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## Fishermen's perceptions of destructive fishing in the Pangkep reGENCY, South Sulawesi, Indonesia

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### Abstract

To date, destructive fishing practices continue in the waters of South Sulawesi, particularly in the North Liukang Tuppabbiring District of the Pangkep Region. The fishermen's ability to reduce harmful fishing heavily depends on how they interpret destructive fishing and its impact on marine resources. The aim of this study is to examine fishermen's attitudes toward damaging fishing in the waters of South Sulawesi in the North Liukang Tuppabbiring District. This study was carried out in two locations i.e. fishermen living on the coast and fishermen living on the islands. The method used in this study is a field survey using questionnaires on 50 respondents, consisted of 20 fishermen living in the coastal area and 30 fishermen living in the island area. The sampling technique utilizes the disproportionate stratified random sampling method. Data were analyzed by measuring index values, then categorization was done by using a composite index. The results showed that island fishermen had a lower perception level than coastal fishermen on economic aspects (3.52 vs 3.81), law enforcement (2.47 vs 2.81) and social conflict (2.69 vs 2.81). However, island fishermen have a higher level of perception than coastal fishermen on aspects of environmental preservation of natural resources (1.38 vs 1.06).

**Keywords:** Perception, fishermen, destructive fishing, Indonesia

### Introduction

Fisheries have an important and strategic role in the development of the national economy, especially in increasing the expansion of employment opportunities, income distribution, and improving the standard of living of the nation in general, small fishermen, small fish raisers, and business actors in the fishery sector while maintaining the environment, sustainability, and availability of fish resources<sup>[1]</sup>.

Fishermen in utilizing marine and fishery resources often occur on a large scale but do not consider environmental sustainability aspects. The problem is that the methods used so far often tend to conflict with the principles of responsible fisheries management (Code of Conduct for Responsible Fisheries - CCRF)<sup>[2]</sup>.

Illegal fishing is part of IUUF (Illegal, Unreported, Unregulated Fishing), which is a well-organized fisheries crime, starting at the national to an international level that can damage fish resources (destructive fishing). The Food and Agricultural Organization (FAO) has placed destructive fishing as a fisheries crime that needs serious attention<sup>[3]</sup>.

In fact, until now, the practice of destructive fishing is still ongoing in the waters of South Sulawesi. The results of research on the description of destructive fishing activities in the Spermonde Islands, South Sulawesi, show an alarming percentage. Of the 120 islands in the Spermonde Archipelago, 10 islands were selected as the study target locations, indicating that 229 respondents, 194 respondents (64.88%) were destructive fishing actors. Of this number, 133 respondents (68%) were perpetrators of the fish bombing, 52 respondents (27%) were perpetrators of fish drugging, and 9 respondents (5%) were perpetrators of both<sup>[4]</sup>.

Fishermen who live in Liukang Tuppabbiring Subdistrict, Pangkep Regency, utilize marine water resources to meet their daily needs. However, in practice many fishermen still use destructive fishing methods in catching fish, such as using explosives and cyanide poison. As a result, it can cause damage to marine ecosystems, such as damage to coral reefs which are the home and breeding grounds for fish, as well as fish populations that continue to decline.

Law enforcement is hampered, so efforts to reduce destructive fishing activities face considerable obstacles.

This is because law enforcement has enormous power in influencing people's behavior. The law must be able to make the perpetrators of destructive fishing activities a deterrent, and not to repeat their activities again. Sociologically, it can influence other people not to do the same thing and give a sense of justice for those who are friendly to the environment [4].

One of the reasons why there are still many damaging fishing methods in the Liukang Tuppabiring waterways is a lack of socialization and counseling for fishermen. Government and stakeholder efforts and innovations are required to ensure that fishermen receive accurate information and understand the repercussions of damaging fishing.

The aim of this study was to examine and comprehend the perceptions of fishermen in Liukang Tuppabiring Subdistrict towards destructive fishing practices in catching fish in the waters of South Sulawesi.

## Materials and Methods

### Study design

Fishermen from the North Liukang Tuppabiring District, Pangkep Regency, were chosen for the study, with 20 living on the coast and 30 on the islands. The purpose of this study was to learn more about fishermen's perspectives about disruptive fishing in the waters of South Sulawesi. It was conducted using a descriptive correlational method. This research employs an LESS strategy (Law enforcement, Economy, Sustainable environmental, Social conflict).

The research instrument is a questionnaire in the form of a statement with five alternative answer choices, which are weighted 5,4,3,2,1 for positive statements and 1,2,3,4,5 for negative statements [5].

### Sampling technique

The sampling technique used is the disproportionate stratified random sampling method, a sampling technique from an unexpected and stratified population, but some of them are not distributed proportionally, because the population members are heterogeneous. Determination of the sample using the formula as follows:

$$n = \frac{N}{1 + N e^2}$$

### Where

n: number of samples

N: population size

e: possible inaccuracy due to tolerable sampling error.

Data was collected by using questionnaires and documentation methods.

### Data analysis

The data analysis method used is to calculate the perception level index of fishermen in the Liukang Tuppabiring Islands District towards destructive fishing practices in the waters of South Sulawesi and classify them into categories. The score used is a Likert Scale, which is 1 for the lowest answer value and 5 for the highest answer value. [5] The category of perception level of fishermen in Liukang Tuppabiring Utara District, Pangkep Regency is divided into 4 groups. The determination of the category is as follows:

Score 1.00 – 1.99 : very low (VL)

Score 2.00 – 2.99 : low (L)

Score 3.00 – 3.99 : high (H)

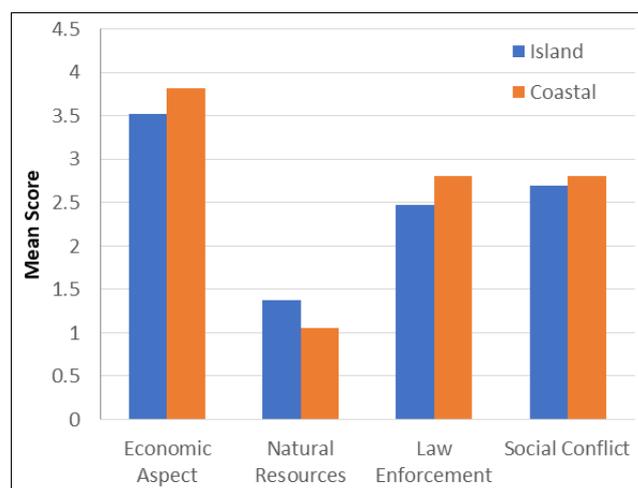
Score 4.00 – 5.00 : very high (VH)

## Results and Discussion

### The level of perception of fishermen in general about the relationship between destructive fishing and various aspects.

The findings of the study on fishermen's perception levels in Liukang Tuppabiring Utara District are generally associated with various aspects, as shown in Figure 1, which shows that island fishermen have a lower perception level than coastal fishermen on the economic aspect (3.52 to 3.81), enforcement law (2.47 to 2.81), and social conflict (2.47 to 2.81). (2.69 to 2.81). In terms of environmental conservation of natural resources, however, island fishermen have a higher view than coastal fisherman (1.38 to 1.06).

Because island fishermen live a simpler lifestyle than coastal fishermen, they have a lesser degree of perception in the economic side. Coastal fishermen had a higher perception of law enforcement and social conflict because they are geographically easier to reach by extension officers, both for legal and other socialization connected to disruptive fishing. Aside from that, coastal fishermen have an easier time accessing knowledge through print and electronic media, as well as associating with the neighboring population. Meanwhile, island fishermen who live off the beaten path find it more difficult to access information, resulting in a lack of awareness of the law.



**Fig 1:** Perception level of island and coastal fishermen in Liukang Tuppabiring Utara District, Pangkep Regency regarding the linkage of destructive fishing seen from various aspects

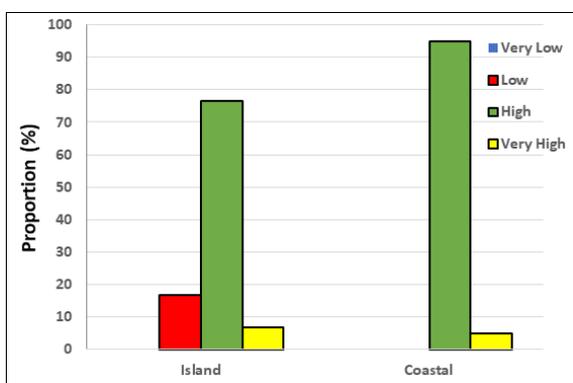
Island fishermen have a greater level of sensibility than coastal fishermen when it comes to environmental conservation of natural resources. This is due to the fact that island fishermen are acutely aware of the importance of protecting the natural environment in which they reside. Island fisherman prefer to fish in areas distant from their home islands, and they will drive away if they encounter other fishermen seeking for fish on their home islands. Coastal fisherman, on the other hand, are less concerned about marine resources because they reside on the coasts of vast islands.

### The level of fishermen's perception of the relationship between destructive fishing and economic aspects

The results of the study on the perception level of fishermen in Liukang Tuppabiring Utara District associated with

economic aspects can be seen in Figure 2, showing that 5 people (16.66%) of island fishermen have a low level of perception, 23 people (76.76%) are high and 2 people (6.67%) were classified as very high. For coastal fishermen, 19 people (95%) have a high level of perception, and 1 person (5%) has a very high level of perception. There were no coastal fishermen who had a relatively low level of perception on the economic aspect.

There are still island fishermen who have a low perception of the economic aspect. Especially for fishermen who live on islands far in the middle of the sea. This is due to the simpler lifestyle of island fishermen and limited access to the delivery of necessities of life due to the distance from the mainland. Meanwhile, coastal fishermen did not find any fisherman with a low level of perception, dominantly having a high perception of the economic aspect. This is because they live in coastal areas that are close to cities and crowds, so they have more complex life needs. So that economic factors become very important in the pattern of life.



**Fig 2:** Perception level of island and coastal fishermen in Liukang Tuppabiring Utara District, Pangkep Regency regarding the relationship between destructive fishing and economic aspects

Some studies indicated that most industrial activities in regencies/cities are in coastal areas. Industrial activities in coastal areas are directly related to a strong (backward and forward linkage) with other industries. In addition, Indonesia's coastal areas have a high comparative advantage, as reflected in the potential of their fishery resources [6].

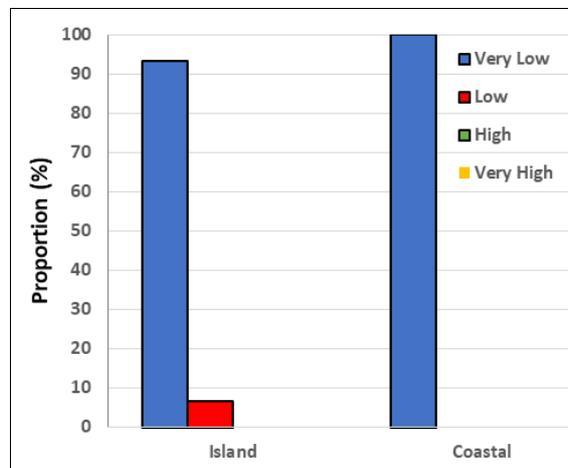
**The level of fishermen's perception of the relationship between destructive fishing and environmental conservation aspects of natural resources**

The results of the study on the perception level of fishermen in Liukang Tuppabiring Utara District associated with environmental conservation aspects of natural resources can be seen in Figure 3, showing that 28 people (93.33%) of island fishermen have a very low perception level, and 2 people (6.67%) is low. Meanwhile, 20 people (100%) of coastal fishermen have a very low level of perception. There were no island fishermen and coastal fishermen who had a relatively high level of perception in this aspect.

Coastal fishermen have very low perceptions of environmental conservation aspects of natural resources. This is related and directly proportional to the economic aspect. The high economic needs cause fishermen to have a tendency to ignore environmental aspects of natural resources. Meanwhile, island fishermen still have a concern in preserving the natural resources where they live.

A study focusing on adaptation strategy for small island fishermen to ecological changes in Pangkep Regency, stated

that ecological changes in the marine area where fishermen catch fish are caused by various forms of exploitation of marine resources that tend to be exploitative and climate change. These various forms of ecological change have an impact on the lives of fishermen, including abrasion in residential areas, difficulty in determining fishing grounds, decreasing catches, increasing distance from fishing areas and increasing the risk of going to sea [12].

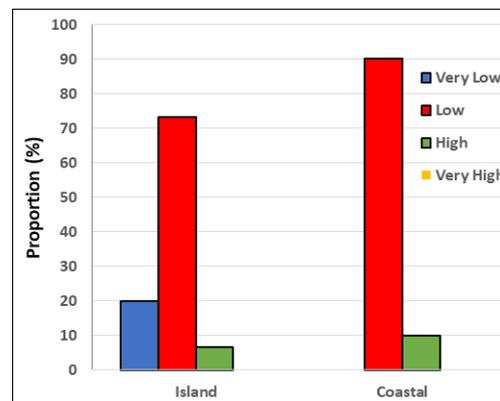


**Fig 3:** Perception level of island and coastal fishermen in Liukang Tuppabiring Utara District, Pangkep Regency regarding the relationship between destructive fishing and aspects of environmental conservation of natural resources

With this fact, island fishermen have a tendency to maintain the sustainability of their marine natural resources. The strategy applied by island fishermen is to diversify sources of income, expand fishing areas with environmentally-friendly fishing gear, mobilize household members and take advantage of social relationships.

**The level of fishermen's perception of the relationship between destructive fishing and law enforcement aspects**

The results of the study on the perception level of fishermen in Liukang Tuppabiring Utara District related to law enforcement aspects can be seen in Figure 4, showing that 6 people (20%) of island fishermen have a very low perception level, 22 people (73.33%) are low and 2 people (6.67%) are high. Meanwhile, 18 people (90%) of coastal fishermen have a low level of perception, and 2 people (10%) have a high level of perception. There were no coastal fishermen who had a very low level of perception in this aspect.



**Fig 4:** Perception level of island and coastal fishermen in Liukang Tuppabiring Utara District, Pangkep Regency, regarding the relationship between destructive fishing and law enforcement aspects

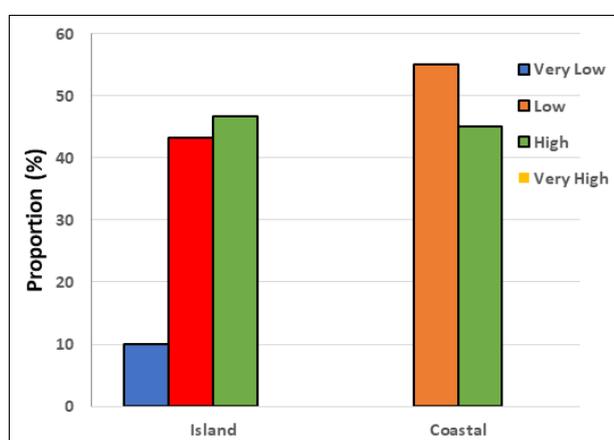
Island fishermen have a low level of perception in legal aspects. This is directly related to aspects of natural resources. The tendency of island fishermen is very concerned about preserving their natural resources, causing them to rarely come into contact with legal issues related to destructive fishing cases. In contrast to coastal fishermen, they have a higher level of perception in the legal aspect. This is because they are more likely to practice destructive fishing, so they are often faced with legal cases.

Data from the Pangkep Police stated that throughout 2018 they had handled 9 cases of destructive fishing with 26 suspects. Destructive fishing activities carried out are by using fish bombs and cyanide-type drugs [8].

The results of research that analyzed of fishermen's legal awareness levels against the use of fish bombs in the Pangkep Regency, stated that the level of legal awareness of fishermen is still low. Factors that affect fishermen's legal awareness are internal factors, including attitudes, behavior and legal understanding, while external factors include education level, socio-economic conditions and lack of cooperation between fishermen and local government [9].

### The level of fishermen's perception of the relationship between destructive fishing and aspects of social conflict

The results of the research on the perception level of fishermen in Liukang Tupabiring Utara District associated with aspects of social conflict can be seen in Figure 5, showing that 3 people (10%) of island fishermen have a very low perception level, 13 people (43.33%) are low and 14 people (46.67%) is high. For coastal fishermen, 11 people (55%) have a low level of perception, and 9 people (45%) have a high level of perception. There were no coastal fishermen who had a very low level of perception on this aspect.



**Fig 5:** Perception level of island and coastal fishermen in Kec. Liukang Tupabiring Utara Kab. Pangkep on the relationship between destructive fishing and aspects of social conflict

Island fishermen have a lower level of perception on aspects of social conflict compared to coastal fishermen. This is because island fishermen who live far in the middle of the sea have limited access to information, both in the form of counseling and guidance from local governments and other stakeholders. This situation greatly affects the ability of island fishermen to manage their catches so that they have maximum economic value so that they can change their lives for the better. The aspect of social conflict really helps them in getting information about the development of the outside world and their opportunities as fishermen to make their lives

better.

Meanwhile, coastal fishermen have a better perception of the aspect of social conflict because they live in mainland coastal areas, which have better access to information and networks. They are easier to reach by the government and stakeholders in providing guidance and counseling related to their lives as fishermen in managing their catch so that they are maximized. Efforts to socialize the impact of destructive fishing to fishermen have been carried out since 2006, through the Coral Reef Rehabilitation and Management Program (COREMAP) [10]. One of these outreach efforts is to involve fishermen directly in the conservation of coral reefs. Fishermen are provided with various training programs and venture capital in order to create their own jobs by managing the marine resources they get. This strategy is expected to enhance the lives of fishermen and prevent them from engaging in harmful fishing methods [11].

### Conclusions

The level of perception of fishermen in Liukang Tupabiring Sub-district on the practice of catching fish by destructive fishing shows that island fishermen have a lower level of perception than coastal fishermen on economic aspects, law enforcement and social conflict. Island fishermen have a higher level of perception than coastal fishermen on aspects of environmental conservation of natural resources.

The study results indicate the need to create a model for the education system and skills training for fishermen in North Liukang Tupabiring District based on environmental management, so that fishermen have good perceptions, knowledge, and behavioral attitudes in utilizing and managing marine resources. In this way, marine resources will be preserved.

### Acknowledgment

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