

# DIFFERENCES IN ENFORCEMENT FACTOR AND MPA AFFILIATION: ITS INFLUENCE ON FISHING PRACTICES AMONG FISHERS IN SELECTED MARINE PROTECTED AREAS IN THE SOUTHERN PHILIPPINES

Loth M. Orozco

North Eastern Mindanao State University-Cantilan Campus Pag-antayan, Cantilan, Surigao del Sur, Philippines

[lothorozco31@gmail.com](mailto:lothorozco31@gmail.com)

**ABSTRACT:** Sustainable fisheries and marine resource conservation concerns are addressed by the establishment of Marine Protected Areas but are continually challenged by social, political, and economic agendas. This study aims to describe the differences in fishing practices by MPA affiliation and its relationship with fishers' perception of law enforcement in the coastal community. 349 respondents for the survey and 42 for FGD were randomly selected from the 7 largest MPAs in Lanuza Bay, Philippines. Results highlighted that MPA engagement is dominated by men, older fishers, higher educational attainment, higher place attachment, longer fishing experiences, and higher income among MPA Members than non-MPA members. Also, MPA members are more inclined to follow the MPA fishing regulations in terms of registration compliance, the non-practice of illegal fishing, and the use of allowed fishing gear in the Buffer Zones. On the other hand, in terms of the influence of enforcement factors on fishing practices, the knowledge, compliance, and manner of enforcement by an authority person are the same for both members and non-members. This implies that the enforcement factor and fishing practices do not significantly differ between the study groups. Correspondingly, there is no correlation between enforcement factors and fishing practices to fishers but their personal and household demographic attributes such as age, number of years in the barangay, fishing experiences, and the number of working household members influence this correlation employing the multiple linear regression analysis. The indifference of the small-scale non-MPA members is reported to be caused by livelihood displacement after implementing the said *coastal resource management in their locality*.

**Keywords:** Social Sciences, Fishing Practices, Mixed Methods, Lanuza Bay

## INTRODUCTION

Marine resources are over-exploited and human activities such as illegal fishing and the use of illegal techniques in fishing have threatened the marine system and raised various social issues like food insecurity [1]. These illegal activities also caused ecological distress causing a loss in marine biodiversity sparking immediate action from policymakers to address the increased need for effective marine protection [2] and prevent further damage to the marine ecology [3]. To reduce the negative effects of human activity on marine ecosystems, coastal resource management programs and marine protected areas (MPAs) have been developed [4] [5]. Globally, 10,280 MPAs are covering 2.3% of the world's ocean area [6]. The early MPAs were established in the 20th century, and at least one MPA was established in every country since then [5]. Multiple studies have affirmed the beneficial impact of MPAs on conservation and had promising results within and outside the protected waters [7] [8]. Other than the biophysical impact of MPAs, it has also contributed to poverty alleviation in communities that are dependent on fishing [7] (Edgar et al., 2014). Globally, there is a goal to conserve 10% of the world's coastal and marine areas through MPAs and MPA networks by 2020 [9].

The Philippines is a signatory to the United Nations Convention on Biological Diversity, which aims to protect 10% of all marine and coastal habitats by 2020 [6]. With this commitment, the Philippines has a long history of MPA establishment. According to [10], the majority of MPAs in the Philippines were created to maintain fisheries use. In 1974, Sumilon Island became the first marine sanctuary in the Philippines [11]. However, only 339 MPAs in the Philippines are being actively managed now [11], even though 1,620 MPAs have been constructed since then [6].

These MPAs are community-based in about 90% of cases. MPAs as they currently exist do not adequately represent

biodiversity in terms of size and dispersion. No-take MPAs presently only safeguard 0.5% of municipal waterways and 2.7–3.4% of the coral reefs in the Philippines. Additionally, only two places hold 85% of the no-take area, and 90% of MPAs are smaller than 1 km<sup>2</sup> [12].

15 of Surigao del Sur's 18 municipalities are coastal ones, with fishing serving as the primary source of income in this Mindanao province. One of these Surigao del Sur coastal towns that front the Pacific Ocean is Lanuza

Bay. Lanuza Bay has a total of 19 MPAs, which are overseen by the Lanuza Marine Park & Sanctuary, established in 1998 because of declining fish catch and to resolve the malpractices and exploitation of the coastal and marine resources of Lanuza Bay [13].

The success of MPAs in fulfilling their conservation goals depends on effective enforcement. The recovery of fish populations within MPAs is directly correlated with enforcement, according to research by [7]. The majority (59%) of the MPAs under study had only one or two distinguishing characteristics and could not be biologically separated from fishing locations. Their findings demonstrate that setting global conservation goals based just on area will not maximize the preservation of marine biodiversity. To ensure that MPAs accomplish their intended conservation value, more focus must be placed on better MPA design, long-term management, and compliance. Additionally, [14] discussion of the role of enforcement in preventing illegal and unsustainable fishing methods underlined how doing so will ultimately protect marine ecosystems.

On the other hand, there are many difficulties with the enforcement of MPAs. Surveillance and patrols are frequently limited by a lack of budget and resources. Even while 71% of MPAs had a favorable impact on fish populations, these conservation effects were rather inconsistent. The best indicators of conservation impact were

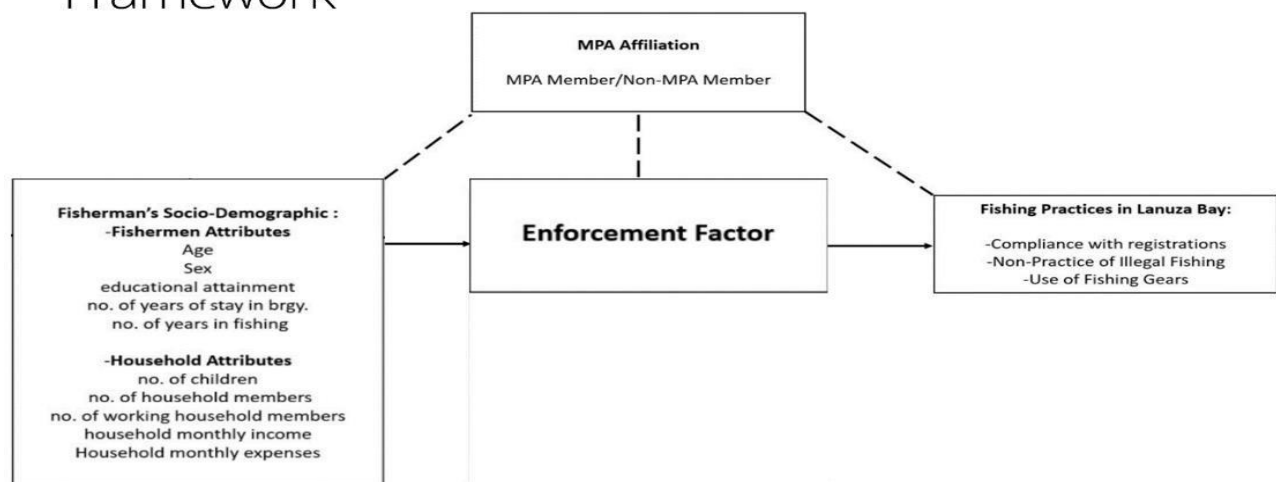
personnel and financial capacity: MPAs with sufficient staff capacity had ecological effects 2.9 times greater than MPAs with insufficient capacity. As a result, sustained worldwide MPA development without significant financial and human resource investment is likely to produce subpar conservation results [15]. Furthermore, there may be tensions between conservation objectives and the interests of regional communities and commercial fisheries, which could result in subpar enforcement efforts [16]. For enforcement organizations, certain MPAs' remoteness and size present logistical challenges [15][17].

To ensure effective enforcement, several strategies were used to solve these difficulties. [18] conducted a thorough study on the role of patrolling and surveillance in implementing MPA laws, highlighting the significance of routine patrols and the use of technology, such as remote sensing and satellite tracking, in boosting enforcement efficacy. As several instances where community-based enforcement programs empowered local stakeholders have shown, collaborative collaborations with local communities have been successful [19]. In the meantime, MPAs are embracing adaptive

management strategies more and more. These strategies include adaptable rules that can be changed in light of monitoring and assessment findings [20]. MPAs can more effectively synchronize conservation and economic aims by incorporating stakeholder feedback and often updating legislation. Multi-level governance structures are necessary for effective enforcement and sustainable fishing methods in MPAs. Harmonizing laws and enforcement actions requires cooperation on a local, national, and international level. In this process, collaborative structures like Regional Fisheries Management Organizations are essential [21].

At the local level, the fishers as the main stakeholders of MPA management playing a significant role in its success. Their affiliation with Marine Protected Area-driven organizations has to be considered to investigate their cooperation in the realization of conservation objectives. Therefore, this study will examine the enforcement factor and their MPA affiliation influence their fishing behaviors in Lanuza Bay because the current Lanuza Marine Park and Sanctuary Committee management plan identified curbing unlawful fishing practices as an essential goal.

## Framework



Generally, policies are implemented to attain order in a constantly changing and developing society. In fishing communities, coastal resource management (CRM) like Marine Protected Areas is established to sustain marine resources by protecting the marine habitat from harmful fishing gear, practices, and activities. The protection of the physical environment impacts the social aspect, both positively and negatively. This may vary from benefits such as higher income from fishing due to the ripple effect theory of the protected zone to disadvantages such as livelihood displacement. The social dimension like the local's fishing practices is the main determining factor in the success of MPA. Thus, this study is important in the policy implication that addresses both physical and social needs and concerns to have a comprehensive and inclusive approach. The purpose of the study is to identify the factors that influence the fishing practices of fisherfolks in Lanuza Bay. Based on Parson's Social Systems Theory, the general objective of this study is

to describe the relationships between the economic capability (independent variables) with the fishing practices (dependent variable) of fisherfolks in Lanuza Bay.

This general objective of the study will be pursued by the following specific study objectives:

1. To describe the profile of the fishers in Lanuza Bay in terms of their socio-demographic characteristics between MPA and non-MPA members.
2. To describe the fishing practices of fisherfolks in Lanuza Bay by MPA Affiliation
3. To determine the correlation between the enforcement factor and the fishing practices of the fishermen in Lanuza Bay.
4. To explore the influence of sociodemographic factors (personal attributes and household attributes) on the relationships of enforcement factors with the fishing practices of fisherfolks in Lanuza Bay.

## MATERIALS AND METHODS

This study employed a mixed-method design. The choice of this research design was based on the behavior of interest, which is the fishing practices and engagement of fisherfolk in terms of MPA membership in Lanuza Bay. Lanuza Bay is located in the northernmost section of Surigao del Sur. It extends from Carrascal in the north and encompasses the municipalities of Cantilan, Madrid, Carmen, Lanuza, Cortes, and Tandag with a combined land area of 1,436.10 km<sup>2</sup>. These municipalities bordering Lanuza Bay have a total of 147,238 hectares of municipal waters and a coastline stretching to 126 km. The Lanuza Bay area has a total of 19 MPAs, all have the same regulation since they are managed by the Lanuza Marine Park and Sanctuary Committee [22]. Seven of these MPAs have been considered integral communities of the Lanuza Bay's ecosystem, based on a previous study [23]. Because of the urgency to use the study findings to draft the new management plan for Lanuza Bay, the researcher utilized these municipalities as research sites for this study, because of their critical role in maintaining the ecosystem of Lanuza Bay. Figure 1 illustrates the proposed study sites in Lanuza Bay.

The mixed method of this study demands a selection procedure for gathering both quantitative and qualitative components. The former demands generating data sets from fisherfolk; the latter pertains to obtaining in-depth information from selected participants.

**The Quantitative Sampling Procedure.** A total of seven barangays were purposively selected among the 19 barangays that are established as Marine Protective Areas. The selection criterion was set forth to be those barangays with a large number of registered fishers as listed in the Municipal Agricultural Office (MAO). A total of 349 respondents were randomly selected from the 7 biggest MPAs in Lanuza Bay. Thus, 50 respondents were chosen from each MPA.

A perusal of the MAO record indicated the list to be incomplete and outdated. Hence, counts were estimated by key informants in the MAO office and other local agencies. The estimated list includes adult fishers (18 years and over for both genders); directly or indirectly engaged in taking and/or culturing, processing, and vending of fish and/or aquatic resources in the Lanuza Bay area of Surigao del Sur Province. The list of the seven most populated coastal barangays in terms of estimated registered fishers is given in Table 1. The population of interest then consists of 3,750 fishers.

The qualitative component of the study was the participants' perspectives on their fishing practices and MPA membership. To ensure an adequate amount of qualitative data, about 6 focused groups addressing various study covariates (young and old fishers, high-income and low-income fishers, and

MPA and Non-MPA members) were asked through FGD. There were about 7 fishers per focus group. In both quantitative and qualitative components, fishers below 18 years old and those that reach 70 years old and above were excluded from the criteria of selection for participants. This was to consider their ability to recall events and details that will be asked during the survey and interview, especially among the elderly. Those fisherfolks who lived and fished in the coastal community for less than a year were also excluded from the study considering their adjustment in the locality, their relationship with the community, and their level of awareness of the policies. The study's recruitment and data collection processes were designed to protect human subjects' privacy and confidentiality following the national ethical guidelines for health research authored by the [24].

The survey items were translated into the local language in Lanuza Bay and were pre-tested by performing face validity with a group of psychometricians and experts in the field before conducting the actual survey. In Objective 1, frequency, percentage, and ANOVA were used to describe the socio-demographic characteristics of the MPA and non-MPA members. In objective 2, weighted mean and mean were employed in describing the fishing practices of two study participants. In Objective 3, Pearson product-moment correlation was used in determining the relationship between economic capability and socio-demographic characteristics (personal and household) influences on fishing practices.

## RESULTS AND DISCUSSION

Table 1 below describes the socio-demographic characteristics (personal attributes) of the sample in terms of age, sex, educational attainment, years of stay in the barangay, and the number of years of fishing. Almost all the participants were male (98.3%), which generally shows the gender-specific distribution of fishers in the local setting. In terms of their involvement in the MPA association, male fishers are more engaged in the MPA association. Also, the harvest of marine resources is inclined to the gender of the fishers. Shellfish to women are of greater importance in their activity [25]. According to [26], gender differences in fishing practices remain widely gapped despite the involvement of women in their distinct fishing practices. In terms of age, most of the fishers are from age 51 years old and above (32.7%). This means that most of the fishers are already in their late adulthood since the age bracket is followed by 41-50 years old which is 24.9% of the sample. This implies that there is no age limit for fishing. It is generally participated by respondents in their late adulthood.

**Table 1**  
**Percentage Distribution of Fisher Folks by Membership Status and by Socio-Demographic Characteristics (Personal Attributes)**

	Socio-Demographic Characteristics n=	Member 262	Non-member 87	Total	Percent Difference
Sex	Male	97.7	98.9	98.3	-1.2
	Female	2.3	1.1	1.7	1.2
	<b>TOTAL</b>	<b>100</b>	<b>100</b>	<b>100</b>	
Age	30 and below	8.0	37.9	22.9	-29.9
	31 – 40	18.3	20.7	19.5	-2.4
	41 – 50	30.2	19.5	24.9	10.7
	51 and above	43.5	21.8	32.7	21.7
	<b>Average Age</b>	<b>47.33</b>	<b>39.31</b>		
Educational Attainment	Below Grade 6	18.4	53.4	35.9	35
	Elem Graduate	18.4	13.7	16.1	-4.7
	High School Level/Graduate	50.6	28.6	39.6	-22
	College Level/Graduate	12.6	4.2	8.4	-8.4
	<b>TOTAL</b>	<b>100</b>	<b>100</b>	<b>100</b>	
Years of Stay in Barangay	10 years and below	5.3	18.4	11.9	-13.1
	11 – 20	17.2	24.1	20.6	-6.9
	21 – 30	12.2	16.1	14.2	-3.9
	31 – 40	14.1	9.2	11.7	4.9
	41 and above	51.1	32.2	41.6	18.9
	<b>TOTAL</b>	<b>100</b>	<b>100</b>	<b>100</b>	
	<b>Average Years of Stay in Barangay</b>	<b>40.90</b>			
No. of Years of fishing	10 years and below	12.2	41.4	26.8	-29.2
	11 – 20	29.8	23.0	26.4	6.8
	21 – 30	25.6	19.5	22.6	6.1
	31 – 40	22.9	8.0	15.5	14.9
	41 and above	9.5	8.0	8.7	1.5
	<b>TOTAL</b>	<b>100</b>	<b>100</b>	<b>100</b>	
	<b>Average Years of Fishing</b>	<b>27.42</b>			

As to educational attainment, the study participants attained mostly secondary education (39.6%), but more MPA members (12.6%) reached tertiary education and (50.6%) secondary education compared to non-MPA members (4.2%), (28.6%). This implies that the MPA members, along Lanuza Bay, have higher educational attainment than the non-MPA members. Their MPA membership may also be attributed to the level of their academic attainment and their wider and deeper understanding of ecological preservation. As regards the length of stay in the locality, most (41.6%) of the respondents have resided in the barangay for more than 41

years and most of them were born and raised in the locality. This means that the fishers are already familiar with the characteristics of their municipal waters which gives them a good adaptation to their environment. Looking into the number of years of fishing, the study participants have 10 years and below and 11-20 years in fishing (26.8 and 26.4% respectively). More non-MPA members (41.4%) have fished for below 10 years than MPA members (12.2%). This implies that non-MPA members have less experience in fishing than MPA members, especially in the area.

**Table 2**  
**Extent of Compliance on MPA registration by Membership**

Indicator	MPA Member n= 262		Non-MPA Member 78	
	Weighted mean	Adjectival rating	Weighted mean	Adjectival rating
<b>Compliance with MPA Registration</b>				
1. I fish in the regulated area in the MPA.	3.63	High	3.50	High
2. I have a valid registration to fish in the regulated area of MPA.	4.95	Very High	5.0	Very High
3. I register my catch with the MPA.	2.96	Moderate	2.79	Moderate
4. I regularly register my fishing equipment and gear.	4.89	Very High	4.68	Very High
<b>Mean</b>	<b>4.11</b>	<b>High</b>	<b>3.59</b>	<b>High</b>

**Table 3**

**Percentage Distribution of Fisher Folks by Membership Status and by Socio-Demographic Characteristics (Household Attributes)**

Socio-Demographic Characteristics	n=	Member 262	Non-member 87	TOTAL	Percent Difference
Total number of children		4.72 ± 1.93			
	1	22.9	42.5	32.7	-19.6
	2 – 3	35.5	25.3	30.4	10.2
	4 – 5	20.2	23.0	21.6	-2.8
	6 – 7	15.3	9.2	12.3	6.1
	8 and above	6.1	0.0	6	6.1
<b>TOTAL</b>		<b>100</b>	<b>100</b>	<b>100</b>	
Total number of Household		4.72 ± 0.72			
	1 and below	0.8	4.6	2.7	-3.8
	2 – 3	29.8	17.2	23.5	12.6
	4 – 5	38.5	52.9	45.7	-14.4
	6 – 7	20.2	24.1	22.2	-3.9
	8 and above	10.7	1.1	5.9	9.6
<b>TOTAL</b>		<b>100</b>	<b>100</b>	<b>100</b>	
No. of Household members working		1.44 ± 0.72			
	Below 1	58.8	80.5	69.6	-21.7
	2	31.3	14.9	23.1	16.4
	3	10	4.5	7.3	5.8
<b>TOTAL</b>		<b>100</b>	<b>100</b>	<b>100</b>	
Annual Household Income (from fishing)		399185.64 ± 4488835.32			
	Less than 100	29.8	31.0	30.4	-1.2
	100-149	23.3	31.0	54.3	-7.7
	150-199	14.1	16.1	30.2	-2
	200-249	13.4	13.8	27.2	-0.4
	250-299	8.0	4.6	6.3	3.4
	Above 300	11.5	3.4	7.45	8.1
	<b>TOTAL</b>	<b>100</b>	<b>100</b>	<b>100</b>	
Annual Household Expenses		39135.26 ± 45549.78			
	Less than 100	35.9	36.8	36.5	-0.9
	100-149	35.9	35.6	35.9	30.3
	150-199	13.4	5.7	9.8	7.7
	200-249	7.3	4.6	5.9	2.7
	250 and above	7.6	2.3	4.9	1.5
<b>TOTAL</b>	<b>100</b>	<b>100</b>	<b>100</b>		

Table 3 shows the distribution of responses on the extent of compliance with MPA regulations between MPA members and non-MPA members. Generally, coastal management programs like the MPAs are established to lessen the impact of harmful fishing practices of fishers to mitigate their detrimental effect on the marine environment. Science-based regulations are also implemented to limit destructive fishing gear and execute closed seasons to sustain particular marine species during the breeding period. The change in fishing patterns compliant with the protected area regulations is the success indicator of conservation goals [4, 5]. Study participants often adhere to good fishing practices. The highest responded items were "with valid registration to fish and regularly register their fishing equipment and gear". In compliance with the MPA regulation category, both MPA and Non-MPA members have a Mean of 4.11 and 3.59 which are interpreted as 'High'. This implies that both study participants comply with the regulations the managers and enforcers set. Between the two, MPA members are more likely to conform to the rules compared with non-MPA members.

Among the four items in compliance with MPA registration, MPA and Non-MPA members have an adjectival rating of 'High' except for registering fish catch which is 'Moderate'. In this case, both study groups revealed during the FGD that their fish catch registration is not religious due to some factors and is mostly dependent on the weather and the presence of peddlers upon their arrival. Table 4 describes the non-practice of illegal fishing. Both MPA and Non-MPA members have an adjectival rating of 'Very High'. All items got the same interpretation. On the other hand, based on the key-informant interview with two MAO Officers, the practice of illegal fishing within the MPA-regulated areas is still rampant though mostly small-scale. It is confirmed by FGDs with both MPA and non-MPA members. On poor fishing practices, the "use *tubli*, use chlorine, use tear gas, use *bituon*, and use explosives were the most observed and recorded ill-fishing practices among the MPAs in the locality. Between the two study group participants, non-MPA members are likely to exercise poor fishing practices in their municipal waters. Use of *tubli*, chlorine, and fishing during the closed season transpired from these interviews

**Table 4**

**Extent of Non-Practice of Illegal Fishing**

Indicator	MPA Member n= 262		Non-MPA Member 78	
	Weighted mean	Interpretation	Weighted mean	Interpretation
5. I don't fish prohibited species.	4.98	Very high	4.95	Very high
6. I don't use dynamite to fish.	5.00	Very high	5.00	Very high
7. I have not used "tubli" to fish.	4.94	Very high	4.84	Very high
8. I have not used chlorine in fishing.	4.96	Very high	4.84	Very high
9. I have not used tear gas in fishing.	5.00	Very high	5.00	Very high
10. I have not used "bituon" in catching fish.	4.96	Very high	5.00	Very high
11. I don't fish in closed areas.	4.93	Very high	4.90	Very high
12. I don't fish during closed season.	4.90	Very high	5.00	Very high
13. I don't use explosives in fishing.	4.91	Very high	5.00	Very high
14. I don't use batteries in fishing.	4.91	Very high	5.00	Very high
<b>Mean</b>	<b>4.95</b>	<b>Very high</b>	<b>4.95</b>	<b>Very high</b>

These poor fishing practices are generally observed during low tides in the regulated areas and no-take zones. They are used in fishing for octopuses and other marine species that hide in corals and rocks. Mostly, small-scale fishers, use this traditional way of fishing in their canoes when the water is low and they use either chlorine or *tubli*. *Tubli* is a plant whose roots are used as a fish poison. This is one of the oldest and once-allowed ways of fishing. It is revealed during focus-group discussion that it is widely used by the locals and is passed on from their forefathers. Later, chlorine and batteries are also used in fish poisoning. This is revealed during the Key Informant Interviews.

Table 5 shows the fishing gear used by the respondents. The following was mentioned in the MPA regulations: *ping pong*,

triple net, compressor, *sahid* (a modified gill net without bunt and sinker drawn by two (2) persons for catching fingerlings in estuarine areas), super light, troll line in fishing. Both MPA members and non-MPA members responded 'Very Low' on the use of fishing gear that is not allowed. These are considered destructive fishing gears because they include not fully grown fish and destroy corals and fish habitats as some of these reach the ground. During the focused-group discussion, among the groups, it was revealed that most violators of prohibited fishing gear are done by non-residents of the municipality. Among these is the use of compressors in catching fish. These violators may be coming from the neighboring municipality and seldom are coming from Surigao del Norte.

**Table 5**

**Fishing Gears used by MPA and Non-MPA members**

Indicator	MPA Member n = 262		Non-MPA Member 78	
	Weighted mean	Interpretation	Weighted mean	Interpretation
1. ondak	2.17	Low	1.79	Low
2. pana (spear)	3.62	High	3.32	Moderate
3. pataw	1.69	Low	1.21	Very low
4. pingpong	1.06	Very low	1.21	Very low
5. onnga-onnga	1.44	Very low	1.42	Very low
6. lunggot	1.46	Low	1.74	Low
7. Bingwit (single hook-and-line)	3.64	High	3.21	Moderate
8. Palangri (multiple hook-and-line)	2.82	Moderate	2.42	Low
9. Wakay (drifted single hook-and-line)	1.77	Low	1.68	Low
10. Rentik (pamuyo)	1.63	Low	1.37	Low
11. Pukat pang Nakos (gill net for squid)	1.73	Low	2.37	Low
12. Pukat Pamanganan (gill net for lobster)	2.06	Low	1.95	Low
13. Pukat Palagad (drift gill net)	1.47	Low	1.79	Low
14. Kayangkang ug Uyang-uyang (Jiggers)	2.11	Low	1.47	Low
15. Pana ng may suga (spear fishing with gas lamp petromax)	1.67	Low	1.16	Very low
(-) 16. triple net	1.05	Very low	1.16	Very low
(-) 17. compressor	1.05	Very low	1.00	Very low
(-) 18. Sahid	1.05	Very low	1.00	Very low
(-) 19. Superlight	1.05	Very low	1.00	Very low
(-) 20. Troll line	1.10	Very low	1.00	Very low
<b>Mean</b>	<b>1.78</b>	<b>Low</b>	<b>1.66</b>	<b>Low</b>

MPA and Non-MPA members differ in their fishing areas which also determines their fishing practices. Non-MPA members, since most of them are small-scale fishers based on their socio-demographic profile, tend to fish in regulated

areas where only traditional fishing methods and gear are allowed. Unlike the MPA members, they are equipped with fishing vessels that can reach distant areas, can withstand bad

**Table 6**

**Summary of the extent of fishing practices of fisher folks by Membership**

Components	MPA Member n= 262		Non-MPA Member 78	
	Weighted mean	Interpretation	Weighted mean	Interpretation
Compliance with MPA Registration	4.11	High	3.59	High
Non-practice illegal fishing	4.95	Very High	4.95	Very High
Fishing Gears	1.78	Low	1.66	Low
<b>Over-all Mean</b>	<b>3.61</b>	<b>High</b>	<b>3.40</b>	<b>Moderate</b>

weather, and stay in the waters for a couple of days. They use modern and large-scale fishing gear.

Table 6 shows the extent of good fishing practices by MPA affiliation. Between MPA and non-MPA members, the former have more likelihood of observing good fishing practices since they are more engaged in the activities, programs, and advocacies that the organization upholds. The continual engagement of the MPA members may serve as their avenue in shaping their mindset on the relevance of

they spend longer time fishing in regulated areas where illegal fishing practices are mostly recorded. As revealed in Table 3, 56% of the non-MPA members fish in the regulated MPA zones while 1.9% of MPA members. Based on the FGDs and KIIs, these poor fishing practices are observed during low-tides and closed seasons in the regulated and No-Take Zones of the MPAs.

**Enforcement Factor.** The integration measure revolves around knowledge of both MPA and LGU regulations and the

**Table 7**  
**Responses of MPA and Non-MPA Members on Enforcement Factor (Integration)**

Indicator	MPA Member n = 262		Non-MPA member 78	
	Weighted mean	Adjectival rating	Weighted mean	Adjectival rating
1. I see enforcement officers patrolling the waters in Lanuza bay regularly.	3.24	Often	3.12	Often
2. I am aware of the MPA regulations.	4.31	Always	4.12	Frequently
3. I know the close-open seasons in our MPA.	4.44	Always	4.32	Always
4. I know the boundaries set by the MPA for protections.	4.33	Always	4.41	Always
5. I know the allowed and prohibited fishing gears in our MPA.	4.67	Always	3.36	Often
6. I know the allowed amount of catch in the MPA.	4.71	Always	4.30	Always
16. Fishing Violators are really fined in our municipality.	4.66	Always	4.29	Always
7. Illegal fishing gears are confiscated once caught.	4.60	Always	4.56	Always
8. Do you know anyone who is imprisoned due to illegal fishing.	4.02	Frequently	4.24	Always
9. The fish wardens are very strict in implementing the rules.	4.30	Always	4.20	Always
<b>Mean</b>	<b>4.07</b>	<b>Frequently</b>	<b>3.71</b>	<b>Frequently</b>

conservation which may affect their behavioral patterns in fishing [28]. Since they have a bigger scale in terms of fish catch and fishing equipment, MPA members are less likely to observe fishing in the regulated areas of MPA and practice prohibited fishing. On the other hand, due to the limited capability and capacity of most of the non-MPA members, compliance, and the manner of enforcement by authority figures. Table 7 shows the responses of MPA and non-MPA members on enforcement factors (Goal Attainment). Although the respondents only often see enforcement officers patrolling the waters of Lanuza Bay regularly (weighted mean =3.2 and 3.1), MPA and Non-MPA members know that those fishing violators are fined (wm= 4.6 and 4.2), their gears are being confiscated by the authority (wm = 4.6 and 4.5), and

enforcement of such. It also includes respondents' observations on penalties for those who violated the regulations and policy. The data suggest that there is no difference between members and non-members in their knowledge,

they know some violators who were imprisoned for violating the prohibited fishing gears and practices(wm= 4.02 and 4.2). Also, both study participants 'Always' perceive that the fish wardens are very strict in implementing the rules. This implies that the respondents perceive that the MPA management is serious in its T conservation objectives and advocacies where the enforcement should be implemented to prevent harmful

fishing practices, especially in the regulated and no-take zones in the MPA's of Lanuza Bay. [29] asserts that even if fishing continues to take place in protected areas, there is not an overexploitation of marine resources. On the other hand, the annual catch seen during the times of lax enforcement in the regulated zones differs significantly. Additionally, illegal fishing is more likely to occur when fishermen believe that doing so will not prevent them from committing the crime [30], and it is also highly profitable to sell live fish obtained by cyanide fishing [31]. The total amount of illicit fishing has increased as a result of harsher regulations being imposed on it in either fishing reserves or open waters [32]. The level of awareness of study participants (MPA and Non-MPA members) is high having expressed that they are always aware of the MPA regulations (weighted mean = 4.3 and 4.1), they know the close and open seasons of the MPA (wm = 4.4 and 4.3), they know the boundaries set by the MPA for protection (w m = 4.3 and 4.4), and that the MPA is doing a good job in informing them of new policies (w m= 4.3 and 4.4) The enforcement factor in this study is Talcot Parson's Integration System. Another social system prerequisite in the attainment of social equilibrium is articulating and enforcing society's collective norms to integrate into the communal community (e.g., the legal system). The sociocultural community (for example, nation,law) performs the integration function by coordinating the many components of society. The social system relies on social control or integration mechanisms to ensure that tendencies toward deviant conduct can be regulated to the extent that deviance does not lead to dysfunctional outcomes. In a nutshell, the goal is to combine social, personality-motivational, and cultural factors so that "they are brought together in an orderly framework". Here, the MPA policies and regulations are articulated and integrated among the stakeholders, particularly among the local fishers as the mainkey players of the goal attainment. They become made aware of its parameters for fishing, the allowed fishing gear and fishing activity within the regulated zone, and the penalty and consequences of violation of such regulations. In this way, regulation is implemented to limit the behavior of the actors, especially its utilitarian tendencies- maximizing its gains. The deviant behavior, illegal fishing in the MPA context, is being limited Table 8 presents the relationship between enforcement factors and fishing practices. The enforcement factor which comprises the MPA membership, cost/barriers to fishing licenses, availability of training, awareness of MPA regulations, enforcement programs, the severity of sanctions, and assistance to fisher folks, have no significant relationship with the respondents' fishing practices. In this case, raising awareness on the importance of conservation through the establishment of MPAs, support from the LGU, education, and management, and strict enforcement of the policies and punishments are relevant in ensuring the goal of sustainability.

These are poignant factors that may influence fishing and carry out the involvement of the coastal community and their behavior towards marine resources, but the findings revealed otherwise as these do not influence the fishing practices of the fishers in Lanuza Bay.

It may be ideal that in increasing awareness about sustainable fishing and its implication of their adoption and non-adoption, training dedicated to sustainability did not translate to the fishers' actual fishing practices. Thus, suggested that long-term training and programs can be provided, including the fishers' children [33]. This result is consistent with the findings of [34] and [35] which suggest that MPA design can play an important role in fishers' compliance and that enforcement is not a requirement for high compliance. The study of [36] also finds out that the punishment mechanisms showed to be important in compliance with fishing regulations, but this does not address the most important issues. They emphasized that installing control, monitoring, and punishment alone may not be enough to ensure compliance. Fear does not ensure management success, as it will eventually fail.

On the other hand, [37] highlights the theory of compliance that emphasizes that individuals, as rational beings, are likely to maximize their utility by weighing costs and benefits. Increasing the cost of the behavior reduces the likelihood of illegal fishing. The enhanced enforcement in the municipal waters and consistent surveillance by the "bantay dagat" personnel, would lessen the occurrence of illegal fishing in MPA zones. Integrating the locals into the management system guarantees their support and co-management. According to [38] factors contributing to the upsurge include a growing perception of scarcity, the restrengthening of traditional village-based authority, and marine tenure through legal recognition and government support, better conservation education, and increasingly effective assistance, and advice from regional and national governments and NGOs.

**Table 8 Relationship between Enforcement Factor and Fishing Practices**

	Correlation Coefficient	p-value	Direction and Strength of Relation
Enforcement factor and Fishing practices	0.081	0.425	(not significant)

\* Significant at .05  
 \*\* Significant at .001

**Table 8**



**Table 9**

**MULTIPLE LINEAR REGRESSION MODEL**

(Assumptions are satisfied)

**Coefficients(a)**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.268	.271		8.383	.000
	EF	.252	.039	.320	6.418	.000
	Age	-.011	.003	-.245	-3.349	.001
	Civil_Status	-.138	.056	-.118	-2.438	.015
	Years_in_Barangay	-.007	.002	-.221	-3.560	.000
	Years_in_fishing	.006	.003	.149	1.948	.052
	Member_working	-.063	.035	-.091	-1.819	.070
	Member_workfishing	-.047	.039	-.066	-1.220	.223
	Annual_expenses	.059	.018	.152	3.326	.001

a. Dependent Variable: FP

Model:  
 $FP = 2.268 + 0.109(EF) + 0.252(IF) + 0.143(SI) - 0.011(Age) - 0.138(Civil\_Status) - 0.007(Years\_in\_Barangay) + 0.006(Years\_in\_fishing) - 0.063(Member\_working) - 0.47(member\_workfishing) + 0.059(Annual\_expenses)$

The model is constituted with variables: enforcement factor, age, years in barangay, years in fishing, the total number of members in the household working, household member, and annual expenses working as a fisher are significant factors predicting the extent of good fishing practices in the area. Moreover, these factors are directly associated with the dependent variable with B=0.293 and B=0.242, respectively. Finally, the higher the number of household members, the less likely that the respondent will perform good fishing practices with B = -0.031.

In terms of the household attributes of the respondents, the number of household members working, the number of household members working as fishers, and annual household expenses hold significant influence on the relationship between economic capability and fishing practices. All three household attributes of the respondents pertain to their economic capability

**CONCLUSION**

This study aimed to identify the factors that influence the fishing practices of fisherfolk in Lanuza Bay and by using Parson’s Social Systems Theory, the general objective of this study was to characterize the difference in fishing practices of the two study groups according to their MPA affiliation, the relationship between the enforcement factor fishing practices of fishers in Lanuza Bay, and the influence of sociodemographic profile. In terms of results, the study led to the following conclusion:

MPA members are more engaged in the MPA association based on socio-demographic profiles such as age, educational attainment, and length of stay in the barangay. They have a greater understanding of their fishing techniques, community rules and regulations, the law enforcement officers who enforce them, and coastal community activities that are considered shared values by residents.

MPA members have better standards of good fishing practices in terms of compliance with MPA regulations, non-practice of

illegal fishing, and usage of fishing gear than non-MPA members. Non-MPA members are more likely to observe ill-

fishing activities in regulated and no-take zones during low tides and closed seasons because they spend more time along the regulated zones as small-scale fishers who are only allowed to use traditional fishing methods. Both study groups differ considerably in economic capability which is eventually apparent in their fishing practices, possession, and use of fishing gear.

The most influential factors in maintaining and adapting to the sustainable fishing practices of MPA members in Marine Protected Areas in Lanuza Bay are the fishers’ age, years in the barangay, years in fishing, number of households working, number of household members working as fishers and annual expenses. This analysis is essential in achieving a balanced and sustainable livelihood and fisheries in Lanuza Bay by reducing the impact of marine resource exploitation and following appropriate fishing practices using Talcott Parsons’ view of society. Lastly, this study also reveals that the decision-making process should be coordinated among fishers, non-government organizations, and government stakeholders to promote legitimacy and long-term effectiveness in reducing destructive fishing practices.

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