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Engine size and proportion of catch kept affects fish catch in Pujada Bay, Davao Oriental

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ABSTRACT. This study aimed to calculate the catch per unit effort (CPUE) and determine the status of finfish population in Pujada Bay. This was conducted through semi-structured interviews, focus group discussion and validation of actual catch sampling/logbook information taken from the interviews. Fishers mostly catch bigeye scad (*Selar crumenopthalmus*), flat needlefish (*Ablennes hians*), horseface unicornfish (*Naso fageni*), purple eyebrowed tuskfish (*Choerodon zamboangae*), silver pomfret (*Pampus argenteus*), and African red snapper (*Lutjanus agennes*) in barangay Tamisan and skipjack tuna (*Katsuwonus pelamis*) and yellowfin tuna (*Thunnus albacares*) in barangay Macambol. Results relating socioeconomic and fisheries variables to catch did not produce significant results. Further analysis using regression showed that normal catch was influenced by engine size and proportion of catch kept by fishers ($P \leq 0.05$). Analysis of CPUE of fishers in Tamisan also revealed significant differences with the best catch having highest CPUE (1.57 kg/hr), normal catch (0.62 kg/hr), and worst catch (0.27 kg/hr) with haul time of 5.46 hours. This was also similar in the case of Macambol which showed significant differences in the catches e.g. best catch having the highest CPUE (7.08 kg/hr), normal (4.37 kg/hr), and worst catch (2.54 kg/hr) with haul time 9.23 hours. Most species caught in Pujada Bay between Tamisan and Macambol are piscivores, other species are molluscivores, omnivores, carnivores, planktivores, and herbivores. Engine size in horsepower and proportion of catch kept by fishers affected the number of fish catch. Continuous assessment of the fisheries resources in the area in the long-term provides better status data relevant for fisheries improvement policy.

Keywords: *Finfish, fisheries management, focus groups, Mati City, Pujada Bay*

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INTRODUCTION

A significant obstacle to the sustainable utilization of ocean resources worldwide is overfishing. In recent years, 32% of the world's fish populations may have been overfished or depleted (Reis-Filho et al., 2016). There are up to 300 species of freshwater fish that could go extinct in the next 20 to 30 years, according to estimates (Mustapha, 2010). There are numerous reasons for this decline, including water extraction, habitat loss and degradation, pollution, the introduction of alien and non-native species, and overfishing, which is one of the largest crises plaguing the world's oceans, decimating fish stocks and destroying vulnerable habitats like coral reefs (Mustapha, 2010).

All seafood consumed in the Philippines comes from the fisheries sector, which contributes 26% to the diet of Filipinos and employs around 1.6 million fishers dependent on the fishing industry for a living (Lavides et al., 2016). In terms of food and revenue, fishers rely heavily on marine resources, which has resulted in resource overuse and decreases (Macusi et al., 2017a). Malthusian overfishing was exacerbated by the widespread poverty in fishing villages as a result of competition for dwindling fish stocks (Muallil and Aliño, 2013). Although fisheries productivity is on the decline, worldwide fishing effort has been steadily rising (Anticamara and Go, 2016). With few possibilities for access control in small-scale fisheries, excessive fishing effort is particularly challenging to regulate (Paully, 2006; Salayo et al., 2008; Daw et al., 2012).

Small-scale fisheries produce half of the world's food fish, and 90% of fishers worldwide are thought to be involved in small-scale fishing (Teh et al., 2011; Bene et al., 2015). The livelihood, welfare, and food security of coastal communities in some of the world's poorest countries are dependent on small-scale fishermen because 95% of them live in developing nations. Small-scale fisheries' capacity to absorb extra labor or serve as a buffer for it is a crucial welfare factor. In times of economic difficulty or calamity, individuals may temporarily turn to fish; therefore, they also function as their social safety nets (Bene et al., 2005; Teh and Parado, 2011). Due to high fishing efforts, 52% of fish stocks worldwide are currently totally exploited, 28% are depleted, 20% are moderately fished, and only 1% have shown signs of recovery (Garibaldi, 2012; Macusi et al., 2017b).

One of the most widely used strategies in the Philippines to stop habitat degradation and the diminishing productivity of coral reef fisheries is the creation of marine protected areas (MPAs) (Russ et al., 2002; Muallil et al., 2013). Only about 3% of the Philippines' total area is under effective management, which is insufficient to considerably reduce the requirement to make up for extremely high levels of exploitation. However, more recent research shows that species can react strongly to both exploitation and protection, which could have significant effects on both community structure and ecological function (Taylor et al., 2014).

One of the strategies to reduce illegal fishing in the Davao Gulf is also thought to be the establishment of a closed fishing season (PNA, 2019). This is to allow fish stocks to recover and address environmental concerns, including the decrease in fish catch. Davao Gulf yearly implements a closed fishing season policy (Macusi et al., 2021). Closed fishing season is one of the simplest management approaches to implement because it completely halts the targeted fishing industry's operations. Additionally, it is known to promote the recruitment of the target species and aid in the successful reproduction, preservation, protection, and sustainable management of the nation's fishery resources. Moreover, a closed fishing season is a national policy, and establishing a closed fishing season is one of the identified conservation methods that, in particular, have had a positive influence on fish catch.

This study aimed to determine the catch per unit effort (CPUE) and status of the finfish population. Specifically, this paper aimed to identify the common species catch composition of finfish species in Pujada Bay and quantify the CPUE of finfish in fishers catches in Pujada Bay. In terms of the responses of fishers under a scenario of declining catch, this can serve to identify potential sites of intervention for policies that aim to reduce fishing efforts or promote adaptive capacity within fishing communities in the Philippines.

MATERIALS AND METHODS

Description of the study area

The study was conducted in Pujada Bay, situated on the Pacific coast of the southern Philippine island of Mindanao. Pujada Bay is an arm of the Philippine Sea in Davao Oriental province, formed by the Guang-guang Peninsula, which separates it from Mayo Bay on the east, and the Pujada Peninsula, which separates it from the Davao Gulf on the west. It lies between 6°53’29” N latitude and 126°13’38” E longitude (Figure 1). The Pujada Bay Protected Landscape and Seascape has been designated as a marine protected area. It encompasses the four islands and thebay’s surrounding coastline area, totaling 21, 200 hectares. With flat sections in the Guang-guang Peninsula turning rough and rugged towards its southern tip at Lawigan Point, the landmass enclosing the bay to the north and west is described as being hilly and mountainous.

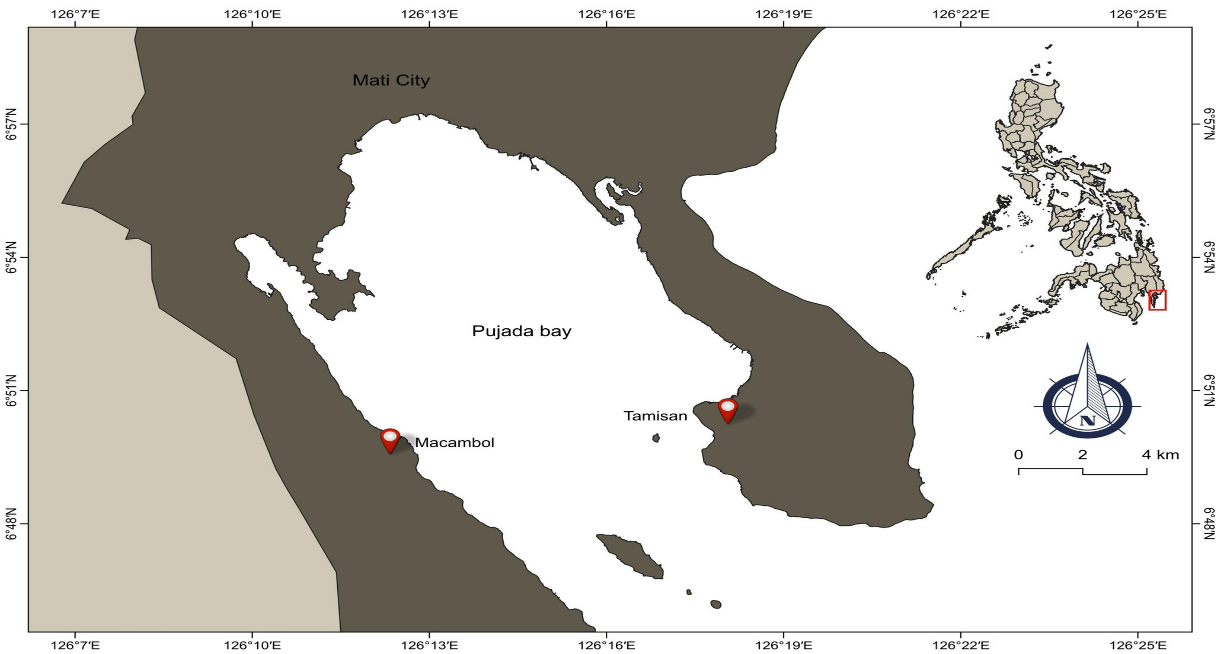

Figure 1. Study areas and map of Pujada Bay, Davao Oriental.

Data collection

Semi-structured interview

A semi-structured interview questionnaire was used to collect the data. At Pujada Bay, a pilot test of the interview was done with only 10 participants per barangay, namely, barangay Macambol and barangay Tamisan. Data on capture patterns, species composition of the finfish, and the common issues that arise when fishing were collected using a questionnaire. Using a notepad and pen, the interviewer had to identify and keep track of the fishers’ catches.

Focus group discussion

Focus group discussions were held in barangay Macambol and barangay Tamisan. Ten fishers were present during the FGDs in barangay Macambol and Tamisan. This was done to verify the catch per unit effort (CPUE) data for several finfish

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Table 1. Number of respondents interviewed by study site.

Study site	Respondents
Macambol	30
Tamisan	30
Total	60

species obtained from the semi-structured interview.

Data analyses

Catch per unit effort (CPUE)

Since the available data from the semi-structured interview of fishermen is based on the number of pieces caught each week, using catch per unit effort (CPUE) in its simplest form can be defined as the entire fishing effort during a specific time period (van Hoof and Salz, 2001; Macusi et al., 2019). To determine each individual finfish fisher's CPUE, the formula below is updated.

Formula:

$$U = \frac{c}{f}$$

Where:

U = catch per unit effort

C = weight of the species caught

f = time spent in fishing

The modification consists of multiplying the number of normal, good, and worst catches described by fishermen over the course of a week by the weight (g) of finfish collected from the field. This resulted in the average, best, and worst catch in grams, which were then divided by the number of hauls made by the fishers to obtain the CPUE.

Average fish weight divided by the total number of fish caught for a given week yields grams per fisher on their best, worst, and average catches (Macusi et al., 2019).

$$U = \frac{\text{grams per fishers (weekly)}}{\text{Haul time (weekly)}}$$

Statistical analyses

Prior to the statistical analysis of the fish catch, e.g., normal, good, and worst catches, as well as CPUE, the catches were first evaluated for normality using Ryan-Joiner tests and homogeneity of variance. The data were transformed using the $\log_{10}$ transformation and then checked once more for normality and homogeneity of variance when the data were normally distributed (using PP and QQ plots and histograms). Then, a one-way ANOVA was used to compare differences in the CPUE of normal, good catches and the factors that affect these catches, including the price of fish, where fish are sold, economic state income, the months of operation, the age of the fisher, the number of years they have been fishing, their level of experience, and the subsequent interaction between the hauling time and the number of months they have been fishing. Since the components in a linear regression analysis are untransformed, the log-transformed values of the catches were utilized as the response values. The fitting line at R^2 and *P* values of variables were examined, including their VIF (variance inflation factors, where the smaller value is more significant) values, and the ANOVA table of regression was evaluated for significance at *P*=0.05 value. Minitab Inc., State College, Pennsylvania, USA, provided the software, version 17, which was used for all statistical analyses.

RESULTS

Socio-demographic profile of the respondents

The semi-structured interview has a total number of 60 respondents across two sites. Table 2 below shows the available fishing gear at both sites. Fishers in barangay Tamisan mostly used gill nets and scoop nets, while fishers in barangay Macambol mostly used hooks, lines, and spears. In terms of their income levels, barangay Macambol has the highest income, but categories 3,000–6,000 have the highest income levels among all other income level categories. The interview included a socio-demographic profile of the fishers', such as characteristics of their household, household size, other sources of household income, and fishing gear, which may motivate the individual fishers to catch fish. Moreover, the maximum number of children was 13, and the minimum number of household members was two with a mean of five (number of children); the smallest number of households was two, respectively.

Table 2. Fishing gears, household size, and income of barangay Tamisan and barangay Macambol.

Site	Tamisan	Macambol
Fishing Gears		
Gill nets	Present	x
Scoop net	Present	x
Hook and line	x	Present
Spear	x	Present
Household size		
Min	2	2
Max	13	10
Income levels (Php)		
Below 3,000	9	3
3,001-6,000	16	17
6,001-9,000	3	2
9,001-12,000	2	5
12,001-15,000	0	1

Socio-demographic profile

The interview data gathered contains numerical and categorical variables tested about the catch data. The age, household size, number of years fishing, and number of years in the community are contributing socio-economic factors for the fishers to barely exit the fisheries. The age fisher in category 31-40 years old in barangay Tamisan has the highest number of respondents of 11, and in category 20-30 years old has the lowest number of respondents of 3, while in barangay Macambol, categories 31-40 years old and 41-50 years old have the highest number of respondents of 9, and in category 51+ years old has the lowest number of respondents of 5. The years of fishing of fishers in category 10-20 years old have the highest number of respondents of 9 in barangay Tamisan; a category below 10 years old has the lowest number of respondents of 3 in barangay Macambol, category 21-30 years old has the highest number of respondents of 10, and category 51+ years old has the lowest number of respondents of 2. For the number of years of fishers in the community, category 31-40 years old has the highest number of respondents of 8 in barangay Tamisan, category below 10 and 51+ years old has the lowest number of respondents of 3, while in barangay Macambol, category below 10 and 41-50 years old has the highest number of respondents of 7, while category 51+ years old has the lowest number of respondents of 2 (Table 3).

Education and fisheries variables

The other variables were also tested like categorical variables, for instance, level of education (elementary level, elementary graduate, high school level, high school graduate, and college level). The high school level has the highest number of respondents with 33.33%, followed by the grade level with 31.66%, elementary and high school graduates with 16.66%, and the college level with 1.66% (Table 3). The educational attainment of the fishers

Table 3. Socio-profile of fishers in barangay Tamisan and Macambol, Mati City, Davao Oriental.

Variables	Category	Tamisan	Macambol	Percentage (%)
Numerical variables				
Age of Fisher	20-30	3	7	15
	31-40	119		31.6
	41-50	8	9	28.3
	51+	8	5	21.6
Years of fishing	Below 10	3	7	16.6
	10-20	9	6	25
	21-30	6	10	26.6
	31-40	8	5	21.6
	41-50	4	0	6.6
	51+	0	2	3.33
Years in the community	Below 10	3	7	16.6
	10-20	4	5	15
	21-30	5	5	16.6
	31-40	8	4	18.3
	41-50	5	7	16.6
	51+	3	2	10
Categorical variables				
Educational attainment	Grade level	11	8	31.6
	Elementary graduate	2	8	16.6
	HS level	11	9	33.3
	HSgraduate	5	5	16.6
	College level	1	0	1.66
Selected variables				
Engine size	Below 10	21	26	80
	10-20	8	4	16.6
Proportion of catch kept (kg)	0-4	26	23	51
	5+	4	7	7

Table 4. Social and fisheries variables to determine which factors affect fishers' catch.

Source	DF	MS	*F*	*P*
Regression	22	0.173	0.89	0.611
Age	1	0.0003	0.00	0.970
Years community	1	0.210	1.08	0.314
Years fish	1	0.0002	0.00	0.972
HH size	1	0.001	0.01	0.944
Engine size (HP)	1	0.362	1.86	0.192
Fish price (Php)	1	0.018	0.09	0.764
Hours_fishtrip	1	0.124	0.64	0.437
Fishtrips_mo	1	0.033	0.17	0.687
Proportion of catch kept	1	0.857	4.39	**0.052**
Education	4	0.105	0.54	0.711
Income levels	4	0.049	0.25	0.904
Type_buyer	3	0.108	0.56	0.652
Credit access	1	0.103	0.53	0.478
Membership	1	0.040	0.21	0.655
Error	16	0.195		
Total	38			

had a large impact on their lives; they find it difficult to quit fishing because they do not finish their education and lack financial assistance to continue. Fishers are greatly involved in fishing, and fishing was the best option to feed their families and provide for their daily needs. Only the proportion of catch kept is significant (*P*=0.052) (Table 4).

Finfish species composition

During the interview, fishers identified different types of finfish species based on their catch composition in barangay Tamisan such as bigeye scad, needlefish unicornfish, tuskfish, silver pomfret, and red snapper (6.75%), white-spotted spinefoot and purple spotted big-eye at (4.91%), mackerel scad and solid (4.29%), leopard coral grouper (3. 68%), swordfish, goatfish (3.07%), *sagumba* (3.07%), redtail scad (2.45%), *cascason* (2. 45%), yellowbelly threadfin bream (2.45%), tropical silverside fish, and bigeye scad (1.84%), bullet tuna, mackerel scad, bigeye snapper, minstrel sweetlips, deep-water red snapper, sardines and golden-lined spinefoot (1.23%), and skipjack tuna, trevally fish, false trevally, largescaled terapon, unicornfish, twinspot lionfish, triggerfish, mackerel, dwarf pygmy goby, yellowfin tuna, and yellowtail fusilier (0.61%), respectively. On the other hand, in barangay Macambol, fishers identified finfish species such as skipjack tuna (15.15%), yellowfin tuna (12.12%), dolphin fish (7.58%), leopard coral grouper, swordfish, mackerel scad, emperor (6.06%), sandperch and tropical silverside fish (4.55%), needlefish and parrotfish (3.03%), bullet tuna, silver pomfret, bigeye scad, yellowfin tuna, silverspot squirrelfish, goatfish, short mackerel, yellowtail fusilier, goby, and amberjack (1.52%). Some of these fish were caught based on using different gears for a certain species and based on the season as well. Fishers pointed out that the good catch is usually around June to August and August to October. Leopard coral grouper has the highest price among all species found in the two sites. The larger the fish caught, the higher the price. The proportion of catch kept for the family is very minimal; this is because they sold it to gain a higher income to provide for the family instead of keeping it for food consumption. They also said that they only kept it at a minimal amount for the family because they consumed and ate it almost every day.

Catch Per Unit Effort (CPUE)

Table 5 shows the average catch of worst (0.27 kg/hr), normal (0.62 kg/hr), and best (1.57 kg/hr) with a haul time of 5.46 hours in barangay Tamisan. On the other hand, Table 4 shows the average catch of worst (2.54 kg/hr), normal (4.37 kg/hr), and best (7.08 kg/hr) with a haul time of 9.23 hours in barangay Macambol.

The analysis of the CPUE in barangay Tamisan also revealed highly significant results, with the best catch having the highest CPUE value (1.57 kg/hr), followed by the normal catch (0.62 kg/hr), and the worst catch (0.27 kg/hr) (*P*-value=0.000). On the other hand, the analysis of the CPUE in barangay Macambol also revealed highly significant results, with the best catch having the highest CPUE value (7.08 kg/hr), followed by the normal catch (4.37 kg/hr), and the worst catch (2.54 kg/hr)

Table 5. Average catch in worst, normal, and best in barangay Tamisan and barangay Macambol.

Site	Weekly catch	Average catch (kg/hr)	Haul time (hours)
Tamisan			
	Worst	0.27	5.46
	Normal	0.62	5.46
	Best	1.57	5.46
Macambol			
	Worst	2.54	9.23
	Normal	4.37	9.23
	Best	7.08	9.23

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Regression Analysis

The results of the regression analysis determined which factors influence normal catches, e.g., engine size and proportion of catch kept, to find out how much they contributed in terms of explaining the variation from the other tested numerical variables. The engine size showed significant results for the normal (*P*=0.007) while the proportion of catch kept also showed significant results (*P*= 0.015). The regression equation was highly significant (*P*=0.006) (Table 6).

There was a slight difference in total catches among the months. The catches were consistent in all three months in the pooled data (df=3, MS= 0.38, *F*=1.88, *P*=0.13). The post-hoc analysis using the Tukey test showed that there was a slight difference in total catches among the months. February has a mean of 1.15, March has a mean of 1.24, and April has a mean of 1.35 in two sites. On the other hand, February has an average catch of 17. 20. March has an average catch of 34. 025, and April has an average catch of 75.075 in barangay Tamisan. On the other hand, February has an average catch of 143.06, March has an average catch of 185.33, and April has an average catch of 105.37 in barangay Macambol, respectively.

Table 6. ANOVA result based on the regression analysis to determine which factors influence normal catches.

Source	DF	MS	*F*	*P*
Regression	9	0.387	3.06	**0.006**
Age	1	0.011	0.08	0.772
Years_community	1	0.079	0.62	0.434
Years_fish	1	0.005	0.04	0.846
HH_size	1	0.004	0.03	0.860
Engine size_HP	1	0.999	7.90	**0.007**
Fish_price	1	0.093	0.73	0.397
hours_fishtrip	1	0.321	2.54	0.118
modified_fistrips_mo	1	0.000	0.00	0.994
Proportion of catch kept	1	0.811	6.42	**0.015**
Error	43	0.126		
Total	52			

DISCUSSION

This is the first inventory of the status of the finfish population in Macambol and Tamisan in Pujada Bay. There is a lack of information on the species composition of finfish found, even from previous publications or reports in the gray literature. Based on the researcher's observation and recollection of the catch species, there may be differences in the composition of catches between barangay Tamisan and barangay Macambol. However, results relating to socioeconomic and fisheries variables did not produce significant results. Fish catches were quantified every week of sampling through catch logbooks for three months from February to April. While the catch composition in barangay Tamisan was more diverse as compared to those finfish species that were landed in barangay Macambol, there were more commercially valuable finfish in barangay Macambol, primarily composed of tunas (Scombridae), scads (Carangidae), and snappers (Lutjanidae).

Overall, a total of 40 finfish species were identified by fishers in barangay Tamisan and 22 finfish species in barangay Macambol. Most of the finfish species that were landed in barangay Tamisan were absent in barangay Macambol, and there were also finfish species that were landed in barangay Macambol that were absent in barangay Tamisan. Although there is scarce data on the status of the finfish population in Pujada Bay, the status of the finfish species listed in this study showed a diversity of species present in the two sites.

Lavides et al. (2010) stated that species may no longer be caught, not because they disappeared but because fisher preferences and fishing practices have changed (Lavides et al., 2010). When samples are taken throughout a site at various times of the day, let alone during various seasons and monsoons, the species composition may show slight changes. In fact, Mamauag et al. (2009) and Utzurrum et al. (2016) have shown that monsoonal shifts can affect the recruitment patterns of Philippine serranids, clupeids, and scombrids (Smith et al., 1983; Utzurrum et al., 2016), as well as pomacentrids, labrids, chaetodontids, and acanthurids (Utzurrum et al., 2016). However, fishers' recollections have indicated declines in catch rates in small-scale Philippine fisheries, but these were to species level only for reef-associated fishes according to Lavides et al., (2016). This is in support of the data from the Davao Oriental Provincial Agriculturist Office by the JICA study team in 1992, that the fishing grounds in Pujada Bay show a decline in fishery production in recent years while the number of fishers has increased. Additionally, it is challenging to prove the decrease in reef fisheries since reef production has been combined with that of other shallow-water ecosystems and recorded as municipal fisheries production. BFAR (1997), appears to imply, however, that the decline in municipal fisheries began only in 1991. The fact that intensive fishing has been documented in shallow coastal areas for decades (Alcala and Russ, 2020) refutes this.

Meanwhile, leopard coral grouper has the highest market value among other fishes of finfish. This motivates the fishers to engage in fishing, and it will likely be difficult to exit fishing because they could gain much higher income than any other source of income. Small-scale fishers particularly in the Philippines, believed that as long as they legally used permitted gear, they should be authorized to fish within municipal waters. Many stated that they do not have other employment options, and most of them do not have the abilities necessary for employment in non-fishing livelihood opportunities or lack the necessary academic requirements (Salayo et al., 2008).

CPUE of the fisheries

The analysis of the CPUE of fishers every week in barangays Tamisan and Macambol revealed significant results, e.g., the best catches had the highest CPUE values (1.57 kg/hr; 7.08 kg/hr). As for their feeding levels, most of the species caught in Pujada Bay within the two barangays of Tamisan and Macambol were piscivores, but some species were also molluscivores, omnivores, carnivores, planktivores, and herbivores. The engine size in horse power and the proportion of catch kept by the fishers affect the number of finfish species caught.

CPUE varies about time, place, fisher, and gear. Therefore, the fishers' choices and regular engagement throughout the year are crucial. Individual fishers competence and motivation will be crucial in target fisheries like those in the Philippines. As a result, the participating fishers should range in terms of experience, age, and marital status. If several types of gear are available, each type's representative should be present. The overall number of fishers needed will vary depending on the degree of variance in CPUE among fishers, the experience category, and the kind of gear. Each category must include a minimum of five fishers. To identify seasonal patterns, fishers who participate in catch calendars should fill out catch calendars all year long. Upon their establishment, temporary stratified sampling may be carried out to lessen the amount of data collected (Meeuwig and Samoilys, 2003). The data is standardized by CPUE based on the effort, i.e., the number of people caught, the number of traps, and the overall length of the trapping event. CPUE assumes that all animals have the same chance of being captured and that catch ability is always constant (Zimmerman & Palo, 2011). These presumptions allow for the use of CPUE as an abundance index (Harley et al., 2001; Bigelow et al., 2003; Zimmerman & Palo, 2011). Additionally, it is presumable that CPUE is proportional to abundance at the moment of collection and that the percentage of the population that is trappable remains constant over time. A steady CPUE can signify exploitation at Maximum Sustainable Yield (MSY) and the potential modification of a fishing technique to offset overfishing brought on by rising abundance (Jones, 2004). For crayfish population estimates and the assessment of stocking success, CPUE has been utilized (Skurdal et al., 2002; Westman et al., 2002; Olsson et al., 2010; Zimmerman & Palo, 2011).

Common issues and problems of fishers

The most frequent issues mentioned by fishers were overfishing and too many fishers, followed by illegal fishing gear, marine pollution, and climate change. Fishers feared they would not have any sources of revenue to support their families if these challenges remained unaddressed. Marine pollution is another factor that could contribute to the loss of fish populations. Most fishers throw their trash into the open sea without realizing how it can impact the fish and their habitat. This was a result of the non-biodegradable and/or plastic materials they were utilizing as traps and discarding their trash directly in the open sea and below the water, which was harmful to other marine wildlife. Furthermore, the waste from the upland area was dumped into the bay and the ocean as well (Macusi et al., 2019). The fact that there are too many people active in fishing and able to make it their living is another issue that could contribute to the decline of fish populations. There are many mouths to feed for their daily needs; therefore, if the number of fishers kept growing, it would have a significant impact on the marine resources.

On the other hand, there are a small number of fishers who utilize illegal fishing techniques to catch fish, catching even the smallest fish, which contributes to the ongoing decline in fish populations. Thus, despite the potential negative effects, there are still a very small number of fishers, particularly outsiders, who continue to employ these unlawful fishing devices. Fishers are concerned that the use of these illicit fishing devices, on which they all primarily rely, will lead to a decline in the number of fish they catch (Macusi et al., 2019).

CONCLUSION

Overall, there were more finfish species that were identified in barangay Tamisan compared to barangay Macambol. There were finfish species that were absent in one site but landed in the other site and vice versa, but there were more commercially valuable finfish species that landed in barangay Macambol, primarily composed of tunas (Scombridae), scads (Carangidae), and snappers (Lutjanidae). On the CPUE of fishers, both study sites revealed significant differences. However, results relating to socioeconomic and fisheries variables did not produce significant results. Most species caught in Pujada Bay between Tamisan and Macambol are piscivores; other species are molluscivores, omnivores, carnivores, planktivores, and herbivores. Engine size, horsepower, and the proportion of catch in kept by fishers affected the number of fish caught. Data collected in fisheries in this study may contribute to the status of the finfish population in the area. Such data may assist in crafting or improving policies and interventions to constantly monitor the species composition, CPUE of fishers, and their feeding habits. Fishers' recollections of the status of finfish species listed in this study showed a diversity of species present in the two sites.

This study serves as a piece of baseline information and guidance to monitor and continuously assess the fisheries resources in the area in the long term and provides better status data relevant to fisheries improvement policy.

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