Asian Journal of Agricultural Extension, Economics & Sociology

Volume 43, Issue 1, Page 36-48, 2025; Article no.AJAEES.129371
ISSN: 2320-7027

Retracing Sustainable Fishing Practices of Marine Resources in the Coastal Communities of Antique, Philippines

Gael J. Cabigunda-Gordon [a*]

[a] *University of Antique, Philippines.*

Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

Article Information

DOI: https://doi.org/10.9734/ajaees/2025/v43i12670

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/129371

Original Research Article

Received: 05/11/2024
Accepted: 07/01/2025
Published: 13/01/2025

ABSTRACT

The European Union (EU) recognized that there is rampant illegal, unreported, and unregulated (IUU) fishing in the Philippines, resulting to a noticeable decline in fish population. To retrace sustainable fishing practices, this research sought to illustrate the fishing methods that fisher folks employ and narrate their experiences during their fishing activities. This research employed a multiple case study approach. To fully understand the experiences of the fisher folks in their fishing activities, one-on-one in depth semi-structured interviews have been conducted as well as scheduled visits in order to gather data. The collected data underwent a narrative analysis. The study was conducted in three fishing communities of Antique, specifically; Hamtic, Tibiao, and San Jose. In order to identify participants of the study, purposive sampling was used as the participants must meet certain criteria. The participants were registered fisher folks and members of a fisher folk organization registered in the barangays. Furthermore, they have been in the fishing industry

**Corresponding author: E-mail: gael.cabigunda@antiquespride.edu.ph;*

Cite as: *Cabigunda-Gordon, Gael J. 2025. "Retracing Sustainable Fishing Practices of Marine Resources in the Coastal Communities of Antique, Philippines". Asian Journal of Agricultural Extension, Economics & Sociology 43 (1):36-48. https://doi.org/10.9734/ajaees/2025/v43i12670.*

for ten (10) years or more. Result of the study revealed that 1. Fisher folks indeed observe regulated and legal fishing methods; 2. Despite the observance of sustainable fishing methods there is still a noticeable decline in fish population; 3. The presence of kubkuban near municipal territories has been cited as a potential cause for overfishing, and 4. Weak law enforcement in the Philippine seas allow rampant illegal, unreported, and unregulated (IUU) fishing to persist. The findings suggest that fisher folks show resiliency in their choice of fishing methods as they are more conservative in managing marine resources. However, government must review and monitor the effects of kubkuban on the sustainable development of marine resources and review the Philippine fisheries code. Furthermore, there is a need to strengthen law enforcement in the Philippine seas.

Keywords: Sustainable development; sustainability; resiliency; marine resources; fishing practices; fisher folks; IUU fishing; law enforcement.

1. INTRODUCTION

Fisheries, the major industry of province Antique, with Fifteen (15) out of Eighteen (18) municipalities being coastal. Moreover, 24,119 of the province's population have been registered fisher folks (BFAR, 2022) making Antique the third largest fishing province in Region Six (6). However, there were rampant illegal, unreported, and unregulated (IUU) fishing in the country. Harmful fishing practice of Philippines' fisher folks include; use of fine mesh nets, fishing with explosives or poisonous substances, and bottom trawling (Abad, 2021) resulting to the slow depletion of marine resources especially nearshore reef and soft-bottom species (Garchitorena and Po, 2022). As marine biodiversity continues to decline in Philippines' shore, the European Union (EU) issued a yellow card in 2014, indicating ban to Philippine's marine resources unless fishing activities would be regulated (Garry, 2019). In hindsight, it is one of the common goals of members of the United Nations (UN) to conserve and sustainable use of oceans, seas, and marine resources for sustainable development (UN, 2018). Philippines, being a member country of United Nations (UN), must uphold and proactive in achieving these goals. Thus, sustainable fishing and regulation is imperative in ensuring country's commitment to achieve this goal. However, fisheries productivity has been dwindling despite the stable observance of sustainable fishing practices. This research sought to retrace sustainable fishing practices of resources in the coastal communities of Antique. Specifically, the research sought to; 1) Illustrate the fishing methods that Antique fisher folks employ, and; 2) Narrate their experiences during fishing activities.

2. THEORETICAL FRAMEWORK

There are many changes in the ecosystem brought about by climate change coupled with human activity including change in composition and volume of aquatic resources affecting fisher folks' livelihood and need to respond these changes imminently. The research used resilience theory to discuss the choice of fishing practices by fisher folks and their experiences in fishing activities or panagat. Resilience is defined as "the ability of a system to adapt successfully to disturbances that threaten the viability, function, and/or development of a system" (Masten, 2019).

For Holling (1986; Pisano, 2012), the central theme to a resilience approach is the continuous change in the system over time. Ecosystems around the world usually proceed through a recurring cycle consisting of four phases; rapid growth or exploitation, conservation, release, and reorganization. The first phase of the cycle occurs when there is a rapid growth in the system and people are exploiting new opportunities and available resources. The second phase occurs when actors are more conservative and efficiently use their resources. The third phase comes when there is a disturbance in the system that can break its resilience. The fourth phase in the cycle occurs when the system reorganizes. This cycle is called the adaptive cycle. The adaptive cycle describes how an ecosystem responds to a changing world (Pisano, 2012).

In this research, the system would refer to the coastal communities together with its marine resources. Phase one of the adaptive cycle would then refer to the abundance of the marine resources, its exploitation, and its decline. How fisher folks and the local government respond to this decline and the result of their response would fall on the next three phases.

2.1 Research Paradigm

Fig. 1 describes how fisher folks respond to the disturbance in their system. In this study, the

system refers to their fishing grounds. As there are noticeable disturbances in their system such as the decline in fish quantity and quality, fisher folks responded by adopting sustainable fishing practices to establish resilience.

3. METHODOLOGY

3.1 Participants

In this study, the term "case" referred to the fisher folks. There are a total of 9 cases. They are registered in their barangay based fisher folk organization and have been in the industry for ten (10) years or more. They are residents of coastal communities in Antique, Three are from Tibiao, Four from Hamtic, and Two from San Jose. Purposive sampling was used in order to identify the fisher folks as they need to meet specific characteristics.

3.2 Procedure

The researcher asked permission from the barangay councils of the coastal communities to conduct the study with registered fisher folks in their barangay. Their assistance in identifying the participants of the study was also requested. After consent was given by the participants, a one-on-one in depth interview has been conducted. A voice recorder was used during the interview in order to collect and store data. A camera was also used to document the interview and the gears that they used in their fishing activities. The recorded interviews were transcribed and subjected to narrative analysis.

3.3 Analysis

The transcribed data from the interview underwent a narrative analysis. (Hsieh and Shannon's 2005; Assarroudi, et al., (2018) five steps of data analysis has been used. First step of data analysis was converting the transcription into narratives, followed by determining themes, next making rules for the coding system, the fourth step was applying the coding system to all narrative data and the last step was verification of data before selecting for final transcript.

4. RESULT AND DISCUSSION

4.1 Results

A total of Nine case studies were conducted through in-depth interviews. Three of them are from Tibiao, Four from Hamtic, and Two from San Jose, Antique. During data collection, their transcribed audios were labeled as Tibiao Fisher folk 1 – 3, Hamtic Fisher folk 1 – 4, and San Jose Fisher folk 1 and 2. This is done in order to keep their identity anonymous. These fisher folks have been introduced to the fishing industry in late stages of their childhood. Fishing has been introduced to them by their immediate family. 8 of 9 said that their fathers were their primary influence while only one 1 of them answered that it was his uncle. Fishing has been part of their family affairs. Male family members would be responsible for fish catch and female family member is responsible for fish processing. Division of labor aside, 8 out of 9 or majority of the cases were small scale fishers and only Hamtic Fisher folk 4 owns a commercial fishing vessel.

4.1.1 Fishing grounds

Fisher folks have identified fishing grounds where the fish population is dense still, this does not guarantee them high volume fish catch. They would navigate through different fishing grounds to have better fish catch.

4.1.1.1 Nearshore

Eight out of Nine Fisher folks answered that their usual fishing ground is within their municipal waters. The Three out of Three cases from Tibiao said that they would have been fishing along Twelve (12) nautical miles from the coastline. Meanwhile, Two cases from Hamtic answered that they would have been fishing within Fifteen (15) nautical miles from the coastline. On the other hand, one case from Hamtic answered that he would have been fishing within Ten (10) nautical miles. Meanwhile, Two cases from San Jose answered that they would have been fishing within Fifteen (15) nautical miles from the coastline. These are the boundaries identified by their respective barangay councils as prohibited areas for commercial fishing.

4.1.1.2 Offshore

For Hamtic Fisher folk 4, since he owns a commercial fishing vessel, he would cross the Ten (10) nautical miles boundary and go 200 nautical miles, at most, from the coastalline. Outside the municipal waters there are islands where he said the fish population is dense and he would often encounter foreign commercial fishing vessels. According to his map, the fishing

ground he frequently falls into the territory of Cuyo East Pass and the Cuyo Islands of Palawan. Although the territory belongs to Palawan, he said that this territory is closer to the Hamtic coastline than that of Palawan province.

Aside from him, the other cases reported to have also gone beyond the municipal borders except for Hamtic Fisher folk 2 and 3. All those who went fishing offshore have also frequent Cuyo East Pass. Hamtic Fisher Folks 1 and 4 have gone to the municipal waters of Dao and Nogas Isalnd of Anini-y, Antique. As for Tibiao Fisher folks 1 - 3, they frequent the shores of Seco Island which was still within municipal territory. They also visit the shores of Barbaza, Antique and Nogas Island. Just like the Fisher folks from Tibiao, San Jose Fisher folks would also frequent Nogas Island.

4.1.2 Reasons for moving fishing grounds

Seven of Nine cases have been rotating their fishing grounds for multiple reasons such as fish migration, low catch, presence of competition, weather condition, and desired fish species.

4.1.2.1 Fish migration

When asked why they change fishing grounds, Tibiao fisher folks acknowledge that fish migration was their primary reason for changing fishing grounds. They said that certain fish species would migrate to Seco Island or Cuyo East Pass. Once they believe that the “season” for fish species like skipjack has ended, they would transfer fishing grounds where other species are abundant. For instance, Tibiao Fisher folk 1 said that if skipjacks have migrated he would transfer to Seco Island to try and catch reef fishes like Pakol and Lapu-Lapu.

4.1.2.2 Declining fish population

All cases testified that there is a decline in the volume of fish within their municipal waters. This in turn resulted in low fish catch. However, this does not affect the Tibiao Fisher Folks as compared to the other cases. Tibiao Fisher folks 1 – 3 agreed that although there is a significant decline, they could still live off their catch. Meanwhile, Hamtic Fisher folk 1 stated that the decline in fish population prompted him to transfer fishing grounds from nearshore to offshore. If he does not do so, he will not be able to at least break even his earnings with his capital. In addition, San Jose Fisher folks said that there are more juvenile fish than adult sized nearshore. This is the reason why they would navigate towards Nogas Island for better fish quality and quantity.

4.1.2.3 Presence of competitors

All cases have observed that the total number of registered fisher folks have increased over the last Ten (10) years. Not only that, but there is also an increase in pangayaw within their municipal waters. Pangayaws are Fisher folks coming from neighboring municipalities and islands who would fish within municipal waters. Their presence is welcomed by tumandoks or fisher folks who are registered and residents where the pangayaws fish. Although their presence is welcomed, fisher folks admitted that they are competitors for fish catch. If these competitors have settled into their fishing grounds earlier than they do, they would often change fishing grounds as they have assumed that the volume of fish has already been reduced.

The same is true with Hamtic Fisher Folk 4 who owns a commercial fishing vessel. In the Cuyo Islands where his vessel settled, he would encounter international commercial fishing vessels. He said that often times this would result in low fish catch. If he observes that his competitors are done with their fishing activity before he started, it will prompt him to change fishing ground.

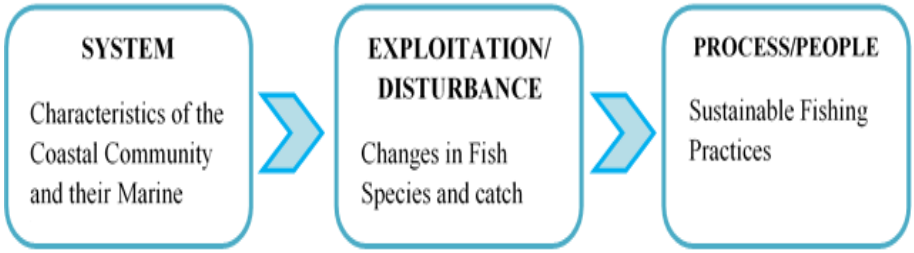

Fig. 1. Research paradigm on sustainable fishing practices

4.1.2.4 Weather conditions

Strong winds and monsoon seasons have affected the fishing patterns of all cases. They would transfer fishing grounds both for their safety and for their desire to have a better quantity of fish catch. According to Hamtic Fisher folk 1, if there is a gale warning; the water would be too clear and stagnant, fish would not bite the bait resulting in low fish catch. So if there is a gale warning, Hamtic Fisher folk 1 would change fishing grounds where there are currents.

4.1.2.5 Desired fish species

Low value fishes live nearshore while high value fishes live offshore. Many Fisher folks desire to fish offshore. If the weather permits, they would move fishing grounds where high value fish like skipjacks are located.

Table 1 shows the different fish species that are abundant within specific fishing grounds. Nearshore, there is an abundance of: marut, bulaw, bisugo, aloy, galunggong, bilong-bilong, tamban, and liwit. Meanwhile, in the Seco Island, fishes such as lapu-lapu and kanturayan/ bangaw are widely available. In Nogas, kanturayan/ bangaw, dorado, and alloy are abundant. In Cuyo East Pass and the shore of Cuyo Islands, tulingan, kanturayan/ bangaw, tangigue, and bantalaan are abundant.

4.1.3 Fishing practices in antique

Registered fisher folks diligently follow the ordinances on fishing activities placed by their respective barangay councils. They also ensure that their gears are according to standard. However, they noticed that pangayaw fisher folks often resort to illegal fishing. There is the presence of the bantay dagat to impose sanctions on illegal fishing but that does not deter the pangayaws from doing it again. It has also been observed that although legal, there is a fishing practice that could be detrimental to the sustainability of marine resources.

Table 1. Fishing grounds and available fish species

Fishing Ground	***Fish Species***
Nearshore	Marut (short bodied mackerel), Bulaw (long-jawed mackerel), Bisugo (threadfin bream), aloy (little eastern tuna), Galunggog (round scad), Bilong-Bilong (Mene moonfidh), Tamban (sardinella), Liwit (largehead hairtail)
Seco Island	Lapu-Lapu (leopard coral grouper), Kanturayan/Bangaw (skipjack tuna)
Nogas Island	Kanturayan/Bangaw (skipjack tuna), Dorado (dolphinfish), Aloy (little eastern tuna)
Cuyo East Pass/Cuyo Isalnds	Tulingan (mackerel tuna), Kanturayan/Bangaw (skipjack tuna), Tangigue (king mackerel), Bantalaan (yellowfin tuna)

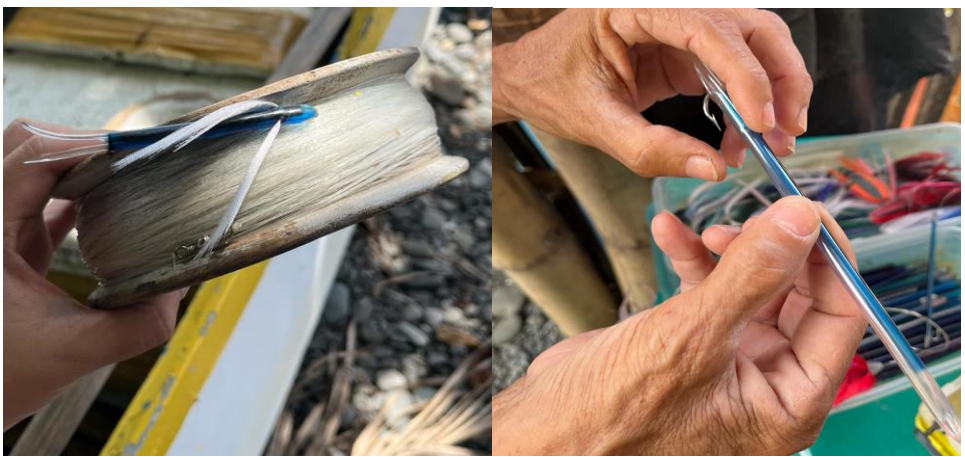

Fig. 2. Hook and line with artificial bait

4.1.3.1 Legal and regulated

Fig. 2 illustrates how fisher folks in Antique use the hook and line method. The hook is inserted in the artificial bait. The artificial bait is attached to a nylon that will be pulled up once the fish is caught.

4.1.3.2 Hook and line

This method makes use of bunit or hook and nylon or pole and line. In this fishing method they would use artificial bait to attract fishes. Dyed chicken feathers and old rubber tube shaped like a fish were their artificial baits. But if fishes are not attracted to the artificial bait they would use natural bait such as squid.

Fig. 3 shows that multiple hooks are attached to a bamboo culm. These hooks are secured by a nylon.

4.1.3.3 Multiple/Squid Hook

This is also a hook and line method but instead of a single hook they use multiple hooks. Several – about 50 to 80 – small hooks are secured by nylon on an 8-inch-long bamboo culm. The culm is attached to a single hand line. They use this method near a fish habitat or what they call balsa. Small valued fish would swim under and feed on algae that is growing under the balsa. The presence of the small valued fish would also attract their predators which are high valued fish. Tibiao Fisher folks would put a rock inside the culm to weigh it down. They were able to catch aloy using this method.

4.1.3.4 Bobo

This is a fishing method that is seldom used. All the cases in study, reported that there are still fisher folks who use this method but they themselves don't. Bobo refers to both the fishing method and the gear used. Bobo is a trap made out from bamboo. Inside a bobo is a bait, might it be a fish or a squid. This method is used when there is an incoming low pressure and will be retrieved when it is over.

4.1.3.5 Pamana

Spear fishing is a method that will endure through time. This method used in catching coral reef fish. However, for the cases in Hamtic, they would only use pamana when they are off shore since there are no bahuras within their municipal territory. Although pamana is an effective fishing method, but fish catch, using this method, is low.

4.1.3.6 Lambat

Lambat refers to both gear and method. Lambat refers to fishing nets such as Gill net and ring net. These nets have eyes with size ranging from 7 – 9 cm. Gill nets are used nearshore while ring nets offshore. It is illegal to use ring nets near shore. The nets are dropped to the bottom of the ocean. It is weighed down by rocks. They would wait for at least an hour before the nets are pulled back up.

4.1.3.7 Pukot

This is similar to lambat but specifically used nearshore. Unlike lambat, pukot is a fishing method used when a school of fish is present. The pukot is released and pulled back immediately to catch fish. This is used when catching marut and bulaw.

4.1.3.8 Sahid

This method makes use of nets. Unlike lambat and pukot, sahid is dragged slowly towards the shoreline instead of being pulled up. Just like lambat, sahid is dropped into the ocean weighed down by rocks and stays there for an hour. When a sahid is used, members of the community would come together and help drag it. Those who helped can have a share of the fish caught from the sahid.

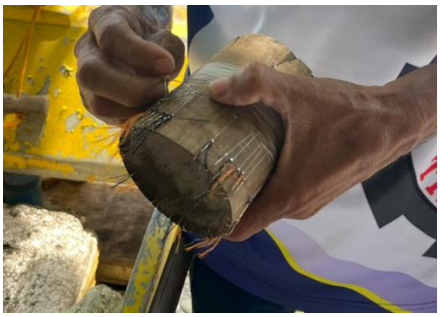

Fig. 3. Multiple hook in a bamboo culm

4.1.3.9 Lambaklad (Otoshami)

It is a large fish trap made of polyethelene nets. These nets are laid down 30 – 40 feet deep portions of the sea. The trap is laid for at least a month and would be checked daily if any fish is trapped. When there is a catch, the net is hauled into the balsa.

4.1.3.10 Kubkuban

A kubkuban is a fishing method that makes use of a fish habitat. This habitat would attract schools of fish and they would feed on the balsa or bamboo raft. While the schools of fish are gathering under the balsa, the fishing vessel would release the purse seine net and circle around the balsa. The purse seine net would then be pulled up. This method is only allowed outside the municipal waters.

4.1.3.11 Likus/Sangya

Likus is a fish trap. It is a net barrier mounted on several bamboo culms. Inside the barrier, a fishing net 60-80 meters wide is cast. The net is weighed down by 20 – 30 kilograms of rocks. After the net is cast the fishing vessel would move away from the likus so as to not scare the fishes away. When the fishes have gathered, the vessel would pull up the net. This method is successfully used during night time

4.1.4 Illegal

4.1.4.1 Dynamite Fishing

Pangayaw Fisher folks would throw dynamite near the shore of Seco Island, not only killing adult sized fish but also juvenile fish and fish fries. Dynamite fishing also destroy bahuras or fish habitats in the island. These pangayaw choose to operate when there is a low pressure because small fishing vessels and bantay dagat won't be able to reach them due to big waves.

4.2 Challenges Faced During Fishing Activity

All cases acknowledged that Antique is rich in marine resources. However, this does not equate to abundant fish catch. They would encounter problems that would result in low volume fish catch.

4.2.1 Commercial fishing vessels

The presence of commercial fishing has been a threat to small-scale Fisher folks. They all agree that commercial fishing ends up taking a large portion of the fish population in their territory and the fishing ground that they would frequent. Even Hamtic Fisher Folk 4, who owns a commercial fishing vessel, admitted that other commercial fishing vessels, especially of foreign origin, would have better fish catch than he does. According to them, these fishing vessels employ fishing methods that involve the use of nets. They can't do anything about it because outside municipal waters, the use of ring nets are allowed.

4.2.2 Decreasing fish population

Related to the presence of commercial fishing vessels, nearshore population of fish have decreased. Sightings of certain fish species such as dorado and liwit have become rare. Hamtic Fisher folks 1, 2, and 4 said that over Ten (10) years ago, these species could be caught using hook and line within municipal waters. At present, they have to move further or over municipal waters to catch them.

4.2.3 Outdated fishing equipment and gear

The Nine cases admit that their low volume fish catch is due to their outdated fishing equipment. They believe that they would be able to have a better catch if: 1) They have a bigger vessel to accommodate more than 50 kilograms of fish. 2) A bigger engine, so that they can explore more fishing grounds and not be limited nearshore. 3) For local commercial fishing, they would need similar technology that foreign commercial vessels use in detecting fish.

4.2.4 Weak law enforcement

All cases have reported that there is a bantay dagat and Philippine coast guard nearby. The bantay dagat is operating near Nogas Island, Seco Island, and they have a municipal headquarter where they can be contacted in case of illegal fishing. However, their presence in the municipal waters nor their operations within the islands do not deter illegal and unregulated fishing. In the case of Tibiao, all cases reported that there are pangayaws who would resort to dynamite fishing that would not only kill fishes but also destroy coral reefs. These pangayaws tend to familiarize the schedule of the bantay dagat and would operate during the days when the bantay dagat is not present. Simultaneously, commercial fishing vessels are prohibited inside municipal waters. However, Seven out of Nine cases reported that there are instances where

commercial fishing vessels would enter and operate in municipal waters. They added that these commercial vessels have been reported yet continue to operate days after paying a fine.

5. DISCUSSION

The Nine cases of the study have described the different fishing methods that they used and observed. In addition, they have shared their experiences and insights on fishing or panagat. Using the resilience theory, it could be said that their fishing practices showcased their resiliency. Resilience is the ability to adapt when there is a threat or disturbance to the development of a system (Masten, 2019). Their actions and fishing regulations are responses to the decline of marine resources.

5.1 Response to Disturbances in the System

The decline in marine resources is a disturbance to the system. Other disturbances in the system include drastic weather condition and increasing competition. The fisher folks respond to these disturbances by;

5.2 Changing Fishing Grounds

Fisher folks have reported that there is a decline in fish population within municipal territories. Fish species that used to be abundant within municipal waters are now moving farther from the coast. As a response, Fisher folks would change fishing grounds. The same is true with Espectato's (2011) study, where tumandok fisher folks would transfer to fishing ground with calm waters when their original fishing ground had strong waves. In the same study, pangayaw Fisher folks would transfer fishing grounds in hopes for a higher volume fish catch. On the other hand, Ivatan hand line fishers would postpone their operations during harsh weather conditions instead of changing fishing grounds (Obar, et al., 2021).

5.3 Utilization of Different Fishing Methods

Fisher folks observed that certain fishing methods and baits attract different fish species. They use hook and line, bobo, pamana, lambat, pukot, sahid, lambaklad, kubkuban, and likus. All of these fishing methods are legal and regulated. Dammannagoda (2018), even suggested that the hook and line should be propagated around the world as one of the best sustainable fishing method. However, not all of these are considered sustainable by Fisher folks. Gear used in hook and line, pamana, lambat, pukot, kubkuban, and sahid are the same gears used by Fisher folks in the municipalities of Lingayen Gulf and Scarborough Shoal (Gaerlan, et al., 2018; Arceo, et al., 2020; Tahiluddin and Terzi, 2021). Whereas, fisher folks in the province of Zamboanga believe that hook and line is the most sustainable fishing method (Schijvenaars, 2017). Likewise, Fisher folks from the province of Batanes hook and line method (Obar, et al., 2021). As for bobo, this is also considered as sustainable since materials for its gears are biodegradable and non-toxic to fish. Fisher folks from Bantayan Island practice this method but instead of squid or fish they use raw eggs as bait (Lacio, et al., 2022).

Fig. 4 shows the different artificial baits that is used by fisher folks in Antique. These baits are handcrafted by the fisher folks themselves.

Fig. 4. Artificial baits used by antique fisher folks

Meanwhile, sahid is also a legal and regulated nearshore fishing method. Fisher folks in Antique also practice this method to catch fish. This is also a traditional fishing method in Zamboanga province (Schijvenaars, 2017). However, in some provinces in Philippines, the use of sahid is prohibited due to the gear's potential to overfish (Abad, 2021). It is the same case with the kubkuban and lambaklad. Although legal and regulated, Fisher folks are worried about the long term effects of these fishing methods. Kubkuban also has a potential for overfishing. Overfishing could lead to ecological extinction which occurs when species become so rare (Craig, 2023). Likewise, Garry (2019) said that overfishing leads to the decimation of marine life. This is currently happening with the dorado and liwit. Fisher folks have noticed that they no longer swim nearshore like they used to. On the other hand, lambaklad is another fishing method that fisher folks are skeptical about. They are worried that the nets used in the lambaklad are toxic for the fish. Meanwhile, Roxas city government has been mulling over regulating this fishing method as some Fisher folks used nets that could catch juveniles (Tayona, 2023). Just like the other two fishing methods mentioned above, lamabaklad also has the potential for overfishing.

Just as the adaptive cycle of the resilience theory suggests, abundance in resources leads to exploitation. The Philippines is dubbed as the center of marine biodiversity around the world by The Global Marine Species Assessment of the World Conservation Union (Chavez, 2021). The abundance of marine resources could set off the first phase of the adaptive cycle which is exploitation. Such as the case for the marine resources in Antique. Exploitation can be observed in the decreasing presence of fish species such as the liwit and dorado nearshore. In addition, the cases testified that there is a decrease in fish catch over the years. From catching 30 – 50 kilograms using hook and line nearshore to 20 kilograms or none using the same method in the same fishing ground. Furthermore, there is also a noticeable increase in fishing activities. This increase was cited by the cases as one of the reasons for the decline in fish population. The second phase of the adaptive cycle occurs when members of the system are more conservative and efficient in managing their resources. In the case of fishing activities in Antique, ordinances in line with the fisheries code are imposed. Municipalities and cities are mandated by the local government code to establish these ordinances for the protection of coastal and marine resources (Yambao, et al, 2001; Mendoza and Porquis, 2016). Fisher folks follow the rules and regulations on proper fishing methods and correct gears. In addition, marine protected areas (MPA) were also identified. Roleda, and Benayahu's (2023) study shows that establishing MPAs have benefited coral reefs' health which are important in marine life being homes to many fish species that are consumed and sold. Reefs located in MPAs and adjacent have benefited from the conservation efforts by the government (Roleda, and Benayahu, 2023).

5.4 Threats to Resiliency

As observed in this study, there are disturbances that pose a threat to the resiliency that the community tried to establish. The presence of another disturbance after establishing resiliency is the 3rd phase in adaptive model. Following disturbances in the system are observed;

5.5 Weak Law Enforcement

One of the sustainable development goals of the United Nations (UN) is to conserve and sustainably use the oceans, seas, and marine resources for sustainable development. The international organization's goal is to "effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans" (United Nations, 2018). The bantay dagat or "sea guardian" program is a law enforcement institution in Philippines that was tasked to monitor and protect marine resources from IUU fishing (Maderazo, SSG Advisors, 2016). Despite their presence, Fisher folks still report that there is IUU fishing in their municipal territories. Dynamite fishing is still observed in the Seco Island. According to the reports of Tibiao Fisher Folk 1, these dynamite fishing operators are familiar with the bantay dagat's schedule and would also take advantage of the bantay dagat vessel's inability to navigate strong currents and big waves. This is the same case with the bantay dagat at Manila Bay. They admitted that their small bangka or rubber boat is too small that it lessens their ability to detect violators (Terry and Donato, 20204). In the study, dynamite fishing vessels would operate during low pressures to avoid confrontation and possible imprisonment. In addition, all cases reported that there are instances that commercial fishing vessels would enter their municipal waters. The same behavior

was observed during the COVID pandemic, where there was a spike in the number of commercial fishing vessels operating within municipal waters (Jabar, et al., 2022). Meanwhile, fisher folks reported these incidents to the bantay dagat or coast guards, they would eventually get caught but would be found within municipal waters after Two days. If this continues, this would lead to rampant IUU fishing and would result in overfishing (Tahiuddin and Terzi, 2021).

5.6 The Practice of Fishing Methods with the Potential for Overfishing

Fishing practices mentioned by the Fisher folks, apart from dynamite fishing, were all legal and regulated. However, Fisher folks believe that there are methods that could threaten the resiliency of the community. All cases point to kubkuban as possible source of fish population decline. Kubkuban is a fishing method used by some commercial fishing vessels. The kubkuban makes use of a fish habitat made of bamboo culms or a balsa and a purse seine net. Despite this method being legal, it still has the potential for overfishing. Purse seine net is an effective gear in catching schools of fish thereby unintentionally catching juveniles and fish fries (Du, 2024). This is supported by an experiment done by (Devine, et al. (2018) with results showing that a purse seine net captured the smallest fish. Furthermore, Dammannagoda (2018) reported that the use of purse seine nets caused global fisheries to collapse due to overexploitation. Thus, the presence of kubkuban near municipal waters poses a threat to the fish population and fish catch for small-scale fisher folks.

Currently, in the adaptive cycle of the fishing community in Antique, threats and disturbances to its resiliency are present. The fourth phase of the cycle states that the community reorganizes in order to address the threats and disturbances. However, in this study, the fourth phase is not yet in motion.

6. CONCLUSION

Antique Fisher folks are diligently observing the legal and regulated fishing methods. However, this does not translate to better fish catch. Furthermore, fish population continues to decline to the point that certain fish species that were once abundant nearshore are now a rarity. In order to conserve marine resources, local governments established the bantay dagat to monitor violations and deter IUU fishing. However, law enforcement is weak, leading to continued practice of IUU fishing, low fish catch, and observance of fish population decline. Furthermore, kubkuban, which is a legal and regulated fishing method, has the potential for overfishing. This fishing method causes the decline of fish population nearshore as it also captures juveniles and fish fries. In the adaptive cycle, Antique fisher folks remain resilient despite the presence of threat and disturbances in their community as they practice fishing methods that are more conservative and efficient in managing marine resources. However, there is another possibility that their resilience will break as threats and disturbances continue to persist.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

The author hereby declares that no generative AI technologies such as Large Language Models (CHATGPT, COPILOT, ETC.) and text-to-image generators have been used during the writing or editing of this manuscript.

CONSENT

The author declares that an informed consent was given, read to the participants, and signed by the participants. A copy of the research's informed consent is available for review by the Editorial office/Chief Editor/Editorial Board of this journal.

ETHICAL APPROVALL

The researcher asked permission from the barangay councils of the coastal communities to conduct the study with registered fisher folks in their barangay.

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

Abad, M. (2021). LIST: Sustainable, harmful fishing practices in the Philippines. Rappler. Retrieved from https://www.rappler.com/environment/list-sustainable-harmful-fishing-practices-philippines/

Assarroudi A., Heshmati Nabavi F., Armat M.R., Ebadi A., Vaismoradi M. Directed

qualitative content analysis: the description and elaboration of its underpinning methods and data analysis process. J Res Nurs. 2018 Feb;23(1):42-55. doi: 10.1177/1744987117741667. Epub 2018 Jan 10. PMID: 34394406; PMCID: PMC7932246.

Bureau of Fisheries and Aquatic Resources (BFAR). (2022). CY 2022 Regional Fisheries Profile. Retrieved from https://r6.bfar.da.gov.ph/fisheries-profile-2

Chavez, L. (2021). With growing pressures, can the Philippines sustain its marine reserves? Mongabay. Retrieved from https://news.mongabay.com/2021/06/with-growing-pressures-can-the-philippines-sustain-its-marine-reserves/

Craig, R. K. (2023). Marine Biodiversity: Challenges, Trends, and New Treaty. Legal Studies Research, Paper Series No. 23-7.

Dammannagoda ST. Sustainable Fishing Methods in Asia Pacific Region. Sustainable Aquaculture. 2018:95-122.

Devine, M., Roy, A., Whiteley, A., Gahagan, B., Armstrong, M., & Jordaan, A. (2018). Precision and Relative Effectiveness of a Purse Seine for Sampling Age-0 River Herring in Lakes. North American Journal of Fisheries Management. Retrieved from DOI: https://10.1002/nafm.10065

Du, L. (2024). Understanding and Enhancing Fishing Practices for A Sustainable Future. Highlights in Science, Engineering and Technology, 227 - 231.

Espectato, L. N. (2011). Tumandok and Pangayaw Fisherfolk of Guiwanon Island, Guimaras: Implications on Sustainable Resource Management. Philippine Journal of Social Sciences and Humanities, Volume 16 No. 1, 46 - 55.

Garchitorena, E. D., & Po, C. (2022). As food security issues weigh on the Philippines: Here is where fisheries management might be headed. Business World. Retrieved from https://www.bworldonline.com/special-reports/2022/07/27/463318/as-food-security-issues-weigh-on-the-philippines-here-is-where-fisheries-management-might-be-headed/

Garry, H. (2019, July). The Philippines' Marine Biodiversity Faces Decimation. Earth.Org. Retrieved from https://earth.org/marine-biodiversity-in-the-philippines-faces-decimation/

Jabar, M., Valerio, M., & Ereneta, L. (2022). Role of Sea Patrols in Marine Environmental Protection and Conservation in the Philippines. DLSU Research Congress 2022.

Lacio, L., Derecho, M., Montecillo, M., & Inocian, R. (2022). Fishing Culture in Bantayan Island, Cebu, Philippines: Basis for the Bobo Model of Constructivist Teaching. Magister Journal of Educational Research, 1(1), 1-16.

Masten, A. (2019). Resilience from a developmental systems perspective. World Psychiatric Association, 102. doi:https://doi.org/10.1002/wps.20591

Mendoza, E. N., & Porquis, J. J. (2016). Faces and phases of participation: a local experience on coastal resources management in Southern Philippines. AES Bioflux, Volume 8, Issue 3, 255 – 264.

Obar, E. A., Noblezada-Payne, M. P., Monteclaro, H. M., & Babaran, R. P. (2021). Characterization of the handline fisheries in Batanes Province, Philippines. Philippine Journal of Natural Science (26), 32-47.

Pisano, U. (2012). Resilience and Sustainable Development: Theory of resilience, systems thinking, and adaptive governance. European Sustainable Development Network.

Roleda, M., & Yehuda, B. (2023). The Philippine seas: Biodiversity and ecological impacts of natural and anthropogenic stressors in tropical reef systems. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-83252-036-9

Schijvenaars, J. (2017). Conditions for sustainable fishing among small-scale fishers. Retrieved from https://www.marineconservationphilippines.org/wp-content/uploads/2018/02/sustainable-fishing-for-small-scale-fishermen-j.-schijvenaars-2017

Tahiluddin, A. B., & Terzi, E. (2021). An Overview of Fisheries and Aquaculture in the Philippines. Journal of Anatolian Environmental and Animal Sciences, 475 - 486. Retrieved from DOI: https://doi.org/10.35229/jaes.944292

Tayona, G. (2023). Roxas City mulls regulating 'lambaklad' fishing. Panay News. Retrieved from https://www.panaynews.net/roxas-city-mulls-regulating-lambaklad-fishing/

Terry, M., & Donato, L. (2024). Combating of Illegal, Unreported, and Unregulated Fishing Activities Along Manila Bay. Asia Pacific Journal of Advanced Education and Technology, Volume 3, Issue 2.
DOI:https://doi.org/10.54476/apjaet/22879
United Nations. (2018, December). The 2030 Agenda and the Sustainable Development Goals: An opportunity for Latin America and the Caribbean. Hugo, J. T., & Mondal, S. C. (2006). Parallels between tissue repair and embryo morphogenesis: A conceptual framework. Global Health, 16, 4.
https://doi.org/10.1186/1744-8603-1-14

APPENDIX

GUIDE QUESTIONS

PART 1: Socio-Demographic Characteristics

Name (Optional) : _____ Age: _____
Address: _____ Sex: _____

PART II: Guide Questions

QUESTIONS
How long have you been in the fishing industry?
How old were you when you started fishing?
Who influenced you to join the fishing industry?
Where do you usually fish?
What is your reason for choosing that fishing ground?
Have you changed fishing ground/spot for the past years?
What was your reason for changing your fishing ground/spot?
What do you think are the causes of these changes?
What other changes have you noticed in terms of catch, species and fishing environment?
What could be the possible causes of these changes?
What fishing techniques do you employ? Please describe them.
What are the conditions when you employ specific techniques?
Why do you employ these fishing techniques?
Can you describe any traditional fishing methods you use that you believe are particularly sustainable?
How are they sustainable?
How do you think these techniques affect your fishing ground?
Are there changes in fishing techniques among you, fisher folks, over the years?
What do you think are the reasons for these changes?
What are the benefits in terms of quality of fishing environment when performing certain techniques or methods?
Do you think there are more sustainable and successful methods?
Do you think that these techniques would allow the marine ecosystem's sustainability?
What kinds of support or resources would help you implement or enhance sustainable fishing practices in your daily operations?
Can you describe the foreseeable future of the marine ecosystem with the methods/fishing techniques you employ?

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/129371