high influence, depending on their commitment to support the implementation of the marine fish farming program.              |
| Fisheries and Maritime Affairs Office (district, province) and Ministry of Fisheries and Maritime Affairs | Medium     | High        |                                                                                                                                                                                                                                                                                                                              |
| Academics                                                                                                 | Low/Medium | High        | Although academics have research and community service duties, they can choose where and when these activities are carried out. Therefore, their level of importance is low or medium. In fact, their abilities are needed as innovators and agents of science and technology dissemination for the community.               |

Source: Research team analysis, 2024.

#### 4. Conclutions

Stakeholders of marine aquaculture through floating cages consist of; 1) fishing community with “high average level of interest but low average influence” consisting of labor capture fishermen, joint venture capture fishermen, owner capture fishermen, and workers in the fisheries support service sector, 2) private sector with high average interest

and influence” consisting of traders/distributors of fresh fish (dead), traders/distributors of live and dead fresh fish, enlargement farmers, Sapeken financial institutions (BPRS, BRI and cooperatives), other entrepreneurs who are consumers of Sapeken sub-district marine products (generally in Bali and Banyuwangi), 3) government with “low interest but high influence” namely village and sub-district governments, the Department of Fisheries and Marine Affairs (district and province) and the Ministry of Fisheries and Marine Affairs, and 4) academics with “low/medium interest but high influence” namely universities in East Java.

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