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Small-Scale Fishers' Perceptions Of The Socioeconomic Reality Of Coastal Communities Amid Climate Change On Sarappo Lompo Island, Pangkep Regency

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Abstract

This study aims to deeply examine the perceptions of small-scale fishermen regarding the socio-economic conditions of coastal communities and their adaptation strategies in responding to climate change on Sarappo Lompo Island, Pangkep Regency. A qualitative approach with a descriptive design was employed. Informants were selected through purposive sampling involving small-scale fishermen as main informants, supported by housewives, community leaders, and village officials, totaling 10 informants. Data were collected through observation, in-depth interviews, and documentation, then analyzed through data reduction, data display, and conclusion drawing. Results show that: (1) socially, there is a decrease in social interaction intensity and collective activities, along with shifts in gender roles within households due to economic pressure; (2) economically, fishermen face declining and unstable incomes due to reduced fish catches and rising operational costs; (3) adaptation strategies include adjusting fishing schedules, diversifying income beyond the fisheries sector, strengthening social solidarity, and more careful household financial management. Fishermen's perceptions of climate change, shaped by daily empirical experience, play an important role in how they respond and adapt

Keywords: ***Perception, Small-Scale Fishermen, Climate Change, Socio-Economic Conditions, Adaptation Strategies***

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INTRODUCTION

Indonesia is the largest archipelagic country in the world, comprising 17,504 islands with a coastline of 95,181 km (BPS, 2023). Approximately 60% of Indonesia's population resides in coastal areas, with their primary livelihood in the capture fisheries sector (Ministry of Marine Affairs and Fisheries, 2022). Among this group, small-scale fishers—defined under Law No. 7 of 2016 as fishers using vessels no larger than 10 GT—constitute the group most vulnerable to social, economic, and environmental change.

Climate change is one of the greatest challenges facing small-scale fishers. The IPCC report (2021) states that global climate change is marked by rising global temperatures, sea level rise, and increasing intensity of extreme weather. In Indonesia, this phenomenon is evident in shifting seasons, increasingly unpredictable weather, changes in ocean current patterns, and a rising frequency of storms and large waves that directly threaten fishing activities.

Sarappo Lompo Island, in the Liukang Tupabbiring Subdistrict, Pangkep Regency, is a clear example of these conditions. This small inhabited island, whose population is predominantly small-scale fishers, faces increasingly complex pressures from climate change. Fishing seasons that were once predictable have become erratic, catches have declined sharply, and extreme weather limits fishing activities. These conditions underscore the need for an in-depth study of how small-scale fishers interpret and respond to these changes through the framework of their perceptions.

Understanding of perception in this context draws on Berger and Luckmann's (1966) framework of the social construction of reality and Alfred Schutz's (1967) social phenomenology, both of which assert that the way fishers understand climate change is strongly shaped by their sociocultural background, local knowledge, and communication networks within their community. Accordingly, this study aims to: (1) describe small-scale fishers' perceptions of social conditions within the community amid climate change; (2) analyze small-scale fishers' perceptions of the community's economic conditions as a result of climate change; and (3) identify the adaptation strategies employed by small-scale fishers in addressing the impacts of climate change on Sarappo Lompo Island.

THEORETICAL REVIEW

This study is grounded in Alfred Schutz's (1967) theory of social phenomenology, which developed the concept of the lifeworld—the view that social reality is formed through everyday experience and ongoing social interaction. Human perception and action cannot be separated from the subjective meaning constructed through empirical experience, cultural values, and social context. This idea is reinforced by Max Weber's (1978) concept of

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verstehen, namely a deep understanding of how individuals attach meaning to their lived experiences. In the context of this study, perception is understood as the way fishers view socioeconomic change resulting from climate change—that is, the process by which individuals select, organize, and interpret information from their environment (Robbins and Judge, 2017:112). This process is not entirely rational; rather, it is shaped by cognitive and affective processes that are themselves formed by experience, belief, and cultural values (Slovic, 2000).

This phenomenological lens is relevant for understanding how fishers make sense of the climate change risks they face. From a sociological perspective, Beck's (1992) Risk Society theory asserts that risks arising from climate change are not evenly distributed; small-scale fishers in developing countries bear the greatest burden of climate change impacts, which are largely caused by industrial activity in developed nations (Adger et al., 2006). These impacts include shifts in fish migration routes, declining catches, rising operational costs, and income instability that trigger social strain within families and communities.

In facing these conditions, coastal communities have developed various adaptation strategies—that is, processes of adjustment to actual or anticipated climatic conditions and their effects (Smit and Wandel, 2006). Research by Akbar and Huda (2017) shows that fishers in Indonesia diversify their livelihoods as a strategy for adapting to climate uncertainty, while Afifah et al. (2024) found that fishing communities maintain strong social ties and cooperation as part of a collective survival strategy.

METHOD

Research Design

This study employs a qualitative approach with a descriptive design to explore social phenomena based on fishers' lived experiences and subjective meaning-making (Creswell & Poth, 2018).

Setting and Study Population

This research was conducted on Sarappo Lompo Island, Liukang Tupabbiring Subdistrict, Pangkep Regency, South Sulawesi, from March to May 2026.

Sampling Technique Procedure

Informants were selected using a purposive sampling technique. A total of 10 informants participated, consisting of: (1) 6 small-scale fishers as primary informants; (2) 2 housewives (fishers' wives) as supporting informants; (3) 1 Neighborhood Head (Ketua RT)

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as a community triangulation informant; and (4) 1 Village Head of Sarappo Lompo Island as a policy informant. The informants varied in age from 18 to 48 years, with fishing experience ranging from 4 to 18 years.

Instruments

Observation Guide The observation guide was used to systematically record social phenomena or behaviors occurring in the field. Observations were conducted both non-participatively (the researcher did not take part in the activities) and participatively (the researcher joined fishers' activities to understand the social context). Observational data were recorded in field notes, which included the time, location, events, and the researcher's reflections on the observed phenomena.

Interview Guide The interview guide was used to direct the interview process with primary informants, such as small-scale fishers, community leaders, and village officials. This guide contained a list of open-ended questions developed based on the study's research focus.

Data Collection

Data collection techniques in this study included observation, in-depth interviews, and documentation, strengthened by data triangulation to ensure the validity of the research findings. Observations were conducted directly on Sarappo Lompo Island to observe the activities and life patterns of small-scale fishers, using both participatory and non-participatory approaches, with results recorded in field observation notes. In-depth interviews were conducted with small-scale fishers, community leaders, and village officials using open-ended question guides to explore their perceptions, experiences, and adaptation strategies in response to climate change. Documentation—including archives, village reports, fisheries statistical data, photographs, and area maps—was used as supporting data to strengthen the findings from interviews and observations. Furthermore, source and method triangulation was applied by comparing data from various informants and data collection techniques to minimize bias and strengthen the credibility of the research findings, in line with the perspectives of Moleong (2017) and Sugiyono (2018).

Data Analysis

The data analysis technique used in this study is qualitative data analysis. Data analysis followed the interactive model of Miles, Huberman, and Saldaña (2014) through three stages: data reduction, data display, and conclusion drawing/verification. The validity of the data was ensured through source triangulation (comparing data across informants)

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and method triangulation (comparing data from interviews, observations, and documentation).

RESULTS

1. Fishers' Perceptions of Climate Change

All fisher informants consistently stated that weather and sea conditions have changed significantly over the past five years. The most noticeable changes are the unpredictability of the weather, the sudden arrival of strong winds, and increasingly higher waves. Informant IF-01 (43 years old, 18 years of sailing experience) stated:

"Before, once we entered a certain season, we already knew how to time our trips to sea. We weren't too uncertain. But now, sometimes it looks fine from the shore, but once we're out at sea, we realize the conditions aren't favorable."

A similar sentiment was expressed by IF-08 (48 years old):

"Sometimes we're all ready, but we have to cancel because the weather changes quickly." Informant IF-05, who never attended school but has 10 years of sailing experience, even described how the locally inherited knowledge based on natural signs can no longer be fully relied upon: "I usually look at the sky and the wind direction. That's how it's always been done. But now it's hard too, because sometimes the signs don't match what actually happens at sea."

These findings illustrate a dissonance between fishers' local knowledge systems and the increasingly complex reality of climate change. As Gibson (1979) explains through the concept of affordance, when natural signs change due to climate change, fishers' perceptions of the marine environment change as well, and this directly affects their decisions about when, where, and how to fish

2. Social Conditions of Fishers in Facing Climate Change

Based on in-depth interviews and field observations, the social conditions of the fishing community on Sarappo Lompo Island show three main changes: (1) changes in patterns of social interaction among fishers; (2) shifts in family roles; and (3) transformation of mutual assistance (*gotong royong*) activities.

Relationships among fishers generally remain strong, particularly in terms of safety and the sharing of information about sea conditions. However, the intensity of recreational togetherness has declined due to economic pressure. Informant IF-01 stated: "When it comes to safety at sea, we're all still solid. We tell each other if there's danger. But casual gatherings have become rare, because everyone is more focused on how to meet daily needs." The Village Head (IF-02) confirmed: "The fishing community here still has strong

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social bonds, especially regarding safety at sea. But other social activities have indeed decreased somewhat because of the growing economic pressure."

Climate change has also caused a shift in gender roles within fishing households. Income uncertainty has pushed fishers' wives to contribute economically as well. Informant IF-06 (housewife, 38 years old) revealed: "Now I also help earn money. We can't just rely on my husband anymore, especially when the weather is bad. So I sell small snacks at home to help with our needs." Informant IF-03 added: "The pressure at home is really felt when we can't go to sea for several days. My wife has become skilled at managing finances, but it's still hard when there's no income."

The finding of decreased social interaction intensity aligns with sociological studies of coastal communities showing that economic pressure can affect the intensity of social interaction, though it does not necessarily erase bonds of solidarity (Putnam, 1993). The shift in gender roles is also consistent with Arora-Jonsson's (2011) finding that women in coastal communities bear a double burden during climate change.

3. Economic Conditions of Fishers in Facing Climate Change

Climate change has had a significant impact on the economic conditions of fishers on Sarappo Lompo Island through three main mechanisms: income instability, an imbalance between costs and fishing yields, and difficulty meeting household needs. Fishers' income has declined and become notably unstable. Informant IF-08 stated: "Income now is unpredictable. Sometimes we earn a lot, but often we get nothing at all." Informant IF-05 added: "Before, we could roughly estimate how much we'd earn. Now we can't anymore. Sometimes we go far out and come back with nothing. That's what makes managing the family economy difficult."

The imbalance between operational costs and catch has become a serious problem. Informant IF-08 explained: "Fuel prices go up, the costs of going to sea go up, but the fish catch actually goes down. So sometimes the capital we spend is greater than what we earn." Fishers now have to travel farther to find fish, yet there is still no guarantee of an adequate catch. This condition reflects what Afifah et al. (2024) call the double burden effect: rising operational costs occurring alongside declining catches.

These economic impacts directly affect the fulfillment of household needs. The practice of borrowing from neighbors and local shops has become a common survival mechanism. Informant IF-05 stated: "If we don't have money, we're forced to borrow from a neighbor or the local shop first. Later, once we get income from fishing, we pay it back. That's become a habit now because there's no other choice." The Village Head (IF-02)

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confirmed that "Many fishing families depend entirely on the sea for their livelihood. When the sea's yield is unpredictable, all household needs are disrupted as well."

4. Fishers' Adaptation Strategies to Climate Change

The fishing community on Sarappo Lompo Island has organically developed three groups of adaptation strategies in response to the pressures of climate change. First, adjusting the timing and activity of fishing trips. Fishers no longer force themselves to go to sea in bad weather, instead waiting for more favorable conditions. Informant IF-10 stated: "Now I mostly wait for good weather before going to sea. I don't dare do it like before, because now we think more about safety." Informant IF-05 described how local knowledge of natural signs is still used as a reference, though now combined with a heightened sense of caution: "We usually look at the wind direction, the color of the sky, and listen to the sound of the waves before deciding to go to sea."

Second, diversification of work and income sources. When unable to fish, fishers seek alternative work on land, such as day labor, helping transport goods, or doing odd jobs. Women in fishing households are also actively involved in small-scale economic enterprises. Informant IF-06 stated that she sells small snacks at home to help with family finances. The Village Head (IF-02) confirmed: "Many now have supplementary work, not relying on the sea alone." This strategy aligns with the findings of Akbar and Huda (2017), which show livelihood diversification as the most effective adaptation strategy for small-scale fishers.

Third, strengthening social solidarity and financial management. The practice of sharing catches among fishers, lending each other basic necessities, and informal savings-and-loan groups at the neighborhood (RT) level are concrete manifestations of collective strategy. Informant IF-01 stated: "If someone gets a bigger catch, sometimes they share it or sell it cheaply to a friend. We all know how hard things are right now." At the individual level, fishers have also become more disciplined about setting aside a portion of their income when they have a good catch. Informant IF-08 admitted: "I've also started managing my money more carefully now. Before, money would be spent right away, but now I try to set some aside."

DISCUSSION

1. Social Conditions of the Fishing Community in Facing Climate Change on Sarappo Lompo Island

The social conditions of the fishing community on Sarappo Lompo Island, based on the research findings, show changes in patterns of social interaction caused by economic pressure resulting from climate change. Although social relationships among

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community members remain relatively good, the level of togetherness has declined as the community increasingly focuses on meeting daily needs.

Interview results show that social interactions such as gathering and mutual assistance (*gotong royong*) still occur, but not as frequently as before. In addition, social relationships among fishers tend to have become more functional—more closely tied to fishing-related activities, such as sharing information about weather conditions. This finding aligns with perspectives in the sociology of coastal communities, which hold that fishing communities have a high degree of social solidarity, but that economic pressure can affect the intensity of social interaction. Under unstable economic conditions, communities tend to reduce social activities and prioritize work instead.

Furthermore, the unstable economic conditions of fishers found in this study are closely related to the concept of fisher poverty. As stated by Soetrisno (1997), one of the largest concentrations of poverty in Indonesia is found within fishing communities. The income uncertainty experienced by fishers places them in a vulnerable economic position and makes it difficult for them to escape the cycle of poverty. This is consistent with interview findings showing that when fishers do not go to sea, they receive no income. This condition demonstrates that the fishing community is highly dependent on marine resources, so that unpredictable weather changes directly affect their economic condition.

Furthermore, fisher poverty can also be viewed as part of a structural problem. As stated by Soedjatmoko, individuals situated within a particular social structure find it difficult to escape that condition due to limited access and opportunity. In the context of the fishing community, this is evident in limited capital, limited fishing equipment, and dependence on capital owners or other parties. This condition indicates what is referred to as a "poverty trap"—a condition in which a community struggles to escape poverty due to various constraints, such as low income, limited economic access, and dependence on specific resources.

Based on the research findings, the elements of this poverty trap can be observed in the lives of the fishing community on Sarappo Lompo Island, namely: vulnerability, seen in their dependence on weather conditions; powerlessness, seen in their limited employment options; and income uncertainty, resulting from unpredictable catches. In addition, climate change further reinforces these conditions, as it becomes increasingly difficult for fishers to secure stable income. On the other hand, despite being in a vulnerable condition, the fishing community still upholds the value of social solidarity. This is evident in the mutual helping attitude among fishers, particularly when someone

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experiences difficulty. This solidarity serves as a form of social strength that helps the community endure difficult conditions.

It can thus be concluded that the social conditions of the fishing community on Sarappo Lompo Island cannot be separated from the influence of unstable economic conditions resulting from climate change. This economic pressure has caused changes in patterns of social interaction while simultaneously reinforcing the social vulnerability of the fishing community. Nevertheless, the value of social solidarity remains an important part of community life as a form of adaptation to existing conditions.

The perceptions of Sarappo Lompo Island fishers regarding climate change were not formed suddenly, but rather through a process of interpreting repeated experiences at sea—increasingly unpredictable weather, declining catches, and rising operational costs. Drawing on Schutz's (1967) concept of the lifeworld, these concrete experiences become the raw material through which fishers interpret climate change not merely as a natural phenomenon, but as a direct threat to their source of livelihood. This process of meaning-making is intersubjective in nature: individual fishers' perceptions are reinforced and validated through interaction with fellow fishers, as found in the section on social conditions. Accordingly, the perceptions that are formed become the basis for fishers' adaptive decision-making, such as adjusting the timing of fishing trips or seeking additional sources of income

2. Economic Conditions of the Fishing Community in Facing Climate Change on Sarappo Lompo Island

The economic conditions of the fishing community on Sarappo Lompo Island show instability influenced by climate change. High dependence on marine resources makes fishers highly vulnerable to changing weather conditions, resulting in unpredictable income. Interview results show that fishers are unable to go to sea regularly due to unpredictable weather conditions. When the weather is bad, fishers choose not to go to sea and thus earn no income. In addition, fishers also reported that current catches are no longer stable, and in some cases yield nothing at all. This shows that climate change directly affects the fishing community's main source of income.

The findings of this study show that climate change has a significant impact on the economic instability of fishers, particularly in terms of unpredictable income resulting from increasingly difficult-to-predict weather conditions. This is consistent with research conducted by Afifah et al. (2024), which revealed that climate change creates uncertainty in fishing activities, thereby affecting the decline in catches and fishers' income. That study also explains that fishers frequently struggle to determine the right time to go to

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sea and face higher risks due to extreme weather conditions, which ultimately increases their economic vulnerability. In addition, this study's findings also show that fishers must expend greater effort to obtain a catch. Fishers must travel farther and spend more time at sea, yet the results obtained do not always increase. This indicates an imbalance between operational costs and catch yields, which ultimately worsens fishers' economic conditions.

This condition is further reinforced by the research of Afifah et al. (2024), which explains that climate change contributes to rising operational costs in fishing activities, such as fuel, equipment maintenance, and other production costs. Meanwhile, fishers' catches tend to decline due to weather uncertainty and changes in fish migration patterns. This imbalance between rising operational costs and declining income places fishers under increasingly heavy economic pressure.

Furthermore, this economic uncertainty causes fishers to struggle to meet their daily living needs. Based on interview results, fishers stated that they frequently experience difficulty when unable to go to sea for several days. This shows that dependence on marine resources is very high, and the absence of a stable alternative income further worsens their economic condition. In facing these conditions, fishers undertake various efforts to survive, such as seeking additional work on land. Interview results show that fishers take on other work, such as day labor or assisting with land-based work, when unable to go to sea. This indicates economic adaptation efforts undertaken by the fishing community.

This finding is consistent with research conducted by Akbar and Huda (2017), which revealed that fishing communities develop adaptation strategies to cope with economic uncertainty resulting from climate change, one of which is livelihood diversification. Fishers do not rely solely on fishing catches but also engage in various alternative occupations, such as farming, raising livestock, trading, and working as laborers or craftsmen. This strategy is undertaken to maintain household economic stability when catches become unpredictable due to changing weather conditions. Through this diversification, dependence on the fisheries sector can be reduced, making the economic risks faced by fishers more manageable. In addition, within the household context, this study's findings show active involvement of family members, particularly wives, in helping meet the family's economic needs. Fishers' wives have begun engaging in small-scale enterprises, such as trading, to supplement household income. This shows that climate change affects not only fishers as primary breadwinners, but also the economic structure within the household.

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Furthermore, the unstable economic conditions of the fishing community can be linked to the concept of fisher poverty. As explained by Afifah et al. (2024), fishing communities are among the economically vulnerable groups due to their high dependence on natural resources and the uncertainty of catches influenced by weather conditions. This shows that fishers' economic conditions tend to be unstable and difficult to improve over time. This condition is reflected in fishers' dependence on marine resources, their limited employment options, and their unpredictable income. This indicates a tendency for the fishing community to remain in an economically vulnerable condition.

3. Fishers' Adaptation Strategies in Facing Climate Change on Sarappo Lompo Island

Fishers' adaptation strategies in facing climate change are an inseparable part of the dynamics of coastal community life. Just as humans continually develop through learning in order to survive and grow, fishers too are required to continuously adapt to the environmental changes taking place. Climate change—marked by unpredictable weather, high waves, and shifting fishing seasons—has affected fishing activities and fishers' income, prompting them to develop various survival strategies. The fishing community on Sarappo Lompo Island has thus undertaken various adaptation strategies to cope with the impacts of climate change. These strategies were adopted in response to unpredictable weather conditions and the income instability they experience.

Interview results show that one of the main strategies employed by fishers is adjusting the timing of fishing trips. Fishers no longer force themselves to go to sea when weather conditions are unfavorable, instead waiting until conditions are safer. This reflects a behavioral shift among fishers toward prioritizing safety more than before. In addition, fishers also adopt the strategy of seeking additional work outside the fisheries sector. Based on interview results, several fishers choose to work as day laborers or perform other land-based work when unable to go to sea. This strategy is employed to maintain income even when not fishing, indicating efforts to diversify income sources as a form of adaptation to economic uncertainty.

This finding is consistent with research by Akbar and Huda (2017), which states that fishing communities diversify their occupations as an adaptation strategy in response to changing environmental and economic conditions. Fishers do not rely solely on marine catches but also engage in other work such as farming, raising livestock, trading, and working in the service sector to meet their living needs. This occupational diversification is one effective way to reduce dependence on unpredictable marine catches. Besides individual strategies, the research findings also show adaptation

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strategies carried out at the household level. The role of family members, particularly wives, has become increasingly important in helping meet economic needs. Fishers' wives have begun small enterprises such as selling food or engaging in other economic activities. This shows that adaptation is undertaken not only by fishers as heads of household, but also involves the entire family.

Another adaptation strategy found in this study is the utilization of social relationships among fishers. Based on interview results, fishers continue to help one another when someone experiences difficulty, whether through sharing catches or providing other forms of assistance. This social solidarity is an important survival strategy in facing difficult economic conditions. This finding is also consistent with research by Afifah et al. (2024), which shows that fishing communities have strong social relationships and cooperation in facing economic pressure resulting from climate change. Such social interaction is an important part of coastal communities' survival strategy, as through solidarity and togetherness, they are able to help one another meet their needs and reduce economic burdens.

In addition, fishers also practice more careful financial management strategies. Based on interview results, fishers try to set aside a portion of their income when they earn more, to be used during periods when they are unable to fish. This reflects the community's awareness in managing finances as a form of anticipation against income uncertainty. Another strategy employed by fishers is attempting to relocate their fishing grounds. Fishers seek out other locations believed to have greater fish potential. However, this strategy does not always yield optimal results, as marine environmental conditions in those areas are also undergoing change.

Overall, the adaptation strategies undertaken by the fishing community on Sarappo Lompo Island demonstrate the community's capacity to adjust to environmental and economic change. Nevertheless, the strategies employed remain relatively simple and limited, and have not yet been fully able to overcome the impacts of climate change they face. Taken together, this study's findings illustrate a continuous chain of cause and effect. Climate change—manifested in unpredictable weather and declining catches—first shapes the subjective perceptions of Sarappo Lompo Island fishers, as explained through Schutz's concept of the lifeworld and intersubjectivity, that the sea has now become a far more uncertain source of livelihood than before. It is this perception that then drives the emergence of various adaptive decisions: adjusting the timing of fishing trips, diversifying occupations, and strengthening social solidarity and financial management. Ultimately, the quality and consistency of these adaptations become the primary determinant of the future economic sustainability of fishing households.

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CONCLUSION

Based on the research findings, it can be concluded that climate change has impacted the social and economic conditions of small-scale fishers on Sarappo Lompo Island. Socially, there has been a decline in social interaction and a shift in gender roles, although solidarity among fishers remains intact. Economically, fishers have experienced declining income due to weather uncertainty, reduced catches, and rising operational costs. To survive, fishers employ various adaptation strategies, such as adjusting the timing of fishing trips, diversifying livelihoods, and strengthening solidarity and household financial management. However, these strategies remain limited, highlighting the need for policy support to enhance fishers' resilience to the impacts of climate change.

Recommendations

Based on the research findings regarding Small-Scale Fishers' Perceptions of the Socioeconomic Realities of Coastal Communities Amid Climate Change on Sarappo Lompo Island, this study puts forward the following recommendations: First, local government and related agencies, such as the Marine and Fisheries Office, need to provide concrete support to small-scale fishers through programs offering fishing gear assistance that is more adaptive to changing weather conditions, as well as easily accessible capital support to help fishers survive during lean periods caused by extreme weather. In addition, ongoing training and outreach on weather and climate information should be provided, enabling fishers to plan the timing of their fishing trips more accurately and reduce safety risks at sea.

Furthermore, village governments and community leaders need to strengthen collective social activities—such as mutual assistance (*gotong royong*) and community gatherings, whose intensity has begun to decline—for example, through fisher groups or shared cooperatives, so that the social solidarity that has been well established can continue to be maintained amid economic pressure. Economic empowerment programs for fishing families, particularly for fishers' wives who have contributed to household income, should also be developed through training in supplementary business skills, such as processing marine products or running small home-based enterprises.

In addition, the government needs to facilitate the diversification of fishers' livelihoods in a more targeted and sustainable manner, given that the adaptation strategies currently employed by fishers remain simple and limited. Support in the form of skills training outside the fisheries sector, market access, and household financial management mentoring will help fishers cope with income instability in a more planned way. Finally, given Sarappo Lompo Island's vulnerability to the impacts of climate change, the

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government needs to include this area as a priority in climate change mitigation and adaptation programs for coastal regions, including strengthening infrastructure that supports the safety and continuity of fishing activities.

Limitations and suggestions for further study

This study has several limitations that should be considered in future research. First, this study was conducted at only one location, namely Sarappo Lompo Island, so the findings cannot yet be generalized to describe the overall condition of small-scale fishers in other coastal areas; future research is recommended to expand the study locations in order to obtain a more comprehensive picture. Second, the number of informants in this study was relatively limited, as it followed the principle of data saturation; further research with a broader and more diverse range of informants would enrich the research findings. Finally, this study focused on fishers' perceptions and socioeconomic adaptation strategies, and did not examine in depth other factors such as government policy, access to weather information technology, or the role of microfinance institutions in supporting fishers' economic resilience; future research is therefore recommended to also explore these factors.

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