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Closed Season Policy Is Only Partly Practiced in Surigao del Sur, Philippines

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Abstract: Small-scale fisheries (SSF) make a critical contribution in terms of employment and food security to coastal communities. Fish serves multiple purposes, mainly as a cheap source of protein and minerals for lower-income families. In order to help sustain this demand and to protect fishing resources, the closed season policy, temporal closure, and spatial closure were adopted to protect fish stocks and avoid fishery collapse. To assess the agreement and compliance of the three municipalities (Cortes, Lanuza, and Lianga) in Surigao del Sur to this policy, we surveyed their responses regarding this policy. We used focus group discussions, two focus groups per municipality (N = 80), followed by member checking to gather and clarify the data from six barangays with small-scale fishers (N = 192). The findings indicate that each community in the three municipalities studied have a different method of implementing the fishery closure or closed fishing season policy which resulted in a limited conservation impact on fish stocks. In the municipality of Cortes, 92% agreed with the policy, provided there would be enough money to comply with the policy. In Lanuza, 60% agreed to implement the policy, provided there would be alternative jobs available. In contrast, the municipality of Lianga, which did not implement this policy, had only 4% that agreed to impose the policy to restore depleted fish stocks. Other reasons for not implementing a closed season policy include lack of community organization, poor fishery management, and lack of strong government support for the policy. Moreover, fishers were only willing to stop fishing if they were given a subsidy of PHP 15,000 per month. In the long term, fishers who provide fish protein needs for the nation also need help and attention from policy and decision makers to realize sustainable fisheries.

Keywords: closed season policy; fish catch; the impact of closed season policy; livelihood; small-scale fishers

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1. Introduction

A closed fishing season policy is just one of the management regimes implemented in the Philippines to stop the decline of exploited fish stocks and protect their habitat during the spawning and breeding period [1–3]. This is usually imposed by the government through its fisheries arm, the Bureau of Fisheries and Aquatic Resources (BFAR), to help in the conservation of marine resources [3].

Inscribed in the Philippine Fisheries Code (Republic Act 10654) is the policy of closed fishing season or seasonal fishery closure [4], which was first adopted as a management policy by the Philippine government in the year 1939 to regulate human activities for taking prohibited fish and the use of banned fishing gear in covered areas [1,5]. A closed season policy is a fisheries management tactic that is usually implemented for conserving depleted fish stocks and widely supported by fishers [2,6,7]. The implementation of the policy from 1939 in the Samar Sea and Visayan Sea and the most recent ones in 2012 in Zamboanga and 2014 in Davao Gulf to conserve tuna, sardines, and small-pelagic species were testament to government policy initiatives together with the fishery stakeholders [2,8]. The recent

implementations of the closure were shortened in a duration up to three months because a long closure duration elicited poor compliance from fishers, e.g., in the Visayan Sea [1]. The changes brought by this policy revision in the closed season policy resulted in effective management with positive impacts in Zamboanga [9] and in Davao Gulf [7] but still with a mixed result in the Visayan Sea [1].

Sardines, including other small-pelagic fisheries, are among the top 10 commercially important fisheries in the Philippines. About 50–60% of sardines are estimated to be produced in the country and are a common target species by commercial fishers and need seasonal fishery closure to reduce fishing mortality [9,10]. According to FAO, the Philippines ranked as a major fishing nation producing more than 767,287 tons of fish and other aquatic and seafood byproducts [11,12]. The fisheries sector in the Philippines employ more than 1.6 million fishers, and 98% are small-scale fishers, laborers, and processors, all reliant on capture fisheries for their subsistence [13–15]. Furthermore, many of these workers are employed in the canneries of tuna and sardines in the commercial fisheries sector [16,17], making it inevitable that these workers should be able to keep their jobs, provided there is a sustainable fish catch from the fishing grounds.

Almost a decade ago, the sardine fishery, which provides one of the basic fish food items in the Zamboanga peninsula, encountered fishing difficulties; catches dwindled [16], which became the main reason for implementing the closed season policy in the area [18]. The positive results of the implementation of the closed season in Zamboanga city showed that the policy increased the production of marine species, especially sardines, tuna, and mackerels, resulting in better fish supply and source of income in the area [16,18]. Similarly, in Davao Gulf there was also an increase in the production of small-scale fisheries compared to the commercial fisheries sector, enabling them to have better foodsecurity and livelihood [7]. This increased the catches of small-pelagics in the area, which include bigeye scads, moonfish, and even sardines. For small pelagic species, they usually spawn around July to September for the major peak season and the minor peak is around December to February while the largest peak occurs during August which is also known as "bumper crop" for the local fishers [19–21]. During the spawning time, pelagic species move from the offshore areas to near shore to spawn and become vulnerable to feed on the sea surface because of abundant phytoplankton which attracts birds and fishers [22]. In other areas, the implementation of a fishery closure led to the reduction in exploitation rates and improvement in spawning-stock biomasses of cod, haddock, and yellowtail flounder in the Georges Bank [23]. Closures inevitably led to a better spawning season for targeted species which can sustain their ecosystem function and livelihood of fishers [24]. This resulted in a higher volume of sardines caught in the case of the Zamboanga peninsula [8,9].

Moreover, the closed season policy can be chaotic to implement when there are no clear guidelines on how to implement it [1,3]. Fishers' livelihoods can be highly affected because of implementing a seasonal fishery closure [9,10]. On the other hand, if properly implemented, fishers can reap better catch and benefit from restored fish stocks providing a stable livelihood and food supply in the long run and a more resilient ecosystem [2,7].

Currently, there are no published studies that document the impact, effect, and implementation of the closed season policy in the small-scale fisheries of Surigao del Sur. Although there were no records in the area that a closed season has been implemented by BFAR (Bureau of Fisheries and Aquatic Resources) or the DILG (Department of Interior and Local Government), investigating fishery management policies and implementing them properly can help improve fishery sustainability [25]. This is regarding the different aspects of the seasonal fishery closure or closed season. We asked the following questions: Do small-scale fishers and their barangay/village officials practice closed season? If so, how long do they practice it? Whether by self-assessment, was this an effective management strategy or not in their fishing communities? Thus, our main objective was to evaluate the effects of the closed season policy and to determine its impact on their fishing and livelihood in the three municipalities of Surigao del Sur.

2. Materials and Methods

2.1. Description of the Study Area

Surigao del Sur is a province in northeastern Mindanao, with Tandag city as its capital, that faces the Philippine Sea. The three municipalities studied in the area are Cortes (barangay Madrelino ad Uba), Lanuza (barangay Habag and Nurcia), and Lianga (barangagy Poblacion and Banahao). Within each municipality, two villages were chosen as part of the study area. The province has a land area of 4932.70 km^2 and a population of 642,000. The populations of the study sites suggest these are small towns; Cortes has a population of 17,924, Lanuza has 13,642, and Lianga has 33,869 (Figure 1). Although considered small in terms of population, these municipalities have the highest number of small-scale fishers in the province. Moreover, the province is also known for tropical fruits as well as metallic mining of silver, copper, and chromite in Mindanao. Additionally, the province is also well-known for seafood, marine fishing, and aquaculture, which are major sources of income for the locals [26]. In recent years, the area has been affected by El Ninño and La Ninña, water pollution, mining, siltation, and climate change impact, which also affected their water quality and fish production in the ground [15].

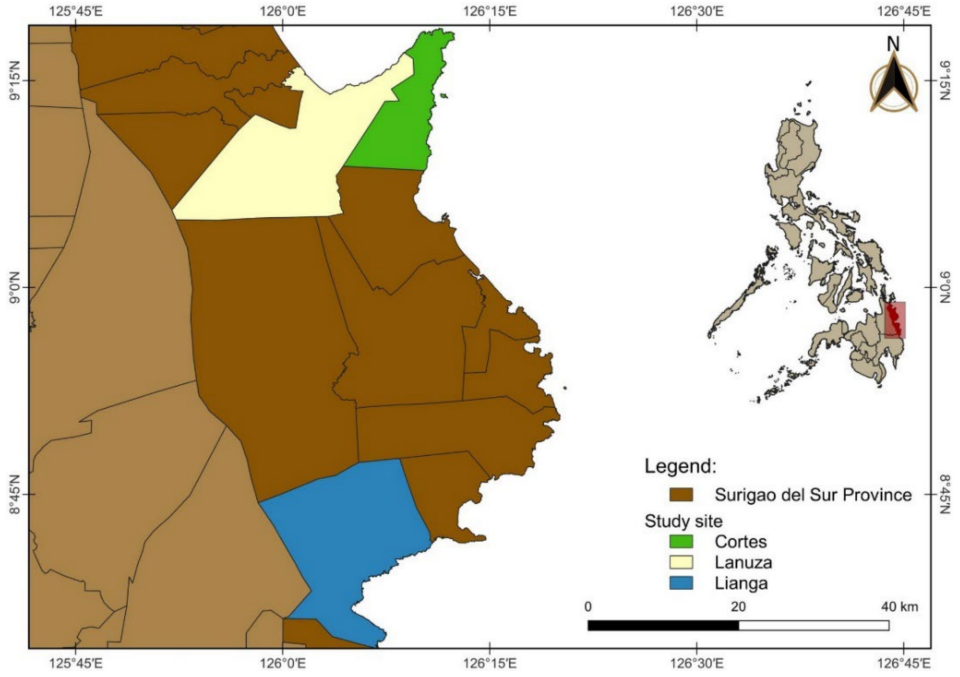

Figure 1. Location map showing the three municipalities of the study sites.

2.2. Focus Group Discussion (FGD)

The first data set was collected in 2019 using a semi-structured questionnaire before the pandemic in March 2020. The results were used as a guide to re-conduct the study from May to June 2022 using focus group discussions (FGDs) which were held in three municipalities, Cortes, Lanuza, and Lianga. A minimum of 10–15 small-scale fisher respondents were invited per meeting, with a total of six FGDs conducted in May and a total of N = 80 participants attending the meetings. A small-scale fisher is typically defined in the Philippines as someone who owns a boat weighing less than 3 tons (~21 feet), uses a gillnet or hook and line, and engages in fishing for their subsistence [21]. During the conduct of the FGD, the local agriculturist assisted the researchers and scheduled the meeting location usually in a barangay hall. The researchers presented the agenda of the study and provided an initial lecture or thoughts regarding the closed season policy; this was followed by questions regarding whether similar management regimes or an actual closed season are implemented in the area. This was followed by questions on their catch species, fishing operations, and typical problems and challenges encountered by fishers. To achieve

the goals of the study in an organized manner and reduce the time of conduct, fellow researchers helped to facilitate the meeting; one gave an initial lecture, another conducted photo documentation, and another recorded the discussion with the respondents. The time after the conduct of the FGD also allowed the researchers to be able to observe the fishers and their interactions in the community as well as further talk with community leaders which helped enrich the discussion and perspectives of the study.

2.3. Member Checking

Member checking often refers to participant or respondent validation and is a technique for assessing the validity of study findings [27,28]. This is helpful to clarify the results that emerged during the data-gathering period. Member checking can assist both the participant and the researcher in managing and correcting their mistakes [29]. To validate our findings, we presented the initial results of the FGD in the three municipalities using a combination of presenting the initial results of the study and a poster to show the results. The researchers further explained how the data was analyzed for each municipality and barangay, and if they have anything that should be included or was missed during the process. Member checking was conducted from the 18th to the 23rd of August 2022 in the barangay hall of the study sites. All gathered data were fully presented so that the respondents could understand, give comments regarding the data, and confirm that the data collected was correct. During the member checking, some respondents were vocal and actively participated in the discussion, especially those who were previously present, so the researchers recorded and wrote all new information that was given by the participants to add to the collected data.

2.4. Target Respondents

A total of 272 respondents (based on the FGDs and member checking) composed of small-scale fishers in the six study sites were selected for this study (Table 1). The sites were pre-selected based on the existence of marine protected areas (MPA) and the total number of registered fishers. The study focused only on those who belong to the small-scale fisheries because this study assessed the impact of the closed season policy on their community and livelihood. All municipalities experienced being a beneficiary of various organizations through their projects that included the Ford Foundation, Fish Project, Green Mindanao, and Fish Forever. In terms of local community organization, the municipality of Lanuza has had the Habag Small Fisherfolk since 2011. Additionally, the *Naghiusang Gagmay Mananagat sa Pag panalipud sa Kadagatan* association was another fisherfolk association in the area. In Lianga, they have the *Pananag-an* Extension Site Association-PESA (ongoing) and *Banahao Mananagat* Organization, which were registered with the DOLE (Department of Labor and Employment). Most of the organizations were active in every meeting, forum, training, and participation in the fishing communities, but most of these organizations have no proper management and leadership due to a lack of financial assistance or funds from the government.

Table 1. Particiant from the different municipalities for focus group discussions and member checking in Surigao del Sur.

Municipality	FGDs	Member Checking
Cortes	27	74
Lanuza	30	75
Lianga	23	43
TOTAL (N)	80	192

2.5. Data Analysis

Field notes and recordings were taken during the conduction of the focus group discussions. Later, this was transcribed and translated by the researchers into English. The response of the participant was organized into themes and topics. These were separated

in terms of experience, discussion, and introspection of the respondents. Some of the opinions of the respondents were converted into quotes and cited directly in the paper. All quantitative parts of the data set were given in frequencies, percentages, or means.

3. Results

3.1. Fishing Characteristics

The three municipalities of Cortes, Lanuza, and Lianga have different characteristics in terms of fish catch, monthly income, fish price, boats, fishing grounds, years in the community, years in fishing, and access to credit (Table 2). The average daily catch per trip was 20 kg for Lanuza, 18 kg for Cortes, and 17 kg for Lianga. Cortes had a monthly income of PHP 11,286, followed by Lianga at PHP 3143 and Lanuza at PHP 2286. The fishers' daily income was determined by the number of kilos of fish caught, price of fish, and the distance traveled to their fishing grounds. Most of Cortes fishers traveled for 14 km (12 HP) or more to their destinations, followed by Lianga at 19 km (8 HP), and Lanuza at 10 km (8 HP). Accordingly, the farther they traveled, the more fish they caught. The demand for the fish and the expense of each fishing trip affected the price of the fish sold. The average fish price in Lianga was roughly PHP 466. This was due to the fact that this fish was primarily demersal and pelagic, making it expensive. Cortes and Lanuza come next, with fish sold at PHP 190 and PHP 181.

Table 2. Fishing characteristics of the small-scale fishers from the three municipalities.

Characteristics	Cortes	Lanuza	Lianga	Average
Daily catch (kg)	18	20	17	18
Monthly income (PHP)	11,286	2286	3143	5572
Access to credit (%)	74	83	78	80
Fishing ground (km)	14	10	19	15
Years in community	38	34	43	38
Years in fishing	19	33	43	31
Fish price (PHP)	181	190	466	230
Boat power (HP)	12	8	8	11

Further, the municipality of Lianga had the longest time of residence at 43 years, followed by Cortes at 38 years, and Lanuza at 34 years for their community stay. This means that the longer they stayed in their community, the more knowledgeable and skilled they became with their fishing grounds. There were about 74% from Cortes, 83% from Lanuza, and 78% from Lianga who had access to credit in Surigao del Sur and availed of microfinance or money lending for fishing operations. Fishers were required to pay their credit every week, although many of the fishers have complained that they do not like paying each week because of the hassle it brings. Nonetheless, this set-up was better than borrowing from a commercial bank or from a financier.

3.2. Income and Credit Access

The source of income of fishers from Surigao del Sur was mainly from fishing (75%) and partly from farming (25%) for those who own land. During bad weather days, the fishers partly worked on farming crops such as rice, sweet potatoes, corn, cassava, and processed dried coconut meat (copra). Surigao del Sur produces coconut for oil, biogas, copra and construction materials, and other decorations for houses or for fashion design materials. While coconut farming is also a major source of income, the farmers we heard have confessed to advising their children not to become a farmer like them because of poverty and hardships in life. Many of the respondents were caretakers, partners, or are in contract with landowners of farms. During the harvest, the farmers and laborers cut a deal with half of the profit going to the owner. This happens to fishers who are also caretakers of farms. They need to adopt this kind of living to find another source of income and sustenance. Other fishers look for temporary jobs such as construction jobs to earn

additional money, others ask neighbors for labor jobs, e.g., to weed their land (*hagbas*), and the women try to help by doing laundry. The seasonal income of small-scale fishers is a challenge to their families because it is usually below the minimum monthly income of PHP 10,571 (Figure 2A).

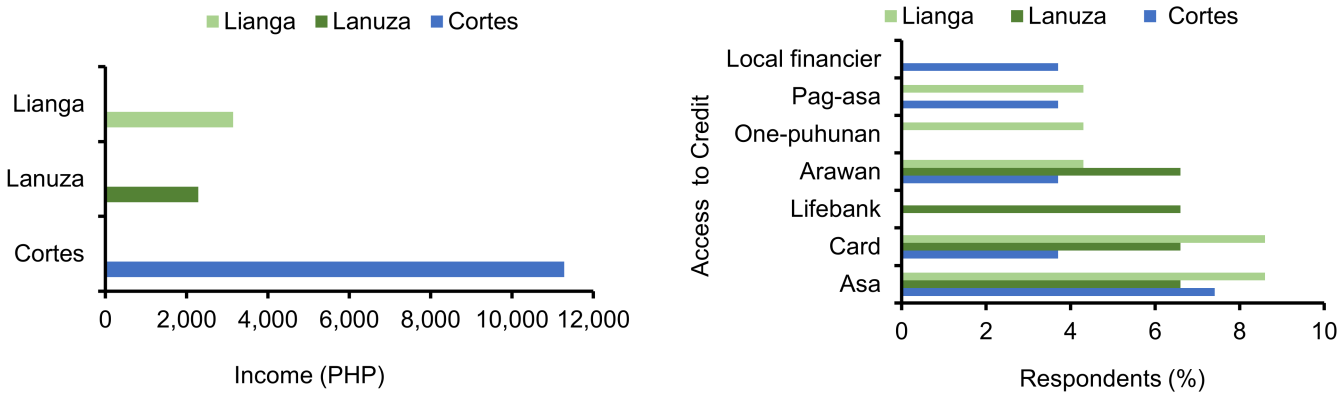

Figure 2. Monthly income of fishers in Lianga, Lanuza and Cortes (**A**) and access to credit of small-scale fishers (**B**) in the three municipalities of Surigao del Sur.

Access to credit or microfinance provides important contributions to their financial needs. Money lending is one financial support that helps most of the fishers due to its low interest, and fishers were able to utilize the loan for buying fishing materials, supporting their children, and running small businesses which also sustain their daily needs (Figure 2B). According to the fishers, they need to apply for microfinance because other banks have bigger interests, and they cannot afford them.

3.3. Common Catch Species and Fishing Gears

The municipalities of Cortes, Lanuza, and Lianga have different fish catch compositions and catch per trip (Table 2). The small-scale fishers from the municipality of Cortes catch 18 kg/trip, followed by Lanuza with 20 kg/trip, and Lianga with 17 kg/trip. Catch species include rabbitfish (*Siganidae*), flying fish (*Cypselurus opisthopus*), skipjack tuna (*Katsuwonus pelamis*), blue marlin (*Makaira mazara*), grouper (*Serranidae*), hairtail fish (*Trichiurus lepturus*), and other species (Table 3). These species are mainly present in the two other municipalities except for the rabbitfish (*Siganidae*) which was mainly seen in Lianga.

Many fishers usually fish in the evening, which they consider as the best time for them to fish. Most of them catch fish near the shore, less than 7 km away from their communities. Sometimes the fishers also catch a haul of 50 kg (mix species, including skipjack tuna or blue marlin), but that usually comes from distant fishing grounds (>15 km away). The fishers may also catch tuna once a month. They concluded that their reduced catches could be due to overfishing, as well as illegal fishing by commercial fishers.

Regarding the varied fishing gear used in Surigao del Sur by commercial, municipal, and small-scale fishers, they commonly use hooks and lines, fishing nets, and multiple hooks and line. The more popular gear used in Cortes were nets, hooks and lines, and multiple hooks and lines. In Lanuza, they commonly used fishing nets followed by hooks and lines, multiple hooks and lines, as well as spears. While in Lianga, they also used fishing nets and hooks and lines, multiple hooks and lines, and spears (Table 4).

Table 3. Common catch species found in Surigao del Sur.

Species	Cortes	Lanuza	Lianga
Bigeye scad (*Selar crumenophthalmus*)	✓	✓	✓
Rabbit fish (*Siganidae*)	✓	✓	-
Flying fish (*Cypselurus opisthopus*)	✓	✓	✓
Skipjack tuna (*Katsuwonus pelamis*)	✓	✓	✓
Blue marlin (*Makaira mazara*)	✓	✓	✓
Groupers (*Serranidae*)	✓	✓	✓
Hair tail fish (*Trichiurus lepturus*)	✓	✓	✓
Great barracuda (*Sphyraena barracuda*)	✓	✓	✓
Spanish mackerel (*Scomberomoros commerson*)	✓	✓	✓

Table 4. Frequently mentioned fishing gear in the three municipalities.

Fishing Gear	Cortes	Lanuza	Lianga
Fishing net	7	10	9
Hook and line	7	7	9
Multiple hook and line	7	3	4
Spear	0	3	4

3.4. Awareness and Agreement for Imposing Closed Season Policy

A typical action regarding implementing three-month regulations for ordinances, such as the closed season policy, require that the head of the fisherfolk organization are informed ahead of time. They are notified for the conduct of a meeting to disseminate the guidelines and rules to the fishers. (These guidelines are usually ordinances crafted either at the barangay level or municipal level that provide protection to fish species, or the marine ecosystem based on the best scientific evidence available stating its urgent protection or solution to a pressing problem). This was to help them prepare economically and emotionally regarding the closed season. For instance, in Cortez, barangay Uba had a 77% awareness and knowledge about the closed season compared to Nurcia (70%) and Habag (64%) in Lanuza. In terms of expected differences regarding the catch after implementation, barangay Uba had 77% who supported the implementation of the closed season, while barangay Nurcia had 84%, followed by Habag at 64%. Furthermore, in barangay Uba, about 77% claimed that the closed season would be useful and agreed to its full implementation. On the other hand, in barangay Nurcia, 76% of its respondents agreed to a closed season, and barangay Habag with 58%. The result of the initial survey data also revealed that the respondents of Uba (77%) declared that there will be an increase in fish stocks with the implementation of the closed season policy, followed by Nurcia (76%) and Habag (58%) (Figure 3A).

In terms of the agreement to the policy, the municipality of Cortes had a total of 92% who wanted the closed season policy imposed, and among the three municipalities, Cortes is one where the policy was very applicable and could be better implemented because the fishers can follow it. The municipality of Lanuza did not agree to the implementation of the policy which is why there was only 60% of fishers who agreed regarding it. In addition, Lanuza had a different interpretation regarding the application of the closed season. Barangay Habag, one of its coastal barangays, did not practice a closed season policy and blamed commercial fishers for the decline of fish stocks in their area. However, barangay Nurcia, a barangay nearby to Habag, practiced fishery closure for only three days during the months of March, April, and May. So, the impact of this policy was not felt. Lastly, the municipality of Lianga had poor management regarding fishery policies. The local government did not implement a closed season policy in all their communities, and only 4% agreed to impose the policy to restore marine fish stocks. Their reason was, mainly, that the fishers do not care about the policy of the government. Most unfortunately, their

fishers reasoned that the policy did not help the fishers' family income, and there was no assistance received by fishers from the government (Figure 3B). When asked what amount of financial assistance would be enough for their needs, they started from PHP 5000 and settled on PHP 15,000.

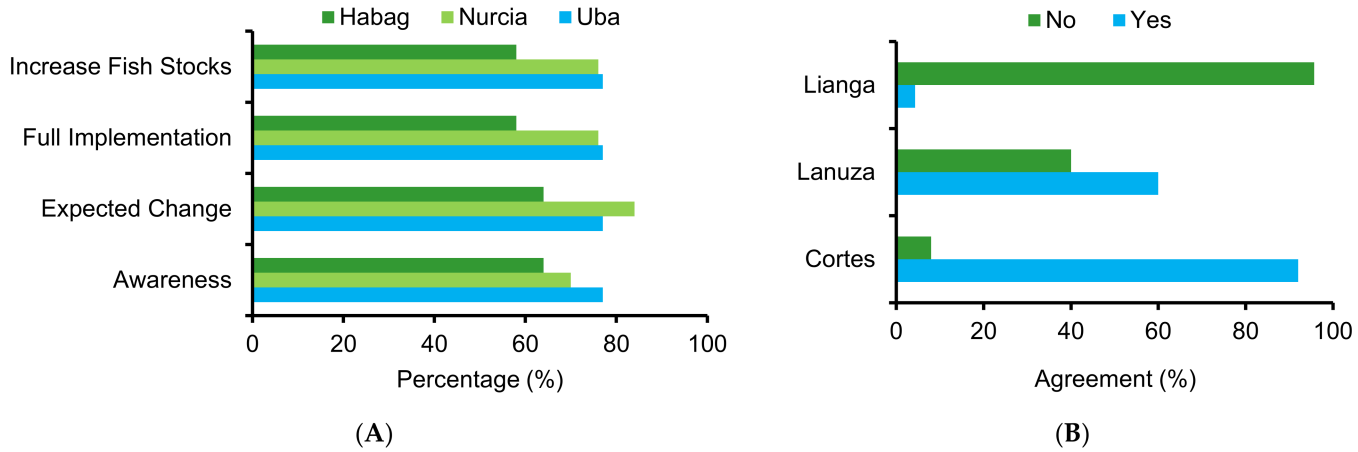

Figure 3. The percentage of awareness and agreement toward the closed season policy in the three municipalities (Cortes, Lanuza, and Lianga). Most fishers are aware of the implementation of a closed season 77% in Uba, Cortes, and 67% in Habag and Nurcia, Lanuza (**A**) while in terms of agreement for the closed season, 4% in Lianga, 60% in Lanuza and 92% in Cortes agreed to its full implementation (**B**).

The following responses recorded during the interviews show their strong emotions and opinions regarding the closed season:

> *"Since the policy will be implemented to stop fishers from catching juvenile fish, not even a few centavos were allotted by the government to help us in our livelihood"* (XI-fisher from Cortes)

> *"They announced that they would hold a meeting to discuss the assistance that they would provide, but it turned out that their assistance was only a joke and a promise made to be broken"* (XV-fisher from Lianga)

> *"The luckiest fisher is the one closes to the government extension worker or his relative was"* (III-fisher from Lanuza)

> *"The mistake of the government is that they provide help to those who are not true fishers. They base their decisions on a list and did not ask the leader of the community organizations for assistance to identify the true fishers. Unfortunately, the real fisher did not receive help"* (V-fisher from Lanuza)

> *"As fishers we feel disgusted by BFAR because they promised us some form of assistance by having us sign documents for payroll in order to receive the assistance, but it's been years since that time and now when they hold some meetings, they will be lucky if we will attend their meetings"* (XII-fisher from Lianga)

3.5. Member Checking

The municipality of Cortes is one of the municipalities of Surigao that partly implemented the closed season policy because of good management, and the responsible leader of the fishers' folk association claimed that even without the help from the government, they were willing to cooperate and comply with the law during the policy implementation. Some problems they mentioned in their day-to-day activities included encounters with dolphins in their fish traps and, many times, the dolphins would take away their fish catch. In addition, sometimes the dolphins became entangled in their nets because they also catch the fish for food. While, in other municipalities like Lanuza, farmers encountered monkeys

that also consumed their young coconuts. Accordingly, this was also one of their favorites because it was soft and easy to open compared to the matured coconut.

Moreover, 90% of fishers from Lanuza depended on catching fish, but only 10% own their land. The fishers of barangay Habag (in Lanuza) confirmed that the closed season policy was not implemented or recommended in the community. Since the area is very far from the city and considered a remote area, their fish wardens did not receive any alimony from the government. It is purely voluntary, and even if they did not implement a closed season policy, they still comply with prohibiting illegal fishing gear and illegal fishing. Overall, the three municipalities source their income from fishing (75%) and farming (25%). The closed season policy in the area was not implemented by the local government nor was it religiously implemented. Overall, their fishers were willing to help and comply with the implementation of the closed season, provided they were given a government subsidy or financial assistance.

4. Discussion

The closed season policy as a fishery management tool, may need modification as well as additional effort control measures could be needed to enforce conservation and to assist the fishers in their livelihood [1–3,10]. The closed season policy can be disruptive to fishers livelihood in Surigao del Sur where they are not ready and are economically unprepared. There could be various interpretations and understandings of the closed season policy due to lack of awareness, understanding, proper dissemination, and lack of funding assistance [30–32]. This could divide the respondents toward full acceptance of the policy since economic help will be needed to consider the impact on their livelihood for three months. By enforcing the policy without providing limited livelihood options and support during the implementation of the closed season can be an unfair policy [32].

Unfortunately, the practice of this policy faces hurdles because the longest time that this was implemented lasted for only nine days in the area. So, this did not result in the rebuilding of fish stocks due to the short time that it was applied. Other municipalities refused to practice the closed season policy because the respondents wrongly concluded that they would obtain bigger-sized fish immediately after the policy will be lifted. This scenario was repeated for both the municipalities of Lanuza and Lianga, where most respondents claim that the fish catch was consistently poor with or without the policy, even without testing it. Through discussion with the fishers, this study found that fish catch did not significantly increase in the three municipalities because it was only implemented for a short time. Similarly, in a previous study in the Visayan Sea, fishers, traders, and processors have different perspectives on whether the policy led to increased fish production or not because they were unable to diversify their sources of income [3]. Consequently, those fishers who were dependent on fishing had their income affected and did not have secondary livelihood support, leading to non-compliance of the policy e.g., illegal fishing [3,33].

On the other hand, illegal fishing activities were not easy to eliminate because some small-scale fishers need to survive. Some fishing associations in the area prohibit the use of illegal fishing gears and techniques such as drag nets and nets with small mesh sizes that can remove juvenile fish species. The increasing use of illegal and highly efficient techniques can lead to a drastic catch decline, and this includes the unmanageable presence of commercial fishers which leads to competition with each other [34,35]. Consequently, fishing gear prohibition can lead to increased fish stocks as there would be a reduction of fishing effort and fishing mortality when commercial fishers are banned from fishing in municipal waters.

Despite their justification that they can manage their fish stocks, even without a closed season policy, these municipalities are trudging on a dangerous path without a comprehensive plan for long term fisheries sustainability. Although they protected the rabbitfish or “dangit”, as it is known locally, the number of days that it is protected from fishing mortality is too short and this was not even monitored whether it was effective. Their local government protected this species due to its disappearing seagrass habitat.

Rabbitfish (dangit) play an important role in marine ecosystems by consuming seaweed and seagrasses [36]. Fishers claimed that the population of dangit was reduced because they catch most of them even before they mature. This could be the main reason for its rapid disappearance in some areas in addition to threats of marine pollution, siltation, and climate change impacts [15,37].

Other issues in the area are mining in Carrascal and Cantilan (Marcventures Mining and Development Corporation—MMDC) which led to siltation in Surigao del Sur province because their fishing ground shares one water body even though they are far from the mining area. They also complained about mining issues that include marine pollution, siltation, erosion, and river runoff due to incessant rains that affected their sanctuary and coastal areas [15]. A previous study in Ghana claimed that mining can release dangerous chemicals that contaminate adjacent rivers, as well as coastal areas, causing water turbidity, siltation, and leading to decreased biomass and oxygen concentration, that can be detrimental to fish that many other species depend on for food, including humans [38,39]. Other sea bottom species, such as clams and fauna, had a 70% decline in output due to mining [40]. The prevention of overfishing and the implementation of closed season policy should be a priority of the local government [1,2,7]. Serious consequences could later follow when fishers wake up to a depleted marine fishing ground due to unsustainable harvest, extraction of resources, and overconsumption of marine species [41,42]. The destruction of mountains due to extractive mining can later cause limited access to drinking water and can cause risks to human health. Destroying natural resources, such as trees and forests, despite their ecological services providing food, preventing flood, purifying water, and improving air quality, can lead to devastating consequences [43]. Without proper action of the government toward this issue, perhaps Surigao del Sur will face serious threats, e.g., decline of catch, an unsafe and unproductive marine ecosystem, and unsafe drinking water.

Other factors that can affect the income of small-scale fishers, such as water pollution, siltation, climate change impact, and garbage disposal, also threaten the marine ecosystem, such as seagrass, mangroves, and coral reefs [44–46]. This can lead to decreased catch due to poor water quality, degradation of fish habitat, water temperature, or warming of the ocean that can affect fish larvae and consequently affect the fish stocks [47,48].

If this happens, fishers might need to diversify their sources of income to help their families and sustain their daily needs. In fact, some small-scale fishers were already engaged in microcredit due to their seasonal income and to have a form of financial stability through borrowing money. Microfinance is convenient for low-income individuals or those with no salary and no pay slips, especially the fishers, because this can be a bridge to lift their living standards [49,50]. Microfinance can assist individuals to grow their small businesses, improve their economic well-being, and empower women [51,52]. Every loan of fishers will be utilized in different needs, such as most of them engaging in loan activities to buy fishing materials to allow their fishing operation. Our study also found that full government support for promoting diverse livelihoods and a fishery management regime, especially a closed season policy, could help the issue and achieve the goal of marine fishery conservation by giving more attention to supporting fishers financially, through goods, and even by providing a targeted livelihood and market [53,54]. In another related survey that we conducted earlier, the amount of PHP 15,000 was agreed as viable for subsidy to these fishers, and the result of the focus groups in this study was also similar [55]. This help will have a big impact on the economy of small-scale fishers and the marine environment as well.

5. Conclusions

There were different types of acceptance and implementation of the closed season policy in each study site. Closed season policies challenge the fishers' family life because it disrupts the fishers' income. Thus, this was a cause of non-compliance for many fishers because there was no government subsidy available in times of the closed season. The implementation of the closed season is not yet fully practiced in the three study sites,

probably due to a lack of alternative livelihood or short-term labor construction with the government to assist them during the implementation. These deficiencies can severely occur, leading to overfishing that impacts marine species as well as the balance of the ecosystem. Thus, the closed season policy has a limited impact on the population of fish stocks of the small-scale fishers, given that it was only implemented for three days per month or nine days for three months. This did not lead to conserving and protecting the marine fish stocks. However, the small-scale fishers agreed that three months of closed season policy would be viable, provided a financial and livelihood subsidy would be provided by the government.

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