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A Common Thread for Adaptive Management Planning of Small-scale Fishermen Needs versus Government Policy in South Papua, Indonesia

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Abstract. Indonesian government has established measurable fishing regulations by Government Regulation 11/2023 to protect and sustain fishery resources. This policy is unsuitable for small fishermen's needs and has resulted in mass demonstrations in South Papua. Data were conducted with the fishermen demonstrators (n=100) by participation observation, in-depth and semi-structured interviews. The results showed fishermen refused the regulated fishing regulations for vessels <30 GT as far as 12 miles, simplify the licensing process, increase the fuel quota and repeal mooring requirements only at the Merauke fishing port. Formulating laws and regulations for fisheries management requires a combination of ecological, economic, and sociocultural principles to sustain fisheries systems. Stakeholder involvement must be implemented into every policy design and decision-making stage by integrating fishermen's perspectives in the fishing business. Integrating fishermen's points of view can be a benchmark for the suitability of fishermen needs and sustainability of fisheries resources in each region.

Keywords: small-scale fisherman, adaptive management, south papua, indonesia

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1 Introduction

The sustainability of small-scale fisheries businesses is currently one of the main priorities pursued by the government and organizations working in the humanitarian and development fields [1] as a step to support the Sustainable Development Goals (SDGs) to reduce poverty, hunger and also to increase the quality of human health [2].

Globally, fishers had many pressures to experience complex from environmental changes, social, economic, and political. This condition is possibly derived by environmental degradation, financial markets, climate changes, increased fishing competition, and regulation barriers [3].

South Papua has fisheries and marine potential originating from the Arafura Sea, many business actors target this area as a fishing location [4]. Fisheries statistics record that around 20,000 boats from outside Papua enter to catch in the South Papua region, which impacts the exclusion of local fishermen and decreases the number of fish catches.

This condition makes it difficult for local fishermen, a very vulnerable population, because they depend on the number of fish in the sea, an expected resource as their income [5]. Fishing activities full of uncertainties result from a lack of awareness to preserve fishing grounds and delays in fisheries zone conditions that affect to the quality of fish.

A follow-up by Ministry of Maritime Affairs and Fisheries established a measurable fishing program, controlled and proportional fishing, carried out in measured fishing zones, based on fishing quotas to preserve fish resources and their environment and equitable distribution of national economic growth. The measured fishing zone is the fishery management area of Indonesia and the open sea, which is managed to utilize fish resources by measuring fish.

Government Regulation 11/2023 concerning the measured fish catch is placed in the State Gazette of the Republic of Indonesia Number 35/2023. However, ironically the Ministry of Maritime Affairs and Fisheries has not prepared its derivative regulations, so implementing Government Regulation 11/2023 is in limbo. The Licensing Directorate by The Ministry of Maritime Affairs and Fisheries stopped applying for business permits, including fishing permits and fishing vessel permits, because they were still waiting for Government Regulation 11/2023. This is very counterproductive and contrary to the objectives of the measured catch of fish, thus creating an uncondusive business climate and causing legal and business uncertainty.

This paper aims to describe an overview of small-scale fishermen in South Papua and the problems faced as a result of laws and regulations made by the government. This condition is also an essential note for researchers, policymakers, and organizations working in the fisheries sector to not only focus on the environment but also to understand the needs and vulnerabilities experienced by fishermen as a common

challenge to manage and regulate fisheries resources to improve the quality of fishermen in South Papua.

2 Theoretical Framework

The sustainable growth of a region has become a global strategic issue [6]. Sustainable regional development is defined as increasing quality by improving the region's environment. Through sustainable environmental improvement, it is essential to consider the availability of resources to ensure the fulfillment of the needs of the people in the region [7].

Fishery resources and increasing market demand must also increase availability [8, 9]. Small-scale fisheries sector in developing countries engaged more than 200 million people [10] but is very susceptible to change. Integrated management should be connected from sectors, stakeholders and regions to sustain fisheries resources [11].

The government is aware of inequality and slow development in small, outermost, and border islands. Disparities in regions and the backwardness of an area are still a problem to be managed. Accelerated development policies must be carried out by considering aspects of the human resources, community's economy, regional financial capabilities, facilities and infrastructure, accessibility, and regional characteristics so that they can run effectively [12].

Overcoming this inequality can be used by the sociocultural component to evaluate the condition of a region and help ensure institutional accountability and measure the region's progress. In addition, incorporating social elements into management evaluations allows decision-makers to adopt dynamic strategies as applicable actions in dealing with changing social conditions in an area [13].

3 Material and Method

This research was conducted from February to June 2023 in South Papua, see Fig. 1. The method are use is combined semi-structured and in-depth interviews [14], also field observation [15] of South Papua fishermen. Respondents were taken randomly during demonstrations with a target (n=50); the results of the interviews showed that 100 respondents were validated, see Table 1.

Interview questions contain about background information such as fishing activity (species target, fishing boat, fishing duration, employment, operational costs and market system), main problem of fisheries activity, government role and law enforcement (the type, procedures, sanctions and the effect for fishermen). Interviewed attend the respondents for about 10-20 minutes to gain more understanding about what fishermen need, and supported by recording the condition of the object target.



Fig. 1. Research Area

Table 1. Respondents characteristic

Variable	Respondents Target		Validation	
	n	%	n	%
Age category				
- Young	20	40	42	42
- Middle-age	20	40	48	48
- Old-age	10	20	10	10
Education attainment				
- No formal	10	20	23	23
- Primary	10	20	25	25
- Secondary	10	20	36	36
- Tertiary	20	40	38	38
Marital status				
- Never married	5	10	21	21
- Married	40	80	64	64
- Divorced/Separated	5	10	15	15
Household wealth status				
- Poor	40	80	35	35
- Middle	5	10	55	55
- Rich	5	10	10	10
Household size				
- Small	40	40	67	67
- Medium	5	10	30	30
- Large	5	10	3	3
The beneficiary of a livelihood intervention				
- Yes	10	20	35	35
- No	40	80	65	65

Qualitative descriptive techniques are used for analyzed data. Qualitative descriptive analysis is a processing of design data conducted by researchers to find out about the conditions that occur, anyone who played the role, what the problem is, and the location of occurrence [16].

4 Result and Discussion

4.1 Fisheries Activity at South Papua

Baramundi (*Lates calcarifer*) and Caroun croaker (*Johnius carouna*) is the most species target of small-scale fishermen in South Papua using fishing boats with 6-60 GT capacity. Fishing activities are carried out throughout the year with a fishing duration of 3–40 days, according to the catch and supplies. One fishing boat consists of 1 captain and 3-7 crew members. The fishing target area is in the Arafura Sea.

The operational costs incurred by fishermen for one trip are 30,000,000,- IDR with a gross income

100,000,000–200,000,000,- IDR. However, the fishing business is uncertain, so sometimes the results do not cover operational costs or do not get results at all.

Baramundi and Caroun croaker are fishery products with high economic value. They are the target species for fishermen in South Papua because they have fish maw which is the organ that regulates the ability to float and swim [17]. Fish maw in the market are used as a luxury food and surgical sewing thread, so they have a high selling price. Fish maw are sold in various sizes (10 grams; 20 grams; and 30 grams). The price for 10 grams fish maw of caroun croaker per 1 kg is around 18 million IDR, and approximately 15.000 tons were produced in 2018 [18].

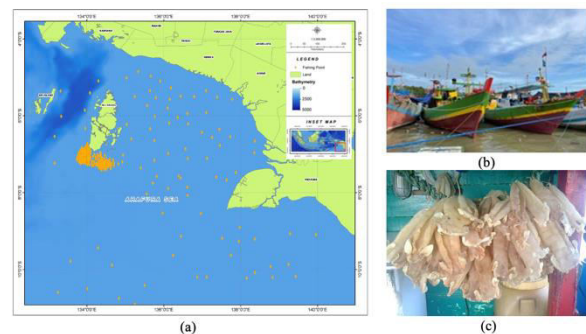


Fig. 2. (a) Fishing Ground of South Papua Fishermen; (b) fishing boat <30GT; (c) dried fish maw

The sale of fish maw is in dried as the primary requirement, so fishermen sometimes carry out the drying process on board to be sold immediately when they are landed. Sale and purchase transactions are carried out by fishermen with collectors who come from Chinese, Javanese, and Toraja tribe to be sent to Java and exported to Malaysia and Singapore.

4.2 Main Problem of Fisheries Activity at South Papua (Fishermen Needs vs. Government Policy)

The challenges currently handle in the development of marine and fisheries, especially capture fisheries, include:

- lack to control overfishing, which has the potential to threaten the sustainability of fish resources and ecosystems;
- management of capture fisheries that have not been integrated and have not optimally grown the regional economy by the potential of its fishery natural resources;
- infrastructure and connectivity of fishery ports, including facilities and infrastructure that are inadequate and uneven; and
- unstable availability of raw materials with insufficient competitiveness and quality of fishery products.

Addressing these issues and challenges, the government has prepared a measured catch policy as a reference for capture fisheries management in Indonesia while maintaining marine ecology that

contributes to national economic growth and ensures the health of Indonesia's seas. The measured catch policy is pursued to preserve the ecology and safeguard biodiversity, increasing regional economic growth and the welfare of fishermen. The measured fishing policy is expected to eliminate illegal, unreported, and unregulated fishing practices.

The measured fishing policy was ratified in Government Regulation 11/2023. As a follow-up to this policy, the Licensing Directorate of the Ministry of Maritime Affairs and Fisheries stopped applying for business permits because it was still waiting to implement of Government Regulation 11/2023.

The government policy triggered a reaction from fishermen, especially those in the South Papua region, where fishermen's social actions manifested in their group's awareness of their environment [19]. The lack of communication among the disputing parties resulted in the ineffectiveness of the policies made. Communication between conflicting parties can work effectively if use the approach that makes it easier for conflicting parties to understand each other, agree and share roles [20].

Table 2. Government policy vs. fisherman needs in South Papua

Government Policy	Fisherman Needs
- Implement of Government Regulation 11/2023 concerning Measured Catching of Fish	- Refuse implement of Government Regulation 11/2023 concerning Measured Catching of Fish about 12 miles from coastline for fishing boat <30 GT
- Stopped the process of fishing permit	- Increase the fuel quota and mini fuel station for local fishermen
- Stopped the process of fishing boat permit	- Simplified and expedited fishing permit
- The catchment area for fishermen with vessels <30 GT is not passing 12 miles from the coastline	- Repeal the requirement for fishing boats to only moor at the Merauke Fishing Port and banning in others ports.

The fishermen's movement against the government arises from social and ecological problems. Genealogically, the fishermen's movement has metamorphosed in organization, issues, and scale. The role of key actors occupies a major position in the effectiveness of the fishermen's movement. It can be seen if there is an organizational change and the actor's followers are dispersed to various organizational activities and issues or continue to follow the key actors [21].

4.3 Adaptive Planning to Sustain Small-scale Fisheries at South Papua

The process of formulating policies and regulations at Indonesia in fisheries sector is aligned with technical and operational regulations, which have only focused on restoring fish stocks (e.g., Government Regulation 11/2020). This makes

fishermen continuously face socio-economic challenges in addition to other impacts such as declining resources, global transformation, contamination, market rivalry, limited institutions, and inconsistencies in policy implementation [22]. Other methods of conventional management planning that are biologically centered [23] suggest an ecosystem-based approach that is more comprehensive and interdisciplinary [24], and incorporates the human dimension as a tool for enhancing management effectiveness. The biological and ecological restoration, which are the main focus, makes policymakers pay less attention to the sociocultural dimensions that impact ecosystems is human-environmental interplay (from production to consumption).

Researchers emphasize the importance to know the value of the management plan by any stakeholder will implement and having the same understanding and perception for successful policy implementation [25]. However, the needs, attention constraints, and new opportunities generated by the performance of guidelines in daily fishing activities related to sociocultural, economic, and biological problems, is still little attention given. Fishermen in South Papua feel this condition. The incompatibility of regulations to be implemented in one area will create new issues for fishermen conducting fishing business, see Table 3.

Table 3. Identification of South Papua Fisherman statement

Respondents	Statement
Interviewer 1	<i>"The condition of Merauke (Arafura Sea), makes it impossible to apply the regulation because it has a sloping topography so that the tides reach 3-5 miles. This condition, the area for fishing activities is very narrow. To catch the fish target, most fishermen use drift gill nets and operated by following the direction of the sea currents and don't allow the current length to be limited."</i>
Interviewer 2	<i>"I think that there are two regulations that cannot be united. On the one hand, the regulations from the center state that from 12 miles to 14 miles is the limit for boat of 30 GT and below. But on the other hand, customary rules emphasize customary territory, which collides. Then this is necessary there are discussions with the government, fishery actors, and the indigenous people themselves so that they don't clashes widen because several times there was looting; if we look for who is wrong so, go awry because it's their territory"</i>
Interviewer 3	<i>"There are taxes—the tax given to the perpetrators of the fishing company in the customary coastal village, evidence— this physical evidence exists, one ship is requested up to 6 million there, now regarding This is not stated in the ministerial regulation."</i>

Interviewer 4 *"The recommendations issued by the agency to obtain subsidized fuel are limited to the number of liters for each boat. The subsidized fuel quota is only up to one and a half months at sea; as a result, many boat do not carry out fishing activities because they buy industrial diesel."*

Participation and adaptive planning can help to increase the effectiveness and successful of fisheries management [26] by pushing stakeholders in voicing their idea and attention to direct fisheries management towards better and more sustainable results [27]. Stakeholder knowledge and social interaction are very necessary for the decision-making process on fisheries management. As well as being a key indicator of fisheries management governance [27, 28], stakeholders can also be the facilitate trust-building, communication, promote joint capacity building [27], play a role in the development and implementation of management plans [29], and encourage research collaboration between scientists and fishermen [30].

5 Conclusion

Determination of Government Regulation 11/2023 concerning Measured Catching is a management measure to maintain fish stocks biologically. However, it does not consider the social, economic, and cultural dimensions experienced by fishermen on the coast. The result is that the policy implementation process cannot run effectively. Stakeholders in policy formulation pay more attention to the target market for sustainability (increasing fish production and stocks in the environment). However, considering the sociocultural conditions in fishing activities can also improve the image of fishermen so that they will feel more cared for.

One of the options that can be applied when formulating policies is to add the point of view of fishermen directly involved in the fishing business. This can be a consideration so that the policies made can adopt to the fishing activities of the fishermen themselves. An ecosystem-based management approach can be included in a community-based system that incorporates proactive key actors and fisheries activities as human activities that are socially and culturally based on the environment.

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