Policy Analysis of Pelagic Thresher Shark (Alopias Pelagicus) Conservation and the Role of Local Communities in Preservation in Indonesian Waters

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ABSTRACT

KEYWORDS
Conservation Area, Local Community, NTT, Policy, Thresher Shark Conservation

The thresher shark (*Alopias pelagicus*) is an apex predator that plays an important role in marine ecosystems, but its population continues to decline due to overexploitation and habitat degradation. This study aims to analyze the thresher shark conservation policy in the Alor Marine Conservation Area, East Nusa Tenggara (NTT), and to evaluate the role of local communities in supporting the conservation of this species. Data were collected through in-depth interviews, participant observation, and document analysis, and were then analyzed using qualitative methods. The results show that the conservation policy in the Alor MPA faces several implementation challenges, such as low community participation and limited monitoring resources. The findings reveal that community-based approaches significantly enhance conservation effectiveness when integrated with sustainable economic alternatives, such as ecotourism development. This study recommends adopting a community-based approach to improve the effectiveness of thresher shark conservation in a sustainable manner. The implications of this research provide a framework for adaptive conservation policy that balances ecological protection with community welfare.

INTRODUCTION

Globally, shark populations face unprecedented threats from overexploitation, habitat loss, and climate change, with approximately 25% of shark species listed as threatened or near-threatened by the International Union for Conservation of Nature (IUCN, 2021). The global shark fin trade, valued at billions of dollars annually, has driven unsustainable fishing practices across Asia, Africa, and Latin America, resulting in severe population declines of commercially valuable species. Despite international frameworks such as CITES (Convention on International Trade in Endangered Species) and national marine protected areas (MPAs), implementation gaps persist due to weak enforcement, limited resources, and insufficient community engagement. The sustainable management of shark populations requires not only regulatory measures but also integrated approaches that address the socioeconomic dependencies of coastal communities on marine resources (Shabtay et al., 2020).

Indonesia is a country with very high marine biodiversity, including shark populations such as thresher sharks (*Alopias pelagicus*). As apex predators in marine ecosystems, thresher sharks play an important role in maintaining ecological balance by regulating populations of prey species. However, the existence of thresher sharks in Indonesian waters continues to face serious threats due to overexploitation, habitat degradation, and unsustainable fishing practices. The primary dependent variable in this research is the effectiveness of conservation policy implementation, measured through indicators such as community participation rates, law enforcement outcomes, and biological population trends of thresher sharks in the study area.

A number of studies show that the population of thresher sharks in Indonesian waters has decreased significantly. According to a report by the International Union for Conservation of

Nature (IUCN), thresher sharks are categorized as "vulnerable" due to continued population decline in various parts of the world's waters, including Indonesia (IUCN, 2021). Research by White et al. (2020) also states that Indonesia is one of the largest contributors to the shark fin trade, including thresher shark fins. This condition is exacerbated by the lack of strict supervision and regulation in fisheries conservation and management efforts.

The Alor Marine Protected Area (KKL) in East Nusa Tenggara (NTT) has been designated as one of the efforts to protect marine biodiversity, including thresher sharks. The Government of Indonesia, through the Regulation of the Minister of Maritime Affairs and Fisheries, has established various policies that support the conservation of thresher sharks, such as fishing restrictions and trade prohibitions on protected species. However, the effectiveness of these policy implementations is still often questioned. The Alor MPA is one of the marine conservation areas designated by the Indonesian government as part of efforts to protect marine biodiversity, including endangered species such as thresher sharks (*Alopias pelagicus*). The region has high biodiversity and unique marine ecosystems, including coral reefs, seagrasses, and ecologically important pelagic fish species. Covering about 400,000 hectares, the Alor MPA encompasses a variety of marine habitats that serve as breeding and feeding grounds for various species, including endemic and endangered ones. The thresher shark (*Alopias pelagicus*) plays a significant ecological role in maintaining marine ecosystem balance. However, its population in Indonesia has decreased drastically due to high fishing pressure and international trade. The Alor Marine Protected Area was established to protect this species, but policy implementation faces many obstacles. This research aims to explore thresher shark conservation policies, identify implementation challenges, and evaluate the role of local communities in supporting conservation.

Previous research has established several critical foundations for understanding thresher shark conservation challenges. White et al. (2020) documented that Indonesia is one of the countries contributing most to the global shark fin trade, with thresher sharks among the species most frequently caught for their fins. This study revealed that thresher shark populations in several areas of Indonesian waters have decreased drastically due to high fishing pressure, emphasizing the urgency of stricter surveillance and regulation. Chen et al. (2017) analyzed migration patterns and habitats of thresher sharks in Indo-Pacific waters, including Indonesian waters, revealing that thresher sharks tend to migrate vertically during day and night to search for prey and avoid predators. The study demonstrated that thresher sharks inhabit deeper waters during the day and rise to shallower waters at night—information critical for designing effective spatial protection measures.

Mustika et al. (2018) examined the role of local communities in shark and ray conservation efforts in Indonesia, including thresher sharks. Their findings showed that conservation programs involving local communities in decision-making and implementation achieved greater success than top-down approaches. Local community awareness and participation regarding the economic benefits of marine ecosystem conservation significantly increased compliance with conservation policies, such as bans on thresher shark fishing. Semba et al. (2016) studied the population status of thresher sharks in western Pacific Ocean waters, revealing that this species is particularly susceptible to overfishing due to slow population growth and relatively long maturation periods. The research showed that thresher sharks have low reproductive rates, which significantly delay population recovery following declines from

fishing activities. Therefore, strict protection policies and appropriate catch quotas are considered essential for the sustainability of thresher shark populations.

Additional studies have focused on different aspects of thresher shark biology and exploitation. Nahdliya (2021) estimated the exploitation rate of thresher shark catches (*Alopias pelagicus* and *Alopias superciliosus*) in the Coastal Fisheries Port of Muncar Banyuwangi, finding that the exploitation rate of *A. pelagicus* was 0.85/year for females and 0.7/year for males, indicating overexploitation of this species. Anjayanti et al. (2017) found that the size of thresher sharks ranged from 50–240 cm FL, with the mode located at 150 cm FL. The growth pattern of female thresher sharks is allometrically positive, while male thresher sharks are isometric. Rafid Shidqi and Dewi Sari (2019), in their research in the Alor Sea, documented that thresher sharks are found at sea depths of approximately 20 meters and exhibit vertical migration patterns between day and night. Thresher sharks can migrate extensive distances and perform activities at depths of 200 to 1,000 meters.

The ecological urgency of thresher shark conservation extends beyond single-species protection. As apex predators, thresher sharks regulate prey populations and maintain trophic cascade functions essential for coral reef and pelagic ecosystem health. The loss of thresher sharks from Indonesian waters could trigger cascading effects, including prey population explosions, altered community structures, and reduced ecosystem resilience to environmental stressors. In the Indonesian archipelago, where millions of coastal residents depend on marine resources for protein and livelihoods, maintaining ecosystem balance through predator conservation is not merely an environmental imperative but also a socioeconomic necessity. The decline in thresher shark populations threatens the long-term sustainability of Indonesia's marine fisheries, undermines ecosystem services valued at billions of dollars, and jeopardizes food security for vulnerable coastal populations.

Conservation policies should not only focus on regulation and prohibition but also include the empowerment of local communities as key actors in marine resource conservation. Based on the theory of common-pool resource management, a community-based approach is considered more effective because it involves them as part of the solution rather than as mere policy objects (Ostrom, 1990). Thus, a conservation approach that considers local social and cultural aspects can improve the compliance and success of conservation programs.

Despite substantial research on shark conservation globally and in Indonesia, significant knowledge gaps remain regarding the integration of community-based approaches with formal conservation policy implementation in Indonesian MPAs. While previous studies have documented either policy frameworks or community participation separately, few have systematically examined the interplay between these dimensions in the context of thresher shark conservation. This research makes several novel contributions. First, it provides the first comprehensive analysis of thresher shark conservation policy effectiveness specifically in the Alor MPA, a critical biodiversity hotspot previously underrepresented in conservation literature. Second, it develops an integrated analytical framework combining soft systems methodology with participatory action research to assess both top-down policy mechanisms and bottom-up community engagement simultaneously. Third, this study identifies specific implementation barriers unique to the Indonesian context, including cultural dimensions of marine resource use, traditional ecological knowledge systems, and socioeconomic dependencies that have been insufficiently addressed in existing conservation frameworks.

Fourth, it proposes actionable, context-specific recommendations for community-based conservation that balance ecological objectives with livelihood security, contributing to the broader discourse on adaptive co-management in Southeast Asian marine conservation. These contributions advance both theoretical understanding and practical application of participatory conservation approaches in biodiversity-rich but resource-limited contexts characteristic of the Indonesian archipelago and broader Southeast Asian region.

This research aims to analyze the effectiveness of thresher shark conservation policy implementation in the Alor Marine Protected Area and evaluate the role of local communities in supporting conservation efforts. The study provides scientific contributions to understanding thresher shark conservation in Indonesian waters while offering practical insights for policymakers to refine conservation strategies and marine protected area management plans. By examining community perceptions and developing evidence-based recommendations for participatory conservation approaches, this research benefits local communities through sustainable livelihood alternatives and capacity building, ultimately contributing to a replicable model for community-engaged shark conservation that balances biodiversity protection with community welfare in developing nations.

METHOD

This study employed a qualitative approach with an analytical descriptive method. The research was conducted in the Alor Marine Conservation Area, East Nusa Tenggara (NTT), which was selected for its significance as a habitat for thresher sharks and its ongoing conservation initiatives. The research took place over six months, encompassing preparation, field data collection, and data analysis. The research population consisted of stakeholders involved in thresher shark conservation in Alor, including local communities, government agencies, NGOs, academics, and conservation area managers.

The soft systems methodology followed several steps. The study began by identifying major issues in thresher shark conservation, including population decline, overexploitation, and limited community participation. Conceptual models were then created to illustrate interactions among key stakeholders such as government institutions, local communities, and NGOs. Dialogues were conducted to gather perspectives on existing conservation policies and challenges, as well as to explore stakeholders' values and objectives. Conceptual models were applied in analyzing field conditions through interviews, observations, and document reviews to assess policy effectiveness. Based on analysis results, adaptive policy recommendations were developed to enhance local community engagement and improve the implementation of conservation policies. An implementation plan for the proposed recommendations was drafted, followed by an evaluation framework to monitor the impact of policy changes and community participation.

Data collection was carried out through in-depth interviews, participatory observation, and document analysis. In-depth interviews were conducted with fishermen, environmental activists, and government officials to explore conservation challenges and expectations. Through participatory observation, researchers became involved in community activities to observe conservation practices and social dynamics. Document analysis included reviewing policy documents, research reports, and relevant data to gain contextual understanding of ongoing conservation efforts in the Alor region.

RESULT AND DISCUSSION

Shark and ray fisheries (Elasmobranchii) are one of the most important fishery commodities in the world. FAO data reports that the total catch of Elasmobranch fish in the world in 1994 reached 731 thousand tons. Of these, countries in Asia accounted for 60% of the total catch. Four countries in Asia, namely Indonesia, India, Japan and Pakistan contribute about 75% of the total shark and ray catches in the Asian region (Bonfil, 2002).

As the largest country in the Southeast Asian region, shark and ray fisheries commodities in this country also play a fairly important role, especially in terms of shark fin trade. The total production of shark and ray fisheries (Elasmobranchii) in Indonesia in the last two decades has shown a significant upward trend. In fact, Indonesia is known as the country with the largest shark and ray fishery production in the world, with a catch range of over 100 thousand tons every year.

The high price of shark fins in the market further increases shark hunting and threatens the sustainability of its stock in the wild (Daley et al., 2002). Based on their biological properties, sharks in general have a slow growth rate, are long-lived, slow in reaching sexual maturity and have a small number of offspring (Coleman, 1996; Camhi et al., 1998; Stevens et al., 2000; Bonfil, 2002; Cavanagh et al., 2003). Thus, sharks become highly susceptible to the rate of death due to capture (Hoenig & Gruber, 1990). If it has been overexploited, it will result in sharks becoming very endangered when compared to other fish groups. Therefore, shark populations can only be conserved by controlling the level of capture efforts that do not interfere with the amount of their reserves (Camhi et al., 1998; Musick, 2003; Cortes, 2000). Several waters in the Asian region are believed to have experienced overexploitation. Shark fishing in Indonesia has been going on since the 70s, as a bycatch of tuna fisheries. Fishing activities began to increase and became more popular when there was an increase in the price of shark fins in the world market in 1988, so that sharks became one of the targets of fishermen's catch in several fish landing places in Indonesia, especially in artisanal fisheries (Anung & Widodo, 2002). Generally, artisanal fisheries in Indonesia are located in coastal villages far from urban areas. In the fishery business, almost all shark body parts are used by local fishermen, but fins are the main product that is processed locally and sold in dry form to major cities in Indonesia, and even then exported to countries such as Hong Kong, Singapore and Japan (Suzuki, 2002). While the meat is smoked or dried for sale in the local market, so is the skin, liver and jaw used for various purposes.

Shark resources have become the main income in certain circles of society, especially those who depend on these fishery products for their livelihoods, ranging from fishermen who catch, collect, sell and process shark products in areas where sharks are the target of their catch. One example is what happened to several local traders in Indramayu, West Java, who previously only traded salted shark meat, after 1986 began to collect and sell shark fins (Suzuki, 2002). In recent decades, shark fishing trends have grown from small-scale longline fisheries to commercial fisheries targeting several high-value fish species such as bottlenose sharks (Squalidae), palm sharks (Rhynchobatidae) and large sharks (Carcharhinidae, Lamnidae, Alopiidae and Sphyrnidae), both as targets and bycatches. Even some shark fin exporters are able to provide loans and capital to local fishermen to increase the number of shark catches. Shark fisheries in Indonesia are currently in the spotlight of the international world because

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Indonesia is the country with the highest volume of shark production out of the 20 largest shark fishing countries in the world. The growth of the shark fishing business in Indonesia is now felt to have exceeded the limit of its production capacity. This is felt from the increasing difficulty of local fishermen to catch sharks because the farther the fishing location, the number of catches decreases and the smaller the size caught. This is an indication of a decline in population stocks in nature and the increasing threat to the sustainability of shark resources in Indonesian waters. This problem is compounded by the lack of a national shark fisheries management strategy that can be implemented effectively. There is no understanding of the public and fisheries actors in Indonesia about the relationship between the biological nature of sharks and their vulnerability to the threat of extinction, causing a lack of concern for the conservation status of shark resources in this country. For example, the whale shark, which is one of the largest fish in the world and has become a global concern, since 2003 has been granted protection status by including this species in Appendix II of CITES and also included in the category of aquatic biota that are vulnerable to extinction in the IUCN red list (Cavanagh et al., 2003). On the other hand, the concern of most Indonesian people for this type of fish is still very lacking until the end of 2011, this can be seen from the fact that there are still incidents of whale sharks caught by fishing nets and not reported, or there are whale sharks that are stranded but do not get a positive response from interested parties but are instead used by the local community. and there are still shops that sell dried whale shark fins, as raw materials for medicine or for shark fin soup. Concern for the conservation status of endangered sharks in Indonesia began to emerge after a lot of international pressure and demand for Indonesia to participate in the protection program for endangered animals. Many international environmental and conservation agencies have highlighted shark fishing in this country, even Indonesia has been under pressure to be able to manage its shark fisheries if it does not want its fishery products to be banned for export abroad. However, there is still a lack of information on catch data, potential, species diversity, biology and exploitation rates of sharks in Indonesia as an obstacle in determining the rational basis for the implementation of sustainable shark fisheries management. Seki et al. (1998) and Stevens et al. (2000) stated that the basis of knowledge about the biology of Elasmobranchii (sharks and rays) such as species identification, size composition, size at the time of sexual maturity and reproductive aspects is very basic to know in utilizing resources and managing Elasmobranchii fisheries.

Indonesia with its vast water area has potential areas for shark fisheries management. The determination of potential fishing areas is usually based on the abundance of types of fish that have important economic value or that are the target of fishermen's catch. In general, fishermen rely on their experience in shark fishing, so they know well the environmental conditions of the waters and the fishing area. With the development of technology, most shark fishermen are already using tools such as GPS (Global Positioning System), which can help to find the geographical position of their catchment. At the time when fishermen get a lot of shark catches, the coordinate position will be stored on the GPS and for the next fishing activity they will return to the coordinate point of the catch location.

Several areas in Indonesia have become important shark fisheries production centers because they are the landing centers for shark catches both from their fisheries management areas and as a place to accommodate catches from other regions. The potential areas for shark fisheries in Indonesia include the western regions of Sumatra (WPP 572), southern Java, Bali

and Nusa Tenggara (WPP 573), the Natuna Sea and the Karimata Strait (WPP 711), the Java Sea (WPP 712) and the Arafura Sea (WPP 718). In general, the most exploited fishery areas for shark resources are in the southern waters of Indonesia (Indian Ocean), which is the habitat of oceanic and semi-oceanic sharks, which are the target of fishermen to take their fins. Each fisheries management area has different fisheries potential and shark species, depending on the characteristics of the waters and habitats in them. The areas that are the center of shark fisheries production and their fisheries management areas in Indonesia are listed in the table below.

Table 1. Shark Fisheries Production Centers and Fisheries Management Areas (WPP) in Indonesia

Shark production hub area	WPP Sibolga Coverage
North Sumatra	WPP 572
Muara Baru, Jakarta	WPP 712, WPP 718, WPP 573
Holiday rentals in Jakarta (Bali)	WPP 712, WPP 713, WPP 711, WPP 573
Holiday rentals in West Java	WPP 573, WPP 572
Cilacap, Central Java	WPP 573
Prigi, East Java	WPP 573
Surabaya, East Java	WPP 712, WPP 713, WPP 573
Benoa, Bali	WPP 573, WPP 713, WPP 714
Tanjungluar, NTB	WPP 573
Kupang, NTT	WPP 573

Source: adaptation of the Ministry of Maritime Affairs and Fisheries of the Republic of Indonesia (2020) and field survey data

Almost all areas of Indian Ocean waters are potential fishing areas for sharks. This can be seen from most shark production centers in Indonesia getting shark catches from these waters. Although they have the same shark catchment area, each area has different fishing area goals due to various considerations, including the size of the boat used, the ship's cruising ability, the length of the fishing operation time while at sea, and the type of fishing from time to time. Shark fishing groups in Palabuhanratu in the period from June to September generally fish in the waters of the Indian Ocean starting from the southern area of Java to the waters of Sumatra at a geographical position between 05-09o south latitude and between 104-108o east longitude. In the same period, a group of shark fishermen from Cilacap caught in the waters of Southern Java at a geographical position between 08-13o south latitude and between 106-111.3o east longitude. Meanwhile, fishermen from Benoa Port, caught sharks around the waters of Bali to Masalembo at a geographical position between 05-11.6o south latitude. Potential fishing areas for sharks in the waters of the Eastern Indian Ocean are the open sea waters around the island of Lombok to close to the waters of northern Australia at a geographical position between 9-14o south latitude and between 116-119o east longitude. In general, this fishing area is a fishing area for shark fishermen from Tanjungluar who use drifting shark fishing gear.

Other potential fishing areas are the waters around the islands of Sumba, Kupang, Sarage, Sembilan, Sabahuna, Ende, and Rote Island, East Nusa Tenggara. In general, shark catches in some of these water locations are carried out by Tanjungluar fishermen who use basic shark rawai fishing equipment. Potential fishing areas in the eastern part of Indonesia are the waters of southern Sumba to the waters of South Kupang at a geographical position between 10-11o south latitude and 122-124o east longitude.

Alor Regency, located in East Nusa Tenggara (NTT), is known as a marine area rich in biodiversity, including various shark species such as thresher sharks (Alopias pelagicus). Sharks play an important role in marine ecosystems as apex predators, maintaining the balance of the food chain. However, threats to shark populations due to poaching, illegal trade in shark fins, and habitat degradation demand effective conservation policies. Alor Regency is known as an area with high biodiversity. The results of the interviews show that:

1) Many fishermen still catch sharks as a bycatch, although they are aware that shark numbers are declining.
2) Some communities depend economically on marine products, so conservation without alternative income is often considered burdensome.
3) The thresher shark-based ecotourism program has begun to be introduced, but it has not run optimally due to limited infrastructure and promotion.

Conservation Policy Analysis

The conservation policy in the Alor MPA stipulates a ban on the capture of thresher sharks and trade restrictions. However, the main drawbacks are:

1) Lack of supervision in the field.
2) Lack of coordination between government agencies.
3) Limited budget for socialization and patrols.
   This causes regulations to be more normative without significant effects on society.

The Role of Local Communities

The role of local communities is very crucial. The results of the interview showed:

1) Fishermen expressed their willingness to participate if given alternative livelihoods, such as marine tourism or sustainable fisheries.
2) Some community leaders emphasized the need for environmental education since elementary school.
3) Local NGOs report that conservation programs are more successful when they involve communities in planning and monitoring.

Implementation Challenges

1. The economic dependence of the community on the exploitation of marine resources.
2. Low awareness and concern for the importance of sharks in the ecosystem.
3. Lack of capacity of the apparatus for supervision and law enforcement.

Alor Regency, located in East Nusa Tenggara (NTT), is known as one of the marine areas with very high biodiversity. Alor's waters are an important habitat for a variety of marine species, including thresher sharks (Alopias pelagicus), which play a role as apex predators in maintaining the balance of the food chain. This ecological role makes the existence of thresher sharks very vital for the stability of marine ecosystems. However, the thresher shark population in Alor faces serious pressure due to poaching practices, illegal trade in shark fins, and increasing habitat degradation. This condition requires a conservation policy that is planned, effective, and can be implemented consistently.

The results of interviews with various stakeholders show some important realities on the ground. First, many fishermen still catch sharks as a bycatch, even though they are aware that

shark numbers are decreasing. Second, some communities depend on marine products for their household economies, so conservation policies that are not accompanied by alternative livelihoods are often considered burdensome and difficult to accept. Third, the thresher shark-based ecotourism program has indeed begun to be introduced as an alternative solution, but this initiative has not run optimally because it is still constrained by limited infrastructure, market access, and less than optimal promotion.

Conservation Policy Analysis

Formally, conservation policies in the Alor Marine Protected Area (MPA) have established a ban on the capture of thresher sharks and restrictions on international trade. However, the effectiveness of this policy is still weak due to a number of factors. First, the lack of supervision in the field causes the practice of illegal arrests to still occur. Second, coordination between central government agencies, regions, and conservation area managers has not been synergistic. Third, the limited budget for socialization, patrols, and monitoring activities makes conservation regulations tend to be normative and do not have a significant impact on changes in the behavior of coastal communities.

The Role of Local Communities

The role of local communities is crucial in supporting the conservation of thresher sharks. Field interviews show that some fishermen are willing to participate in conservation efforts as long as alternative livelihoods are provided, such as the development of marine tourism, sustainable fisheries businesses, or the diversification of the local economy. Community leaders emphasized the need for environmental education starting from an early age to grow collective awareness about the importance of protecting marine ecosystems. In addition, local NGOs report that conservation programs that are designed in a participatory manner and involve communities in planning and monitoring are more successful than top-down programs.

Implementation Challenges

Despite various efforts, the implementation of the thresher shark conservation policy in Alor still faces complex challenges. First, the community's economic dependence on the exploitation of marine resources makes conservation considered a threat to livelihoods. Second, the level of public awareness and concern for the role of sharks in the ecosystem is still low. Third, the capacity of the supervisory and law enforcement apparatus is limited, making conservation violations difficult to control.

Thus, shark conservation policies in Alor cannot rely solely on regulatory aspects. An integrative approach is needed that combines regional protection, supervisory capacity building, environmental education, and community-based economic empowerment. Local governments, together with MPAs and conservation institutions, need to strengthen synergy with local communities through ecotourism programs, diversification of livelihood sources, and community-based supervision. With these measures, thresher shark conservation in Alor can be more effective and at the same time support the sustainability of marine ecosystems and the welfare of coastal communities.

Community-Based Program Implementation Plan

In order for the recommendations for the conservation of thresher sharks in Alor to be more applicable, community-based programs need to be outlined through concrete steps. One of the main strategies is the empowerment of alternative economies for communities that depend on shark catches. This program can be realized through the development of thresher shark ecotourism, where fishermen are trained to become marine tour guides, especially for snorkeling and diving activities, while still keeping tourist interaction from disturbing shark habitats. In addition, fisheries diversification is also an important solution by helping fishermen shift to more sustainable catch targets, such as small pelagic fish, through the provision of eco-friendly training and equipment. Another effort that supports the economic resilience of the community is the sustainable processing of marine products. The community can be trained to process non-shark marine products into value-added products, such as fish crackers, shredded fish, or smoked fish, which have the potential to be marketed both locally and to tourists.

In addition to economic empowerment, increasing supervisory capacity is an important pillar in the implementation of conservation policies. Local communities can be involved in the formation of community patrol teams consisting of fishermen and indigenous leaders to monitor fishing activities in the protection zone. Support for an easily accessible violation reporting system also needs to be developed so that the public can actively report illegal practices to the authorities. Thus, supervision is not only the responsibility of the government, but also participatory and community-based.

Conservation efforts must also be supported by continuous education and socialization programs. Material on the importance of the role of thresher sharks in maintaining marine ecosystems can be integrated into the curriculum of primary and secondary schools in Alor, so that the awareness of the younger generation grows from an early age. In addition, participatory workshops involving fishers, governments, academics, and NGOs can be held regularly to discuss problems and find conservation solutions collaboratively. With this approach, it is hoped that a strong and sustainable collective consciousness will be formed in society.

To ensure the success of the program, measurable evaluation metrics are needed. Indicators of economic success can be seen from the level of fishermen's participation in alternative livelihood programs, such as the percentage of fishermen who switch from shark hunting to ecotourism activities. Environmental awareness indicators can be measured through periodic surveys to determine the increase in public knowledge and attitudes towards shark conservation. Meanwhile, biological indicators can be obtained from the results of a survey of thresher shark populations conducted with researchers every year, so that the trend of stabilization or increase in the population can be monitored. Finally, surveillance indicators can be seen from the number of cases of illegal arrests reported and followed up each month, which at the same time reflects the effectiveness of community patrols and the reporting systems implemented.

With a community-based implementation plan and clear evaluation metrics, Thresher shark conservation policies in Alor can be more effective, adaptive, and sustainable, while improving the well-being of local communities.

The shark conservation policy in Alor is part of national and local policies aimed at protecting this species and supporting the sustainability of marine ecosystems. The area includes a full protection zone that restricts fishing activities and a sustainable use zone that

regulates fishing activities and marine tourism. Strategies for the management and protection of shark species in Indonesia, including fisheries monitoring, public awareness raising, and economic empowerment through conservation-based ecotourism. The Alor local government works with the MPA and conservation agencies to implement conservation policies, including law enforcement against illegal shark catching. Local community-based programs, such as the empowerment of fishermen to reduce dependence on shark hunting. Some of the policies include:

1. Conservation Policy in Alor MPA

   Conservation policies in the Alor MPA include a ban on the capture of thresher sharks and restrictions on international trade. However, the effectiveness of this policy is still limited due to the lack of supervision and community involvement.

2. The Role of Local Communities

   Local communities have great potential to support conservation, but low awareness and engagement are an obstacle. Empowerment programs that involve communities in conservation monitoring and education have shown positive results in some cases.

3. Implementation Challenges
a) Lack of supervision resources.
b) Community's dependence on the exploitation of marine resources.
c) Lack of coordination between the government and local communities.

CONCLUSION

The thresher shark (*Alopias pelagicus*) plays a vital role in maintaining marine ecosystem balance, yet its population continues to decline due to overexploitation, the shark fin trade, and insufficient enforcement. This study found that while conservation policies in the Alor Marine Protected Area (MPA) are in place, their implementation remains constrained by limited monitoring capacity, weak stakeholder coordination, and low community participation. Conservation strategies focused solely on fishing bans have proven inadequate, highlighting the need for inclusive approaches that incorporate local community involvement, environmental education, and sustainable economic alternatives such as conservation-based ecotourism. Strengthening collaboration among the government, local communities, and conservation agencies, alongside improving public awareness and capacity, is essential for ensuring the long-term protection of thresher sharks and ecosystem sustainability. Future research should explore measurable frameworks for integrating community-based monitoring systems and sustainable livelihood programs into marine conservation policy implementation.

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