



EXPLORING FISHERMEN'S ADAPTIVE STRATEGIES FOR POST-TYPHOON RECOVERY

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ABSTRACT

This study explores the adaptive strategies that are used to recover from the damages caused by post typhoon occurrences for fishermen in Looc, Danao City, Cebu, through the use of qualitative research as an approach, specifically a phenomenological design. Data were collected through purposive sampling from 20 fishermen in Looc, Danao City, Cebu, for an interview, and analysed using thematic analysis. Results revealed that almost all of the fishermen suffer from the aftermath of typhoons, affecting their livelihood and damaging their fishing equipment. Thus, the fishermen employed various adaptive strategies to recover from the impacts of typhoons. Moreover, this study emphasizes how the fishing is paramount to the fishermen in life, keeping their needs and necessities. The study highlights the resilience of the fishermen and how fishing is very important in sustaining their daily needs.

Keywords: fishermen's recovery, adaptive strategies, post-typhoon recovery, typhoons, fishermen's resilience

Introduction

Typhoons do not only bring strong winds and rains; they release pervasive destruction that also directly impacts the fishermen and their communities, leaving a cycle of economic hardship that extends beyond immediate destruction. Studies have shown that extreme weather events, including typhoons, have brought about significant economic damages in the fishing industry. For example, the Food and Agriculture Organization (FAO) report indicated that natural disasters are responsible for more than 30% of the average annual loss in the fisheries and aquaculture industry, and among the loss-inducing disasters are typhoons (FAO, 2021). They provide intensive weather patterns which limit fishing practices, cause devastation to structures, and impact on marine habitats (IPCC, 2021). Typhoons can devastate large-scale infrastructure such as jetties, landing ports, and onshore storage facilities, seriously affecting fishermen's livelihood. Fishing gear and boats—most often bought after years of hard work and economic self-denial—are usually destroyed or heavily damaged, and it is hard for the fishermen to begin again even after the typhoon has long gone. Successful adaptive strategies involve comprehending the impacts of typhoons, including their probable effects on marine ecosystems and the resilience of fishing communities. Informal support systems in fishing communities may be relied upon by some fishermen, but these are invariably overwhelmed by the scale of the damage caused by a large typhoon.

These storms pose severe weather conditions that hinder fishing activities, destroy infrastructure, and affect marine ecosystems (IPCC, 2021). For instance, typhoons have the potential to destroy major infrastructure such as jetties, landing ports, and onshore facilities for storage, hugely affecting the lives of fishermen. Fishing gear and boats—usually acquired after years of toil and financial sacrifice—are usually destroyed or severely damaged, and it becomes challenging for the fishermen to get back to work even after the typhoon has passed. Knowledge of the effects of typhoons is very important in planning adaptive measures, which include projecting their impacts on marine ecosystems and the vulnerability of fishing communities. Most fishermen have to depend on community-based informal support networks, but these can become saturated with the extent of damage wrought by a large typhoon.

Typhoons result in instant devastation and have lasting impacts on marine ecosystems and fish stocks, leading to coastal erosion and water quality changes, which influence fish habitats and migration patterns. Such disturbance can lead to lower fish catches, thus increasing the economic burden on fishermen. Typhoons also bring forth widespread destruction, directly affecting fishermen and communities (Sainsbury, 2018). The loss of the fishing vessels and gear, years of laboriously acquired through and often costly personal sacrifice, is especially demoralizing. Not only are the fishermen harmed by the loss, but their families and a whole society dependent on their crops as well. The destruction of coastal structures such as fish markets, storage houses, and docking structures are part of the challenges. The fishermen therefore have their goods made impossible to sell, store, or move safely. The uncertainty of typhoons and their devastating effect leave most fishermen vulnerable, with little money to repair and rebuild.

China is the world's largest fishing nation, and it plays an important role in supplying seafood globally. According to Global Fishing Watch (2019-2021), the country operates the most extensive and highly subsidized fishing fleet, with tens of thousands of distant-water vessels reaching all corners of the ocean (Oceana, 2021). Though it plays a huge role in the supply of seafood globally and feeding international food markets, this massive fleet is one of the primary drivers of China's status as a global seafood exporter that helps feed international food markets. But it also brings issues of overfishing, ecosystem loss, and marine resource depletion, which have created pressure for international management and sustainable fishing to maintain ocean health (Pauly & Zeller, 2016).

Similarly, Indonesia has a significant fisheries sector, composed of marine and inland capture fisheries as well as aquaculture, which plays an important role in supporting the national economy and food security. In 2021, the gross domestic product from fisheries was 2.77%, and the fish available for consumption was 35.26 kg/capital (SEAFDEC, 2022). This robust fisheries sector, as evidenced by its significant contribution to the GDP and per capita consumption, the fishing industry in Indonesia is critical not only for domestic consumption but also for export, supporting both local livelihoods and the broader economy. Indonesia is also the second-largest marine capture producer in the world after China, with 84.4 million metric tons of seafood caught in 2018, based on the U.N. Food and Agriculture Organization (FAO). Indonesia's wild capture fisheries have approximately 2.7 million employees, who are primarily small-scale fishers who use boats less than 10 gross tonnage. These fishers often face challenges such as limited access to new technology like GPS or sonar, capital shortages because of high fuel costs, and competition from huge industrial fleets, but they are an essential part of Indonesia's successful fishing industry. The magnitude of these industries demonstrates the unprecedented potential damage of typhoons, not only to local communities, but to global food security and economic well-being. Interference with the fisheries in these areas has drastic implications. Coastal erosion, fueled by more intense typhoons, sea-level rise, and rising storm surge (IPCC, 2021), also imperils these communities.

Regardless of their dominance in the fishing industry, the sudden destruction caused by a typhoon spares no nation. Fisheries across various sectors and countries remain extremely vulnerable to these storms, which disrupt operations, damage equipment, sink boats, and put thousands of fishermen's lives at risk. The loss, damage, and injury brought about by such disruptions have significant repercussions, not only on the local fishermen but on the international supply of seafood and its prices as well. Far too many times, the incessant efforts, diligence, and sacrifices of fishermen go unnoticed and unrewarded by the societies they contribute to. The susceptibility of fishermen to typhoon damage is due to constant exposure to extreme environmental hazards and the very risky nature of their vocation.

Typhoons have continuously wrecked the fishing industry of many countries, particularly in the Philippines. For instance, powerful storms such as Typhoon Haiyan in 2013 and Typhoon Bopha in 2012 razed large amounts of fishing equipment, vessels, and processing plants, bringing colossal economic losses to thousands of families. In more recent times, storms like Typhoon Odette in 2021 have also caused considerable damage, showing the sector's continued vulnerability. Based on news reporting by the Philippine News Agency (2022), Typhoon Odette itself wrought more than PHP 1 billion worth of losses to the country's fishing sector.

This nationwide vulnerability is particularly evident in Navotas City, often referred to as the "Fishing Capital of the Philippines," where approximately 70% of its population works in fishing and related activities like fish trading, fishnet repairs, and processing (DOT, 2015). Each day, fishermen set out to sea with hope of a bountiful harvest in order to sustain their families. But during typhoon season, everything changes. The strong winds and heavy rains inundate the roads, capsize fishing boats, and destroy storage sheds, and most fishermen are hard-pressed to rebuild from such devastation. Lacking any disaster preparedness, for example, in the form of poor early warning systems and emergency funds, recovery is hard for Navotas fishermen, once again putting them into a cycle of loss and recovery (FAO, 2019). It is most stressful to the fishermen's and their families' mental and physical health. The constant stress of not knowing and attempting to rebuild after each storm can render them hopeless and desperate.

In Looc, Danao City, life is also difficult. Most families in Looc depend on fishing for their livelihood, but they encounter a lot of hardships when typhoons hit. Most fishermen in the barangay have very little means to secure their boats and equipment from typhoons. They don't have good storage facilities and access to good weather forecasts that would warn them ahead of an incoming typhoon. Lacking time or resources to prepare, these fishermen are more likely to lose their livelihoods when it comes to extreme weather.

These are ongoing issues highlighting the essential need to research how the fishermen heal and develop following typhoons, specifically in oppressed populations like Looc, Danao City. It is vital to know the fishermen's hardships and resilience during typhoon seasons to effectively manage coastal communities' fisheries in a sustainable manner. This study aims to analyse the adaptive strategies employed by fishermen to rejuvenate themselves following destructive typhoons. Through the revelation of these strategies, the research aims to make valuable contributions towards promoting resilience among fishery communities and policies that will help in improving their recovery process. Overall, this study hopes to find the essential drivers of building resilience among fishermen dealing with the mounting adversity of typhoon season to enable the construction of stronger, sustainable fishing industries in the future.

Literature review

A. On How Typhoon-Induced Changes in Marine Ecosystems Affect Fishermen's Ability to Recover

Typhoons are powerful storms that can destroy coastal communities as well as marine life. This typhoon is similar to a hurricane or cyclone but is specifically called a typhoon in this region. (Dong, et al., 2024). In addition to disrupting the daily lives of fishermen, typhoons also alter the marine ecosystems where they catch their fish. These environmental changes can result in the displacement or death of fish populations, making it more difficult for fishermen to find and catch fish even after the storm has passed (Ortiz, et al., 2022). Most areas are greatly affected by these storms, and the Philippines is one of them. This often led to an influx of freshwater, pollutants, and debris into coastal waters, altering salinity levels and introducing harmful substances that can disrupt marine food chains. Having a high frequency of typhoons every year, the fishery communities of the Philippines struggle to recover from the impact on marine ecosystems. These are mainly short-term ecological effects such as species death, habitat loss, and changes in community structure (Feelian, et al., 2024).

Typhoons can cause big changes in marine ecosystems, which directly affect fishermen's ability to recover after a storm. Strong winds and heavy rain can damage coral reefs, stir up sediment, and reduce fish populations, making it harder for fishermen to catch fish. If fish populations decline, fishermen would not be able to earn income and support their families. The alteration of water temperature and salinity following a typhoon may also influence fish behavior, and they become more difficult to catch. Due to these difficulties, fishermen need to discover new strategies to sustain their livelihood after the storm.

This subject relates to our research since knowing these effects can explain why fishermen require adaptive measures for recovering from typhoons. If their fishing area is destroyed, they might need to change methods of fishing, target other fish species, or even take on temporary work elsewhere other than fishing. Understanding how they recover can help to develop better support systems, such as economic support, new technologies for fishing, or education. The connection between recovery and typhoon damage points out the need to be ready for the next storm. From observing what happened to them, we can facilitate the fishermen recovering faster and protecting their means of livelihood.

B. On Adaptive Strategies Fishermen Implement to Restore Their Livelihoods After Typhoons, and the Effectiveness of the Strategies

Following a typhoon, fishermen are faced with immediate challenges such as damaged equipment, changed fishing grounds, and depleted fish stock. As adaptation to these issues and to rebuild their livelihood, most fishermen have coping mechanisms that enable them to adjust to the recovery process. Macusi et al. (2025) noted that super typhoon-affected fishing communities undergo severe dislocation in livelihood activities, such as decreased catch per trip and working difficulties. Coping mechanisms in the affected communities are likely to be dependent on government and non-government support programs, such as mangrove replanting, seawalls with wave breakers, cash-for-work programs, and alternative livelihoods such as tourism (Macusi et al., 2025).

Typhoons also cause catastrophic damage on coastal ecosystems, including loss of habitats, fish loss, and degradation of fishing areas. The resultant environmental effects intensify the adversity faced by fishermen in reviving their source of livelihood. Investigations by Dong et al. (2024) and Ortiz et al. (2022) highlight the long-term impacts of typhoons on ocean ecosystems, especially in the Philippines—a nation that is often toured by weather disturbances. The aforementioned research is relevant to the present study, wherein stress is laid on how fishermen cope with such variables for recovering their source of livelihood.

The Food and Agriculture Organization (FAO) came up with the tools such as the "Guidelines for the Fisheries and Aquaculture Sector on Damage and Needs Assessments in Emergencies" and the "Fisheries and Aquaculture Emergency Response Guide" to assist in the identification of key needs of fishermen following typhoons. The guidelines were intended to enable fishermen to regain their livelihood and get back to normal gradually (FAO, 2019). In the same vein, the Department of Agriculture (2022) underscored that there is a need for an immediate government intervention since fishermen tend to lack the capacity to recover on their own.

Studies identify numerous adaptive techniques employed by fishermen globally. For instance, research in Indonesia indicates that fishermen employ internal strategies such as household discussion, family problem-solving, and sharing of responsibilities to cope with new situations (Mozumder et al., 2018; Omerkhil et al., 2020). Exogenous strategies entail undertaking community activities, seeking alternative livelihoods, or expanding fishing enterprises (Damanpour et al., 2018). In the Philippines, typhoon-affected fishers have been supported through livelihood training projects to increase skills in aquaculture farming or ecotourism activities to complement their income.

On top of such interventions, the fishermen are also counting on grassroots movement and governmental intervention in forms such as reforestation in mangroves to protect the shore from up-coming typhoons (Macusi et al., 2025). All these efforts are crucial in the sense that they explain ways fishermen are transforming workplace habits along with daily routine to better tackle post-typhoon disadvantages. The emphasis here on these rehabilitation efforts reinforces the essence of our research by providing the tangible means by which fishermen survive and overcome the typhoon. In the long run, the purpose of this research is to examine adaptive strategies used by fishermen to recover after typhoons. Through the analysis of these strategies and their relative success, this study aims to contribute to insightful understanding of enhancing resilience in fishing communities and to guide policies that can more effectively aid in recovery.

C. On Individual, Community, and Policy-Driven Factors Contributing to the Resilience of Fishermen in Post-Typhoon Recovery

A study by Baldwin et al. (2021) found that community-based social networks were essential for post-disaster recovery of fishermen. More specifically, fishermen who were part of strong local support networks (be it fisher associations or cooperatives) had a higher resilience compared to those who did not have those networks: the solidarity of these social networks made it possible to share resources and exchange knowledge with a wider group of fellow fisherpersons and ultimately facilitate faster recoveries as well as adaptation to the changing nature of the environment after typhoons.

The concept of financial resources and diversification of livelihoods also is emphasized in Cabral et al. (2010), who report that in their research on coastal fishers in the Visayas region, the data showed that the fishers having access to microfinance, savings programs or other alternative livelihood vectors, such as aquaculture or tourism, recovered faster from the damage sustained by typhoon; hence, resilience in the face of a disaster is not only the ability to recover immediately but the capacity of long-term financial and livelihood strategies to cope with the shocks of upcoming disasters.

Thus, community-level disaster preparedness programs may increase the resilience of fishers. In a study conducted by De Guzman et al. (2019), they found that formal disaster preparedness training (i.e. risk assessment, early warning systems, and evacuation protocols) assisted fishermen in the recovery process quicker and improved their feeling of security. These training interventions also reduced anxiety and panic during recovery of a typhoon and allowed fishermen to continue their rehabilitation process more effectively.

These studies and other findings together suggest that resilience of fishermen (after a typhoon) is affected by social network influence, economic buffer and preparedness strategies. These factors all have a significant impact on their capacity to recover from and adapt to future disasters and can serve as further conceptual insights into policy and intervention to assist coastal communities in becoming more resilient to climate-related disasters.

1.2. Research questions

This research examines the various adaptive strategies employed by fishermen to recover from the destruction caused by typhoons. It aims to understand the resilience and recovery methods they develop in response to this natural disaster. To achieve this objective, the study seeks to address the following key questions:

1. How do typhoon-induced changes in marine ecosystems affect fishermen's ability to recover?
2. What adaptive strategies do fishermen implement to restore their livelihoods after typhoons, and how effective are these strategies?
3. What individual, community, and policy-driven factors contribute to the resilience of fishermen in post-typhoon recovery?

Methodology

Research Design

A qualitative research design was utilized in the study to examine fishermen's adaptive strategies after typhoons. Phenomenology is the research design as it emphasizes understanding and explaining personal experiences and perspectives of people (Williams, 2021). The researchers utilized this design for the study as it provides richer insights into complex phenomena, in this case, learning about the environmental effects of typhoons on fishermen and how fishermen adapt to recover from typhoons. Phenomenology allows the investigation of lived experiences, providing insights into how individuals interact and make sense of their social worlds. This study utilized the purposive sampling since this sampling method allows the researchers to deliberately select participants who have firsthand experience. Only the fishermen who experienced the first-hand destruction of typhoons were selected as research participants.

Sample / Participants

This study involved 20 fishermen from Looc, Danao City, Cebu. They were selected as research respondents because they have spent their lives in the fishing industry to sustain food supplies, support their daily needs, and provide insights relevant to the study's objectives.

The respondents of this study were chosen based on the following criteria:

- Fishermen
- Fishermen who experienced typhoon

The respondents of the study are the fishermen residing in Looc, Danao City, Cebu. The particular site was chosen as the context of the study due to the fact that it depends a lot on fishing as a primary source of living. Looc is near the coast, and due to a strong typhoon, the area was hit hard, with fishing gear shattered, catch of fish reduced, and fishermen's sources of income disrupted. The primary objective of this study is to explore the various approaches these fishermen employ to recover from the effects of such natural disasters. This involves understanding their adaptive strategies, including alternative livelihoods and social support networks at the community level. This study, conducted between February and March 2025, offers useful information on the resilience of Looc's fishing community. Their coping mechanisms can be utilized to develop better disaster response programs and sustainable recovery programs for such coastal communities in the future.

Instrument(s)

Data for this study were collected mainly using semi-structured interviews to examine post-typhoon adaptive strategies utilized by fishermen. The interview guide included three open-ended and a few follow-up questions to obtain comprehensive information about the lived experiences of the fishermen while maintaining flexibility for participants to elaborate on their responses where they viewed necessary. The interviews were done one on one and in order to obtain the precise transcription of the data, the researchers used audio recording.

Data collection procedures

The researchers obtained parental consent for their parents to provide their signature of approval for conducting the interview in Looc, Danao City, Cebu. For integrity and transparency purposes, the researchers devised a consent letter to give an explanation to the fishermen regarding the interviewing process and ensuring their personal information will be kept confidential. Once consent was acquired, all 20 participants were asked 3 questions and follow-up questions from a semi-structured interview guide. The participants were invited to provide answers truthfully. The allotted time for each fisherman to complete the interview was 20-40 minutes.

After conducting the interviews, the researchers documented the data while keeping it confidential as stipulated in the consent form. The gathered information was kept safely to safeguard the privacy of the respondents such that only the authorized researchers had access to the data. Through these steps, the researchers completely complied with the aims of the consent form, focusing on the privacy and confidentiality of the participants.

Data analysis

To analyse the gathered data from the 20 fishermen participants who experienced post-typhoon occurrences in Looc, Danao City, Cebu, the researchers utilized thematic analysis. Thematic analysis, specifically Braun and Clarke's data analysis process, which was also used to analyse the data in the

qualitative phase to identify recurring patterns or themes related to the response of the fisherman's experiences (Braun & Clarke, 2006). This method consists of six phases: (1) familiarization of data; (2) generation of codes; (3) combining of codes into themes; (4) reviewing themes; (5) determining the significance of themes; and (6) writing up and reporting of findings.

Results and Discussion

1. How do typhoon-induced changes in marine ecosystems affect fishermen's ability to recover?

A. Scarcity of Fish due to Huge Waves

The aftermath of typhoons brings significant challenges to marine ecosystems, which in turn affect fishermen's livelihoods and recovery processes. The analyzed data indicates that typhoon-induced changes in marine ecosystems have a profound impact on fishermen's ability to recover, particularly due to the scarcity of fish due to the huge waves, as detailed in the responses below:

"It's hard to catch fish because of the waves. The waves are big, so we can't fish." (Interviewee 7)

"It will be difficult to fish because there are no fish because of the strength of the waves. It is difficult because there are no fish to catch, it is really difficult." (Interviewee 12)

"There are no fish because of the really strong hitting waves." (Interviewee 15)

Typhoon-caused big waves greatly agitate marine life, making it difficult for fish to survive. The strong waves displace fish from their customary habitat and break schools. It therefore becomes challenging for fishermen to find fish. It also makes seas physically dangerous or impossible for fishermen to venture out, further decreasing their catch. Since there are fewer fish around and it is risky to navigate seas, recovery gets tougher for them.

"The impact of the storm is that there are very little to no fish at all. We catch only a few kilograms of fish. The waves are really big." (Interviewee 2)

"The typhoon scares the fish, and they hide. They won't show up. It's the same with big waves, they hide." (Interviewee 5)

"The fish are scared because the waves are big. There are no fish. We can't fish at all because the waves are too big." (Interviewee 6)

These responses add strength to the previous ones. The responses of the fishermen demonstrate how typhoons and resultant huge waves make fish scarce, and they struggle to catch any. The waves disperse and push the fish away, so they retreat or go to deeper, inaccessible areas. This makes fishing unfruitful since the fishermen catch little to no fish. The harsh condition of the sea also renders it unsafe for them to fish, further constraining their capacity to recover.

These results are aligned with Crespo and Dunn (2017), who showed that intense climate events, including typhoons, synergistically interact with fishing pressures to destabilize marine ecosystems. Their work found that typhoons can lead to sudden changes in fish behavior and pattern distributions echoing the "hiding" phenomenon reported by the fishermen while also wrecking fishing infrastructure.

B. Prolonged Financial Struggles Due to Fish Scarcity

The consequences of typhoons impose tremendous economic burdens on fishermen, which consequently influence their capacity to recover and maintain their livelihoods. The results from the collected data show that typhoon-induced disturbances to ocean ecosystems greatly impact the financial stability of fishermen, especially through the lack of income generated from fishing activities, as elaborated in the responses below:

"We are not able to go fishing, and even if the typhoon is over, there will still be no fishes which means that we won't have any money to buy rice." (Interviewee 16)

"The fish is the one that is affected if there is a typhoon. Us fishermen as well. If there's no fish, there's nothing for us to sell." (Interviewee 17)

"There's no fish, the price of the fish will be expensive. We cannot go fishing." (Interviewee 19)

The direct operational interruption prevents the fishermen from conducting fishing operations, and it affects their capacity to earn a living directly. Even when the typhoon has passed, the extended lack of fish continues to affect their livelihood because there are no fish to sell or catch. This scarcity impacts their incomes too and brings up market prices for fish even more, placing another economic burden on both fishermen and consumers. Inability to have fish available for sale points directly to the implication that fishermen have insufficient finances in order to have the money they need for food purchase, exemplifying how exposed their financial steadiness is towards typhoon agitation.

"The flow of the current changes. There are no fish at all. Us fishermen rely on the calmness of the sea, because this is when the fish will come out and it's easy to catch them. We couldn't fish for many days. We don't have money, and we couldn't make money since we couldn't fish." (Interviewee 4)

"Typhoons create massive waves making it hard for us, fishermen, to go to the sea and catch fish. Additionally, typhoons not only affect waves but also the fish itself. Typhoons exert an impact on the fish's senses, due to the discern of their senses these fishes hide in reefs, rocks and in different sectors in the ocean. As typhoons affect these aspects, we face difficulties in sustaining our daily needs such as rice, since fishing is our only way to support our needs and is our only way of living." (Interviewee 13)

The ecological disruption caused by typhoons—such as changes in marine currents and fish hiding behaviors—directly affects fishermen's ability to catch fish, leading to prolonged economic hardship. Fishermen rely on calm sea conditions to catch fish, but typhoons disrupt these conditions, making it difficult for them to earn a living. The absence of fish not only reduces their income but also affects their capacity to meet basic needs, such as purchasing food. This highlights the vulnerability of fishing communities to environmental shocks, where the loss of fishing opportunities translates into food insecurity and financial instability. The reliance on fishing as their sole means of support exacerbates these challenges, emphasizing the need for diversified livelihood strategies to mitigate such risks.

This is supported by evidence from existing studies placing in perspective the effects of extreme weather, such as typhoons, on livelihoods of fishermen. For instance, a study conducted on Vietnamese small-scale fishermen points to the importance of livelihood response to extreme weather like typhoons, which destroy fishery products and impact livelihood activities (Pham & Saizen, 2023). Similarly, tropical fisheries research has shown that impacts of climate change, like increased storms, can yield decreased catches in fish and economic insecurity for fisheries communities (Islam et al., 2020).

2. What adaptive strategies do fishermen implement to restore their livelihoods after typhoons, and how effective are these strategies?

A. Fishing as a Means of Recovery

As fishermen struggle from the devastating effects of typhoons, they have conducted adaptive strategies in order to restore their livelihood, ensuring these strategies are effective to all fishermen undergoing the effects of the aftermath of typhoons, strategies include fishing. The analyzed data indicates that fishing provides help to fishermen to restore their livelihood, furnishing them with their necessities.

"We still fish, but it depends. The fish hide during typhoons, so we catch less. Sometimes we can sell, sometimes we don't." (Interviewee 2)

"When it's calm, we fish. That's how it is. We catch a little as long as it's calm. We earn very little." (Interviewee 6)

"Fish. That's all. If we get a catch, we sell, but it's really hard to get catches" (Interviewee 3)

The given response has shown that fishing is a way of fishermen to catch fish, sell them, and make income. A study illustrates that fish, fishing, and fisheries management is at the center of disaster relief and recovery for Pacific Island communities. Recognizing the humanitarian value that well managed fisheries resources can play while coping with hardship from natural hazards adds another dimension to the imperative of improving management of coastal fisheries and aligning policies across sectors (ScienceDirect).

"We still fish, but we catch a little. We earn just enough to buy rice. My strategy is to keep fishing because it's how we feed our family" (Interviewee 5)

"We still fish because we can catch fish so we can buy rice. We are not strong enough to survive a typhoon. We really hide when a typhoon hits, we will evacuate quickly, run, we will run away because the water will reach our house. If there is no damage, we will go back to fishing" (Interviewee 10)

These given feedback states that fishing is a way for fishermen to provide their need not only for themselves but also to their respective families. Doing their responsibility as a part of the household. Small-scale fisheries (SSF) employ greater than 90% of the world's capture fishers (Kolding et al., 2014) and provide livelihoods and food security for hundreds of millions of individuals around the world (FAO, 2018). These responses has proven a prof that fishing is not only a job but also as a provider to the fisherman, supplying their necessities, from catching fishes to earning money and to provide the need of their family.

B. Seeking Alternative Livelihoods for Stability

Fishermen, who often struggle with unstable earnings from fishing, seek alternative jobs to supplement their income. Typhoons frequently damage boats and fishing equipment, making it difficult to return to the sea immediately. To provide for their families, some fishermen take on side jobs or start small businesses. Their feedback highlights their willingness to pursue other forms of work:

"If we are given an opportunity to work, then, we will work like driving a pedicab." (Interviewer 14)

"If I get offered a job, then I will accept. Like driving "sikad"." (Interviewee 16)

"I am an electrician; I have a bunch of skills." (Interviewee 19)

In times of catastrophe, while fishing remains their primary source of income, they do not rely on it entirely. Their eagerness to explore other jobs demonstrates their adaptability and resilience. This highlights the importance of diversifying income sources to ensure financial stability during difficult times.

"It depends. Like, we sell fruits. It's not as effective. Fishing is better because you can earn more easily." (Interviewee 4)

"In our home, we will really try to find a way to feed our families. That's our only livelihood, fishing and selling spices to earn extra income." (Interviewee 8)

These additional responses highlight that having alternative livelihoods can indeed help fishermen with some financial support during their difficult times. These alternative jobs, such as selling fruits, driving a sikad, pedicab, and selling spices, can serve as a supplementary source of income. However, these alternative jobs cannot fully sustain their family needs; it is not as effective as fishing, where they can earn money faster and more easily.

A study by Mills et al. (2011) explores how fishermen in coastal areas adopt alternative income-generating activities during fishing disruptions. The research found that many fishermen engage in transportation services, construction, or small-scale trade to cope with income instability caused by environmental factors. This study supports the claim that fishermen's adaptability through secondary jobs enhances their financial resilience.

3. What individual, community, and policy-driven factors contribute to the resilience of fishermen in post-typhoon recovery?

A. Relying on Government Assistance

When fishing and other income sources are insufficient, many fishermen turn to government aid for survival. Relief programs provide food, financial assistance, and resources to help them recover after typhoons and other disasters. However, not everyone receives help equally, as some aid distributions depend on registration, availability, and bureaucratic processes. Understanding the role of government assistance in the lives of fishermen highlights both its benefits and limitations in ensuring economic stability and recovery during crises. The responses below highlight this perspective:

"The government gives us 'ayuda'." (Interviewee 1)

"The government gives us help. Food and 'ayuda.' They give help to us fishermen that cannot fish." (Interviewee 3)

"Like during Typhoon Yolanda, we couldn't fish. But there was 'ayuda' given, like rice and canned goods." (Interviewee 4)

The testimonies reveal that government assistance serves as a critical safety net for fishermen, especially after calamities. The term "ayuda" (assistance) signifies emergency relief, typically in the form of food, cash, or materials to help sustain communities affected by natural disasters. This reliance underscores the vulnerability of fishing-dependent livelihoods when external shocks disrupt their primary source of income.

"But there is government aid if there is damage to our boats, we can get insurance if we register our boats, boat insurance, etc." (Interviewee 9)

"Yes, those kinds of aid, like during typhoons, they give us rice, canned goods, and stuff like that. Sometimes we go to the DSWD to ask for rice, and they will give it immediately." (Interviewee 11)

"The government provides help to us when there is some ruin and damages." (Interviewee 15)

"Yes, the government will give us money or wood and roofs." (Interviewee 17)

These additional responses highlight that assistance extends beyond food relief to include financial aid, materials for rebuilding, and even boat insurance. However, the mention of registration requirements implies that access to these benefits is not universal.

The dependence on government assistance among fishermen reflects both the necessity of aid in disaster-prone areas and the challenges of equitable distribution. While such assistance provides immediate relief, it does not always address the long-term economic vulnerabilities of fishing communities. Existing studies emphasize that while relief programs are crucial, policymakers must implement sustainable livelihood strategies to reduce dependency and promote resilience (Aldrich, 2017). Strengthening insurance mechanisms, expanding alternative income opportunities, and streamlining access to government aid can help ensure that fishermen can recover and thrive beyond immediate crises.

B. Unequal Access to Government Assistance

Not all fishermen are helped by the government, even after disasters. Some claim that the system is unfair, as access to aid appears to depend on being registered or known to the authorities, with others left behind to fend for themselves. They experience the same hardships and losses but feel left out of receiving relief items and cash assistance. The following responses highlight the frustration and sense of inequality experienced by those left out of the distribution process.

"Only those registered got the money, but those without registration don't. Many don't have registration." (Interviewee 2)

"There's no government assistance here. We didn't receive any. During Typhoon Odette, we didn't receive anything at all. None. The only time we receive something is whenever someone runs as a barangay official or government official, then we get it. If no one does, we get nothing. Some fishermen were chosen to receive aid, but even though our boats are registered, we didn't get any." (Interviewee 6)

"Some receive assistance from the government, but not everyone. Only those listed or registered get it. Those who know get it, but those who don't know, don't. We here don't get any." (Interviewee 7)

"There will be no help from the others. Maybe the government will give us essential needs after 100 years. The help depends on where you lived. They'll decide where or who they want to give a charity. If they will not provide help, then they will not give something." (Interviewee 19)

The fishermen's responses indicate that they are frustrated with unequal access to government support following disasters. Most of them believe that only people who are registered or who know someone in the government are helped, while the rest are neglected. There is a perception that aid is at times politicized, with assistance being conditional upon elections. In addition, inefficient communication regarding the aid programs informs some that they do not know how to go about receiving the help. These statements highlight the need for fairer and more transparent aid distribution to ensure all those in need receive support.

"If there's 'ayuda', we accept it. Sometimes we don't receive any. It depends." (Interviewee 5)

"In the village there is none, in the community there is none, in the government there is none either." (Interviewee 10)

"I maintain a strong mentality even in the occurrence of typhoon and even without the help of the government." (Interviewee 13)

"In times of typhoons, no one helped us to donate what we needed, even the government and the councilor." (Interviewee 14)

"The government has given us no aid at all. None." (Interviewee 16)

The responses from fishermen reveal frustration with unequal access to government aid after disasters, with many feelings excluded because they are not registered or lack political connections. They believe aid is often given based on favoritism, and there is a lack of clear communication on how to access support. This highlights a systemic issue where vulnerable groups are left out during crises.

The fishermen's frustration with unequal access to government aid highlights issues of fairness in disaster relief. Benson and Clay (2004) argue that complex registration processes and bureaucratic delays often prevent the most vulnerable groups from receiving timely assistance. To address these challenges, governments should implement transparent and inclusive distribution systems, simplify registration requirements, and improve outreach efforts to ensure that all affected individuals receive the support they need.

C. Financial Struggles and Alternative Income Sources

While some fishermen continue to fish, others recognize the need to find temporary or additional sources of income to survive. Typhoons can cause extensive damage to boats and fishing equipment, making it impossible to return to the sea immediately. In response, some turn to other jobs or small businesses to provide for their families. It is relevant to the research question as it highlights both the economic vulnerability of these communities and their resilience in adopting alternative strategies for survival. Understanding these dynamics is essential for developing policies that support sustainable livelihoods in vulnerable coastal areas.

"We will try to find another source of income," (Interviewee 16)

"But when there's a typhoon, we can't go fishing directly, so we try to find other jobs to sustain our needs." (Interviewee 20)

"Of course, we don't just focus on the problem of having no money. We keep going, not losing hope. We just look for ways to earn money. Strategy is important. Maybe drive a "sikad" or something." (Interviewee 4)

These responses reveal that fishermen are actively seeking alternative income sources to mitigate the impact of financial struggles caused by the typhoon. They are not entirely dependent on it, they try to find alternative ways to earn money such as driving a "sikad", and the willingness to take loans for repairs, indicate a proactive approach to different income streams. This adaptability is critical in contexts where fishing—a primary source of income is unreliable due to natural disasters like typhoons.

"We will try to look for another source of income if we can. If we cannot find another job then, we will wait until the sea is in good shape before we go fishing at the shore." (Interviewee 14)

"Sometimes, we borrow boats from our neighbors and relatives." (Interviewee 18)

These findings illustrate that fishermen are not only dependent on fishing; they employ a variety of strategies to secure their livelihoods in the face of economic vulnerability and environmental challenges. Thus, they are willing to explore other options to ensure their survival, demonstrating their resourcefulness and determination.

Overall, the data collected can be supported with the existing study of Eadie et. al. (2020) regarding the resilience of the fishermen on how they will find ways to survive other than fishing. Fishing is their main source of income, yet their resilience assists them to discover skills which they thought fishing is the only job they could do. Such research emphasizes the need for comprehensive policy interventions that not only enhance disaster preparedness but also support the development of alternative income opportunities to foster long-term economic resilience.

D. Waiting for Safer Conditions Before Fishing Again

Although some fishermen are brave enough to face the rough seas, others choose to wait until the waters are safe before returning to work. The dangers posed by strong waves and unpredictable weather often force them to postpone fishing until conditions improve.

"And when it's calm, we go out to sea because that's how we earn a living, by catching fish." (Interviewee 6)

"We will wait until the sea is in good shape before we go fishing at the shore." (Interviewee 14)

"If the ocean has calmed down, then we'll go back to fishing." (Interviewee 15)

"We will just wait for the ocean to calm down so that we can go back to fishing again." (Interviewee 16)

"We will go fishing if the weather is in a good shape." (Interviewee 19)

This balance between necessity and caution reflects their experience and awareness of the risks involved. While fishing is essential for survival, patience in waiting for better conditions shows their ability to make strategic decisions for long-term sustainability.

The persistence of small-scale fishermen in continuing their work despite challenges highlights the importance of fishing in their survival and identity. This resilience is common in many coastal communities. A study on fishermen in Tacloban City, Philippines, found that those who adapted by finding alternative income sources were more resilient during crises (Paz, 2022). Similarly, research in Davao Gulf, Philippines, showed that small-scale fishers are highly vulnerable to climate change, emphasizing the need for adaptive strategies to strengthen their livelihoods (Caliso & De Guzman, 2023). These findings support the idea that resilience in fishing communities is shaped by their ability to adapt.

Conclusions

The findings reveal that typhoons severely impact the livelihood of fishermen, primarily due to rough waves and the scarcity of fish. Many fishermen struggle to catch enough to sustain their families, with some resorting to alternative means of income, such as selling goods or taking on temporary jobs. Despite their resilience and willingness to adapt, the financial strain caused by these natural disasters remains significant. Some fishermen rely on loans to repair their boats, while others turn to prayer and perseverance to survive. Government assistance, or "ayuda," is provided to some but is inconsistent, with many fishermen expressing frustration over the unequal distribution of aid.

Despite the challenges, fishermen continue to find ways to recover from the damages brought by the typhoon, emphasizing their hardships and determination. Many return to sea as soon as it gets calmer, while others are exploring different jobs to sustain their daily needs. The importance of the government aid is evident, but gaps in distribution emphasizes the need for a more inclusive approach to assistance. These findings highlight the fishermen's vulnerability to natural disasters and the importance of establishing better support systems to sustain their long-term livelihood and well-being.

Recommendations

Typhoons resulted in a destructive impact on the fishermen such as destroying their fishing supplies forbidding them to sail due to the massive waves. As a result, it would be difficult for them to provide for their families. To help the fishermen recover from post-typhoon challenges, this study proposes the following recommendations such as contributing relief goods and needed supplies including fishing gear, and boat repair kits, looking for alternative jobs and providing temporary shelter for those who lost their homes,

These recommendations are crucial in supporting fishermen while they are not able to return to fishing in order for them to mitigate the aftermath of the typhoon. Government agencies and non-governmental organizations (NGOs) should coordinate effective distribution efforts to ensure affected communities receive timely support. Local government units (LGUs) and organizations should also offer job placement assistance in fields such as transportation (e.g., pedicab driving) or construction work. Providing microloans or financial aid to start small businesses can also help fishermen diversify their income sources.

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