



ANALYSIS OF THE LEVEL OF FISHERMEN'S COMPLIANCE IN COASTAL ENVIRONMENTAL MANAGEMENT BASED ON LOCAL WISDOM (Case Study: The Role of Panglima Laot in North Aceh Regency)

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Abstract

Coastal resource management based on local wisdom regulates environmental conservation customs for the sustainability of coastal resources in Aceh Province. As direct users of marine resources, fishermen have a key role in maintaining the sustainability of coastal ecosystems. The level of compliance of fishermen in the utilization of coastal resources is very important. Specifically, this study aims to identify problems in coastal area management related to the implementation of customary law in North Aceh Regency and to analyze the level of compliance of fishermen in terms of maintaining the coastal environment based on customary law. This study uses a survey method where the determination of the location is determined purposively (intentionally) in North Aceh Regency. Primary data were obtained from fishermen through structured interviews (questionnaires) involving 80 fishermen while secondary data were obtained from various agencies related to this study. Data were analyzed qualitatively with Likert scale measurements. The results of the study showed that the problems that occurred in the coastal area of North Aceh Regency were dominated by the use of environmentally unfriendly fishing gear, lack of supporting facilities and infrastructure for the activities of the Panglima Laot institution, and low human resources of the Panglima Laot institution apparatus. Based on the analysis of the level of compliance of fishing communities in maintaining the coastal environment, the following are in order: 1) Prohibition on bombing and anesthetizing fish. (2) Not violating the no-go days at sea. (3) Not damaging coral reefs. (4) Not polluting the coastal environment. (5) Not catching protected fish and marine biota. (6) Not damaging/cutting down mangroves.

Keywords: *Panglima Laot, fishermen's compliance, coastal environment, local wisdom, sea customs.*

1. INTRODUCTION

Aceh Province has a coastline of 2,666.27 km with 272 islands, with 6 small outlying islands and 1,182 coastal villages. Geographically, some of the regencies/cities in Aceh Province are located on the coast. This geographical condition encourages some Acehnese people to live or settle on the coast and work as fishermen. This condition will certainly make people interact with each other, both with each other and with nature, thus giving birth to local culture and wisdom (Munazir, R., et al, 2017). Local wisdom can be understood as local ideas that are wise, full of wisdom, have good values, which are embedded and followed by members of the community. Local wisdom is knowledge that is used by local communities to survive from generation to generation as a means of intelligence (Adli Abdullah M., et al, 2006)

Acehnese society has local wisdom that is structured in traditional institutions. Based on Aceh Qanun No. 10 of 2008, it states that traditional institutions are all traditional community organizations formed by a traditional legal community that manages and resolves matters related to Acehnese customs. Aceh has 13 Traditional Institutions, namely: (1) Aceh Traditional Council; (2) Imuem mukim; (3) Imuem Chik; (4) Keuchik; (5) Tuha Peut; (6) Tuha Lapan; (7) Imuem Meunasah; (8) Keujreun Blang; (9) Panglima Laot; (10) Pawang Glee/uteun; (11) Petua Seuneubok; (12) Haria Peukan; (13) Syahbanda (Aceh Qanun No. 10 of 2008).

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In the coastal communities of Aceh, there are known to be traditional leaders of the fishing communities called Panglima Laot. The leader of the Panglima Laot traditional institution carries out his role as the local wisdom of the coastal community owned by the Acehnese people. Panglima Laot as a maritime cultural heritage, its existence (existence) has been rooted in the lives of the Acehnese people since the time of the Aceh Sultanate until now (Marzuki, A. 2020). Local wisdom such as Panglima Laot is very possible to be used in managing the coastal and marine environment (Pita C, Pierce GJ, Theodossiou I. 2010)

According to Sulaiman T (2019) Coastal resource management must be carried out by considering the principles of sustainable development and environmental preservation. There are two important things, namely positioning customary law of the sea and fisheries management while still considering the principles of sustainable development. This is also in line with the research results of Ta-li-lin, et. al. (2021). stated that increasing capacity in local communities is needed with the aim of giving them the authority to make them understand and comprehend and solve problems related to coastal area management and motivating them to achieve a better life.

Many violations committed by fishermen in the utilization and maintenance of the coastal environment require synergistic handling between stakeholders involved in the management of coastal areas based on local wisdom. Especially compliance with the no-go-to-sea days, maintaining the coastal ecosystem, minimizing the use of environmentally unfriendly fishing gear and maintaining the mangrove ecosystem regulated in the customary law of the sea. One of the initial steps to increase compliance in minimizing violations is the level of community compliance with the rules regulated in the customary law of the sea.

2. IMPLEMENTATION METHOD

This research was conducted in Dewantara and Syamtalira Bayu Districts in North Aceh Regency. The location of this research was determined intentionally considering that this place is a coastal area that applies customary sea law in managing coastal areas. This research was conducted from April to August 2024. The object of this research is the fishing community involved in the management and utilization of coastal resources in the area of implementation of customary sea law. The scope of this research is to identify problems in the utilization and management of coastal resources and to analyze the level of compliance of fishing communities related to the implementation of customary sea law in the management of coastal resources.

The population in this study was (1) coastal communities whose profession is fishermen (2) elements of the Panglima Laot Regency, (3) Panglima Laot Lhok/Sub-district. The sample size in this study was 80 respondents. The types of data used in this study are primary data and secondary data. Primary data collection was conducted by interviewing and distributing questionnaires to fishermen in Dewantara and Syamtalira Bayu Districts. Secondary data in the form of documents obtained from the BPS of North Aceh Regency, the Fisheries and Marine Service of North Aceh Regency, scientific journal articles, literature reviews of previous studies. In this study, the method used to analyze the data is a qualitative descriptive method using a Likert scale. Where the Likert scale is a scale that can be used to measure the attitudes, opinions, and perceptions of a person or group of people about a symptom or phenomenon. This Likert scale is generally used in questionnaires and is the most widely used scale in research in the form of surveys. The identification of the Likert scale scores used is presented in Table 1.



Table 1. Likert Scale Identification

Answer	Score	Information
(1)	(2)	(3)
A	4	Strongly agree
B	3	Agree
C	2	Don't agree
D	1	Strongly Disagree

Source: Sugiyono, 2017

For the total score of each statement or question that will be asked, the following formula is used;

$$\text{Total score} = T \times P_n \quad (1)$$

Information:

T = Total number of respondents who chose

P_n = Choice of Likert score numbers

Next, to obtain the interpretation results, the highest score (Y) and the lowest number (X) for the assessment item must be known using the following formula:

Y = highest Likert score x number of respondents x number of questions

X = lowest Likert score x number of respondents x number of questions

So the assessment of respondents' interpretation of the level of compliance of fishermen in managing the coastal environment based on local wisdom in North Aceh Regency is with the % index value with the following formula Sugiyono. (2017)

$$\text{Index value \%} = \frac{\text{Total Skor}}{Y} \times \% \quad (2)$$

To find out the position of the index, first find out the interval (distance) and percentage interpretation using the method of finding the percentage score interval (I) as follows (Sugiyono. 2017)

$$\begin{aligned} I &= 100\% - 25\% \\ &= 75\% \\ &= \frac{75\%}{4} \\ &= 18.75\% \end{aligned}$$

So I = 18.75%

In this study, the score interpretation criteria are based on the following intervals:

25% - 43.74%	= Very uncompliant
43.75% - 62.49%	= Less compliant
62.50% - 81.24%	= Compliant
81.25% - 100%	= Very Compliant

With the following conditions:

- If the index is in the interval of 25% - 43.74% then the level of compliance of fishermen in implementing customary maritime law in managing coastal areas is categorized as very non-compliant.
- If the index is in the interval 43.75% - 62.4% then the level of compliance of fishermen in implementing customary maritime law in managing coastal areas is categorized as less compliant.
- If the index is in the interval 62.5% - 81.24% then the level of compliance of fishermen in implementing customary maritime law in managing coastal areas is categorized as compliant.

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- d. If the index is in the interval 81.25% - 100%, then the level of compliance of fishermen in implementing customary maritime law in managing coastal areas is categorized as very compliant.

3. RESULTS AND DISCUSSION

A. Characteristics of Fishing Communities

In this study, the characteristics of the fishing community are seen including; age, formal education, experience as a fisherman, number of dependents and income from fishermen. The distribution of characteristics of fishermen in North Aceh district can be seen in the following table;

Table 2 Distribution of Fishermen Characteristics

No	Characteristics of Fishermen	Unit	Range		Average
			Low	Tall	
1	Age	Year	24	76	49.35
2	Formal education	Year	0	16	8.02
3	Length of Experience as a Fisherman	Year	2	41	19.72
4	Number of Family Dependents	Soul	0	9	4.01
5	Income	Rupiah/ Month	1,200,0000	7,000,000	2,954,0000

Source: Primary Data (processed), 2024

Based on age characteristics, the average age of fishermen is at productive age. At productive age, fishermen generally still absorb information quickly and still have a strong physique to carry out fishing activities at sea. Meanwhile, if fishermen are of unproductive age, usually fishermen are not able to work optimally in carrying out their activities as fishermen. The average level of education of fishermen in the research location is Junior High School (SL-TP), this is classified as low education. Basically, a highly educated fisherman will adopt innovation and technology more quickly, thus making fishermen more dynamic and more efficient in their work. However, the low level of formal education is supported by the average long experience as a fisherman, the longer the experience, the easier it is for fishermen to solve obstacles related to activities as fishermen based on the experience gained. This is in accordance with the research of Setia Budi (2015), the length of experience will contribute to the skills and maturity of fishermen in dealing with various obstacles in the fishing activities they undertake.

The number of dependents of fishermen's families is on average included in the medium category (more than 4 people). The number of dependents greatly affects the activities as fishermen, this is because for fishermen who have a large number of dependents, the capital costs in carrying out fishing activities are partly absorbed to meet the needs of the number of dependents of fishermen. The average income level of fishermen also shows that it is still below the 2024 Provincial Minimum Wage (UMP) of Rp. 3,166,460. The low income of fishermen in the coastal areas of Aceh is still relatively low and will have an impact on the inability to deliver fishermen to a prosperous life. The low income of fishermen can be caused by various factors, such as the lack of sufficient capital to catch fish Widodo, S. (2011).

B. Identification of Problems in Coastal Area Management in North Aceh Regency.

Based on information obtained from sources of Panglima Laot of North Aceh Regency regarding a number of Panglima Laot roles that are still being carried out, such as in terms of supervising the provisions of the Customary Law of Laot, resolving disputes and disputes between fishermen, as a liaison between fishermen and the government, and implementing



customary ceremonies of the Laot. Some of the problems that occur in the management of coastal areas related to the institution of Panglima Laot are:

1. Low Availability of Operational Funds for Institutions

One of the major challenges faced by Panglima Laot is the lack of operational funding support from the government, which has a direct impact on the effectiveness of this institution in carrying out its role. Panglima Laot in carrying out its role really needs operational funds, these funds are needed in resolving cases that occur in North Aceh Regency. The Panglima Laot institution has the main responsibility in resolving various disputes that arise among fishermen, both concerning violations of maritime customs, fishing areas, and the use of fishing gear that is not in accordance with the rules. The effectiveness of this institution is very dependent on the availability of operational funds to support activities such as meetings, deliberations, travel to dispute locations, and holding customary hearings.

With no financial support from the government, Panglima Laot must rely on limited resources, often by raising funds from fishermen. This poses a number of challenges, which if not addressed, could significantly weaken the institution's role. Sometimes Panglima Laot is required to collect donations from fishermen in the North Aceh district so that it can continue to carry out the trial processes for cases that occur.

2. The widespread use of environmentally unfriendly fishing gear

In terms of the use of fishing gear by fishermen in North Aceh Regency, there are still many who use fishing gear that is not environmentally friendly, the fishing gear that is often used is the trawl fishing gear, this condition still continues to this day and there have been no significant efforts to regulate it from the government and the Panglima Laot of North Aceh Regency. The ban on the use of fishing gear that is not environmentally friendly is actually one of the strategies implemented by the Panglima Laot institution of North Aceh Regency to prevent the occurrence of...*illegal fishing*. One of the efforts that can be done is to conduct socialization to fishermen directly through the Panglima Laot Lhok institution or a monitoring group formed to convey the prohibition on the use of prohibited fishing gear such as trawls. The use of trawl fishing gear in coastal areas has a significant impact on the sustainability of coastal ecosystems, one of which is the destruction of marine habitats, where trawls are fishing gear that are pulled using ships, the resulting damage can cause the loss of shelter and spawning grounds for various fish species, which will threaten the survival of marine biota. Other impacts that arise are fishing becomes non-selective, where the trawl fishing gear will catch all types of fish in its path, including non-targeted species. This can cause unwanted declines in fish populations and disrupt the balance of the ecosystem.

3. Limited Facilities and Infrastructure.

Lack of facilities and infrastructure at the Panglima Laot of North Aceh Regency, such as the availability of...The representative office of Panglima Laot must be a concern. This will also have an impact on the suboptimal role of Panglima Laot in resolving disputes in North Aceh Regency. The absence of a representative Panglima Laot office will have a direct impact on the administrative activities of this institution. An adequate office functions as a coordination center, a place to hold customary deliberations, and a data processing center related to fishermen's activities and potential disputes. Without adequate facilities, the administrative process, case documentation, and dispute resolution will be disrupted. A representative office is also important to build the legitimacy and credibility of Panglima Laot in the eyes of the fishing community. If this institution does not have adequate physical facilities, public trust in the authority and effectiveness of the institution could decline. Conversely, an office equipped with good facilities, including communication equipment, a modern recording system, and fast access to information, will support Panglima Laot's duties in resolving disputes more efficiently. One of the most crucial problems

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faced by the Panglima Laot of North Aceh Regency is the lack of operational vessels for sea surveillance. Given the vastness of the waters of North Aceh, adequate operational vessels are very important to ensure that supervision of fisheries activities can be carried out properly. The imbalance between the number of available surveillance vessels and the vastness of the sea in the North Aceh region causes a gap in the enforcement of fisheries regulations and supervision of vessels operating in the region. The imbalance between the number of vessels and the vastness of the sea in the North Aceh region will result in a decrease in the effectiveness of Illegal Fishing Supervision, Suboptimal Management of Fishing Areas and Limited Monitoring of Marine Ecosystems.

4. Limited Human Resources of the Panglima Laot Institution.

The limited human resources (HR) who understand the customary law of the sea, which are seen as administrators of customary law institutions of the sea, are one of the obstacles so that when making case reports and collecting data, they are not systematically carried out properly. Not all of those who become panglima laot in the coastal areas of the research location have adequate background knowledge of customary law of the sea. The limited ability and number of people to carry out their roles can lead to low performance of panglima laot institutions in implementing customary law of the sea for coastal area management. Some of the main implications include the lack of supervision and management of fisheries areas with the increasing number of fishermen using environmentally unfriendly fishing methods, lack of assistance for fishermen in the socialization and implementation of customary maritime law regulations and limited capacity in resolving conflicts between fishermen and other parties that occur in the management of coastal area resources.

C. Analysis of Fishermen's Compliance Level to Customary Law Rules.

The results of tabulation and data analysis using Likert scale measurements of the level of fishermen's compliance with customary maritime law regulations in coastal resource management can be seen in Table 3 below;

Table 3. Level of Fishermen's Compliance with Maritime Customary Law Rules

No	Fishermen compliance indicators	Index value	Interpretation
1	Do not damage/cut down mangroves	47.05	Low
2	Does not pollute the coastal environment	70.25	High
3	Prohibition on bombing and anesthetizing fish.	89.23	Very high
4	Do not violate the no-go-to-sea days	87.62	Very high
5	Does not damage coral reefs	76.38	High
6	Do not catch protected fish and marine biota	68.43	High

Source: Primary Data 2024 (processed).

Based on table 3 shows the level of compliance of fishermen is very high compliance not to bomb and anesthetize in carrying out coastal resource utilization activities. Based on the confession of several fishermen, fishing activities with bombing have been carried out by fishermen from other areas but this practice was quickly prevented after receiving information from fishermen addressed to the maritime law institution which then coordinated with law enforcement officers. At the research location, the fishing community has been socialized about the dangers of using bombs, anesthetize and tiger trawl fishing gear carried out by the maritime customary law institution in collaboration with the North Aceh Regency Marine and Fisheries Service. The level of compliance of fishermen with the no-go-sea days (prohibited from going to sea) is also in the very high category. Where the majority of fishermen are very obedient to the rules of the no-go-sea days. The number of no-go-sea days in a year is 59 days including; kenduri laot day, Friday, Eid al-Fitr, Eid al-Adha, Indonesian Independence Day, day to commemorate the Aceh Tsunami. For the fishing community, the sea taboo day which is part of the implementation of customary sea law has (1)



religious value reflected in the taboo on going to sea on Fridays and holidays, (2) socio-cultural value reflected in the taboo on going to sea on the khanduri laot day (a series of activities of gratitude for the sea's bounty) which activities are carried out by the entire fishing community working together (3) kinship value reflected during the sea taboo day, fishermen gather with their families and the coastal community, (4) Loyalty value reflected in the sea taboo day commemorating Independence Day, a symbol and form of loyalty of Acehese coastal fishermen towards the Indonesian nation which is commemorated every August 17th, and (5) environmental sustainability value reflected in all the sea taboo days (59 days/year) which have a major impact on ecological processes so that the fisheries ecosystem has the opportunity to grow and develop sustainably.

The results of the study on the level of compliance of fishermen towards the importance of maintaining coral reef ecosystems are in the high category, fishermen believe that coral reefs are a breeding ground for fish and other marine biota. The existence of coral reefs for the majority of small fishermen with simple fishing gear and technology is felt to be very important to be a place for them to live to get fish as their main source of income. Activities to not pollute the coastal environment are also part of the behavior of the fishing community, where some coastal fishermen in North Aceh Regency still consider that the estuary / estuary and the sea are still used as a place to dump garbage. Another form of pollution that is often done by fishermen is by making waste left over from fishing activities, dumping oil spills during repair activities for ship fleets / fishing gear and dumping leftover ship repair materials / waste from fishing gear, both nets and fishing lines, all of which will have an impact on pollution of coastal areas and will result in fish dying in the sea.

The form of protection activities for protected fish and marine biota in the North Aceh district, for example turtles, is still high. The results of the study showed that the level of knowledge and understanding of the community is still high. This is evident from the statements of fishermen and sea commanders that if fishermen find protected animals (turtles), they will return them to their habitat. This form of knowledge and understanding is inherited from generation to generation. However, the activity of utilizing turtle eggs is still high in the fishing community, but fishermen are still obedient not to take all the eggs from the biota, but some are left to hatch as an effort to maintain the sustainability of the turtle ecosystem in coastal areas, especially in North Aceh Regency which is one of the Turtle conservation areas.

Mangrove ecosystem is a transitional ecosystem from land to sea. Ecologically, mangrove forests are a habitat for many types of fish, shrimp, and mollusks. This place also provides a place for laying eggs, growing, and a place to find food for various small marine animals. Meanwhile, in terms of physical aspects, mangrove forests function as protectors of coastal areas from wind and sea waves. In addition, this ecosystem also protects from mud from land, especially during floods. Based on the results of interviews with respondents, the level of compliance not to cut down mangroves is still low, this is because the mangrove habitat at the research location is only a little and most of the mangroves have been converted into ponds for brackish water fisheries cultivation.

Post-Aceh Tsunami, mangrove planting activities in coastal areas were widely carried out by various parties (NGOs, Government, State Universities/Private Universities) by involving coastal communities as well as an effort to educate coastal communities about the importance of mangroves. Based on observations of mangrove habitats in the coastal areas of North Aceh Regency, their habitat is decreasing. The decreasing existence of mangroves is due to the conversion of functions for fisheries cultivation ponds and also various mangrove utilization activities for the daily needs of the community, such as firewood, building pond construction and other buildings. Overall, the application of customary maritime law has a greater chance of support from local communities and a better level of compliance compared to conventional marine conservation systems (Hamid, SK, et al, 2017, Hamid SK, et al 2020).

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The problems faced by the Panglima Laot institution in the coastal area of North Aceh Regency are dominated by the rampant use of environmentally unfriendly fishing gear, lack of operational funding support for the implementation of customary law of the sea, and low human resources of the Panglima Laot institution apparatus.

The level of compliance of the fishing community in maintaining the coastal environment in sequence is: 1) Prohibition of bombing and anesthetizing fish. (2) Not violating the sea prohibition day is very high (3) Not damaging coral reefs, (4) Not polluting the coastal environment (5) Not catching fish and protected marine biota, in the high category while (6) not damaging/cutting mangroves is in the low compliance category. Efforts to increase compliance of fishermen in supporting the maintenance of the coastal environment can be done by strengthening the capacity of the Panglima Laot institution, especially in maintaining the sustainability of mangrove forests. Stakeholder involvement is needed to build strategic partnerships with the customary law institution of the sea led by Panglima Laot in sustainable coastal area management based on local wisdom.

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