

## **Socio-Economic Condition Among the Fisherfolks in Iligan Bay, Northern Mindanao, Philippines**

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### **ABSTRACT**

A one-year assessment on the fishery and reproductive dynamics of roundscads was conducted from September 2017 to October 2018 to determine the status of the fishery in Iligan Bay, including information on the socio-economic condition of the fishers in the Bay. The study used Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) conducted between September to October 2017 and secondary data to gather information on the number of fishers, type and number of boats, type of fishing methods and number of fishing gears, income, expenditure distribution, and non-fishery-based income sources as well as the fishers' perception on issues and problems affecting their catches. The Bay had an estimated 15,357 fishers across all sites from 17 municipalities and two cities based on focus group discussions. Most fishers were from the province of Misamis Occidental or representing about 74% of the entire fisher population operating in the Bay. Iligan Bay has an artisanal or subsistence type of fisheries where most fishers rely mainly on traditional methods to harvest fish resources except for the commercial fishers operating the ring net or "kubkuban". Thirty-three types of municipal fishing gears were operated in the Bay, nine of which could capture roundscads. Traditional fishing often could not provide higher revenues so that fishers, their wives and even their children had to engage in additional livelihood activities to supplement their daily earnings such as operating a sari-sari store, livestock rearing, and farming. Fishing

remained a popular and important source of livelihood for most fishing households in the bay, despite having irregular and low income from the activity which is perceived by the fishers to have been largely affected by illegal fishing practices and habitat destruction.

**Keywords:** roundscads, focus group discussion, socio-economics, Iligan Bay

## INTRODUCTION

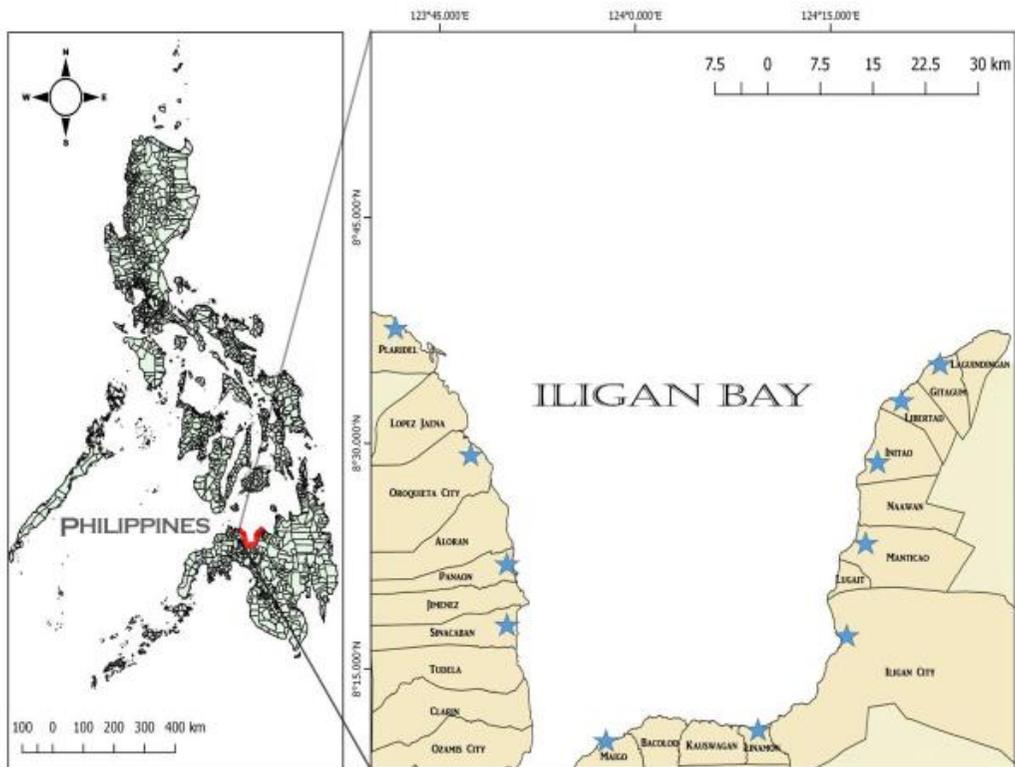
Marine fisheries are important sources of income and livelihood (Barut et al., 2004) particularly of more than a million Filipinos living in coastal areas (Luna et al., 2004; Palomares et al., 2014). What makes the sector even more popular is the contribution of fish to more than half of the animal protein in the average Filipino diet (Espejo-Hermes, 2004). In 2015, the Philippines ranked 9th among the top fish producing countries in the world making up 2.3% of the total world production of 199.7 million metric tons (Philippine Fisheries Profile, 2016) or about 4.59 million metric tons logged for the country. The most commonly consumed fish species in the Philippines are sardines, scads, milkfish, tilapia, and anchovies (Needham and Funge-Smith, 2014). However, fisheries production had declined particularly for roundscads from a total production of 183.08 thousand metric tons in 2017 to 168.15 thousand metric tons in 2018 (PSA, 2018).

There are 10 major fishing grounds in the country including Iligan Bay, which ranked 6<sup>th</sup> in terms of its total area of 1,811 ha next to Sibugay Bay in Zamboanga del Sur with 1,935 ha (PSA, 2018). Roundscads are also abundant in the Bay and a major segment of the Bay's fisheries production along with tuna, big-eyed scads, and sardines (NFRDI, 2017). Despite their economic contribution, little is known on the current status of the fishery, including the socio-economic profile of the fishing households in the Bay which is vital information for fisheries management options (FAO, 2002). Thus, an assessment of their stock, fishery, and reproductive characteristics in Iligan Bay was conducted from October 2017 to September 2018. The data on the number of fishers, types of fishing gears, types of fish caught, and income from fishing based on empirical data were helpful in illustrating the dynamics of the fishery in the Bay. With these, the project provided very important scientific information to assess and understand the status of roundscads in Iligan Bay during this period, however, other data such as the socio-economic characteristics of fishing households in Iligan Bay, and fishers' perceptions on issues and concerns affecting their catches are considered

necessary in providing a synoptic picture of the fishery. In this manner, site-specific ecosystem-based fisheries management is not merely based on the biophysical dimensions of the fishery but also understanding the present status of the economic conditions of the fishing community in the area.

## MATERIALS AND METHODS

The study conducted a series of focus group discussions (FGDs) to generate information on the socio-economic status of fishing households, particularly those involved in the roundscad fishery between September to October 2017 in 17 coastal municipalities and two cities along Iligan Bay (Fig. 1).



**Figure.1.** Map of Iligan Bay in Northern Mindanao, Philippines showing the location of the FGDs conducted between September and October 2017.

Additional information on fishing activities was solicited from key informants in each municipality/city. Secondary fishery data were requested from the concerned local government unit (LGU) to supplement the primary data collected from the focus

group discussions. Some key officials, particularly from the municipal offices, were instrumental in the successful conduct of the FGDs, particularly in arranging for the venue and identifying the participants. Fishermen, People's Organization (PO) members, and fish vendors who were mostly women took part in each FGD. Occasionally barangay officials, Municipal Fisheries and Aquatic Resource Management Council/Barangay Fisheries and Aquatic Resource Management Council (MFARMC/BFARMC) Chair, and agriculture personnel were present during the FGD.

## **RESULTS AND DISCUSSION**

A total of 495 individuals engaged in fishing activities participated in the series of FGDs in 17 municipalities and two cities across three provinces along Iligan Bay. Relevant information was also generated that would provide insights on the economic activities of fishers useful in drafting prospective fisheries management options for the Bay.

### **A. Profile on Fishing Effort**

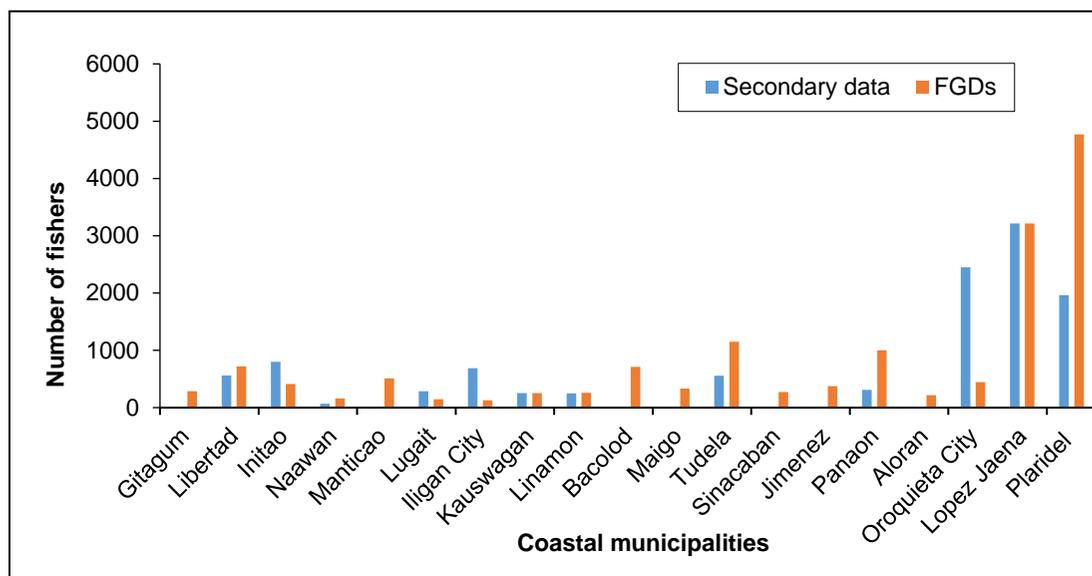
#### **Number of Fishers**

Of the 19 areas covered for the project, only 12 municipalities had data on the number of fishers in their locality. Moreover, the information generated from the FGDs and records of the Municipal Agriculture offices varied across sites (Fig. 2). A total of 15,357 fishers were provided by FGD participants across areas while only 11,399 were recorded from the offices of the municipal agriculturists. Most participants were considered municipal fishers while only very few were involved in commercial fishing.

Fishing as an occupation dominated by men is true in Iligan Bay according to the respondents, where women act as supporters to their fisher-husbands in the fish capture arena. However, their significant contribution during post capture activities like vending and in the economy of the household cannot be underrated. Moreover, the wives of fishers and their daughters also play active roles in many current coastal resource management activities in the coastal areas around Iligan Bay based on the FGDs and KIIs.

As per FGD results and from secondary data, most fishers came from the province of Misamis Occidental with the municipality of Plaridel recording the highest number (4,770) followed by Lopez Jaena (3,213). Meanwhile, the industrialized city of Iligan recorded the lowest number of fishers at 125. Fishing has become a popular

activity or livelihood option among coastal communities in Iligan Bay considering the growing number of fishers. For example, only 712 fishers have been reported in 2009 in the municipality of Lopez Jaena (De Guzman et al., 2009), 1,236 fishers in Plaridel (MSUN-FSTDI, 2011) and 388 from 375 fishers in Jimenez, Misamis Occidental in 2007 (De Guzman et al., 2007).



**Figure 2.** The number of fishers in the coastal municipalities and cities along Iligan Bay based on secondary data and FGD output between September to October 2017.

### Number and Types of Fishing Boats

Data on fishing boats secured from the offices of the municipal agriculturist and those from the FGDs showed some inconsistencies as to the number and types. There were about 6,809 fishing boats identified by FGD participants in the 16 coastal municipalities and two cities along Iligan Bay in which 69% was classified as motorized and the remaining 31% as non-motorized. This figure was higher compared to the data from the Municipal Agriculture Offices (Table 1). The municipality of Plaridel, Misamis Occidental had the highest number of fishing boats recorded at 1,650 while Bacolod, Lanao del Norte, had the fewest at 42.

**Table 1.** The number of motorized and non-motorized boats operated by fishers in Iligan Bay.

Municipality	FGD		MAO	
	Non-motorized	Motorized	Non-Motorized	Motorized
Aloran	51	156	-	-
Bacolod	12	30	149	113
Gitagum	76	94	-	-
Iligan City	35	66	273	348
Initao	13	179	50	224
Jimenez	250	450	-	-
Kauswagan	105	151	105	151
Libertad	35	685	-	-
Linamon	81	92	80	64
Lopez Jaena	319	332	319	332
Lugait	36	70	36	70
Maigo	94	183	-	-
Manticao	130	410	-	-
Naawan	28	115	25	170
Oroquieta City	51	285	51	285
Panaon	44	98	74	95
Plaridel	535	1,115	406	815
Sinacaban	77	148	-	-
Tudela	105	73	34	171
<b>Sub-total</b>	<b>2,077</b>	<b>4,732</b>	<b>1,602</b>	<b>2,838</b>
<b>Total</b>		<b>6,809</b>		<b>4,440</b>

### Fishing Gears and Methods

There were thirty-four (34) fishing gears and methods operating in Iligan Bay were identified, which include the more common reef gleaning activity as revealed by FGD participants (Table 2). The ring net or “kubkuban”, classified as commercial gear, operated along with the 33 municipal fishing gears. The same number of municipal gear types was also recorded in a study conducted in Iligan Bay in 1986 (Abrea et al., 1986). The ring net which was recorded only in selected areas particularly in Libertad, Initao, and Manticao, Misamis Oriental, and also in Oroquieta City and Plaridel, Misamis Occidental could catch roundscads in substantial volumes. This is not surprising given the extensive area accessed by fishing vessels of this type, other than

their efficiency provided by a large crew of around 45 members. This type of fishing gear is also very efficient in catching target fishes, particularly the larger representatives of the tuna family (Smith et al., 1980) which command higher market prices as compared to small-sized fishes.

Of the municipal gears, only the following could include roundscads in their catches: bottom set gillnet (BSGN1-pukot palugdang); bottom set gillnet (BSGN2-pukot pangbugsawan); drift gillnet (DGN1-pukot palutaw/ pukot paanod/palaran); encircling gillnet (EGN-likos/kayagkag); set gillnet (SGN1-kagolgol); multiple handline (MHL1-bundak-bundak/bira-bira); multiple handline (MHL2-lampurnas); simple handline (SHL1-pasol); and bottom set longline (BSLL-parangli/palangri) (Table 2). The multiple handline or bundak-bundak was the most commonly used.

The significant number of gear types recorded during the survey indicates the Filipino fishermen's innovativeness and ingenuity to load up their fishing baskets as well as their pockets. FGD participants intimated the use of illegal fishing methods i.e. dynamite fishing, use of super light or magic light, and use of fine mesh nets by some fishers to increase their catches despite regulations and enforcement of fishery laws in their area. An option such as this, no matter how unlawful, is probably a way for fishers to recover their investment from a day's poor catch.

## **B. Economic Profile**

### **Catch and Income from Fishing**

Among the nine identified fishing gears that could catch roundscads, the ring net or "kubkuban" could obtain a mean catch per trip of 3,097.50 kgs, but the volume of the catch could range from 100 to 6,000 kgs/trip. In contrast, catches from municipal fishing gears ranged only from 9.47 to 59.23 kgs/trip, with the encircling gillnet (likos/kayagkag) and bottom set gillnet (pukot-palugdang) catching the highest and the lowest catches, respectively (Table 3). During peak season, however, catches from these gears could reach up to 20 to 100 kgs/trip- which fishers called "jackpot". Most fishers sold a large fraction of their catch to "compradors" or whoever had the highest bid or if not, the housewives retailed their catches. Only a small percentage of the catch (0-10%) went to the household, showing their need to augment the family's meager income from a day's fishing activity.

**Table 2.** Classification and estimated counts of gears used in Iligan Bay based on FGDs conducted between September to October 2017.

Categories	Gear representatives	Code	Local Name	Total Gear Units
1. Hand instruments	1. Spear Fishing (daytime)	SF	Pamana/pana	1004
	2. Handpicking/ gleaning		Panginhas	67
2. Entangling Nets	1. Bottom Set Gillnet	BSGN1	Pukot palugdang	963
	2. Bottom Set Gillnet	BSGN2	Pukot pangbugsawan	No data
	3. Bottom Set Gillnet	BSGN3	Pukot pangdiwit	No data
	4. Drift Gillnet	DGN1	Pukot palutaw/ Pukot Paanod/ Palaran	614
	5. Drift Gillnet for anchovies	DGN2	Pangbolinao	423
	6. Drift Gillnet	DGN3	Pangmalangsi	18
	7. Encircling Gillnet	EGN	Likos/kayagkag	18
	8. Scoop net	SN	Sigpaw	6
	9. Set Gillnet	SGN1	Kagolgol	185
	10. Set Gillnet	SGN2	Pataw-pataw	20
3. Lift Nets	1. Bag Net	BN	Basnig/Tapay	27
	2. Cast net	CN	Laya	No data
	3. Crab Lift Net	CLN	Panggal	5
	4. Stationary Lift Net	SLN	Floating Newlook	14
4. Handlines	1. Multiple Handline	MHL1	Bundak-bundak/bira-bira	3720
	2. Multiple Handline	MHL2	Lampurnas	1062
	3. Multiple Handline	MHL3	Lapris	232
	4. Multiple Handline	MHL4	Pinan-an	140
	5. Multiple Handline	MHL5	Palagdas	16
	6. Simple Handline	SHL1	Pasol	150
	7. Simple Handline	SHL2	Pamalo	17
	8. Simple Handline	SHL3	Pangtiryra-tiryra	232
	9. Troll Line	TL	Subid	1390
	10. Tuna Troll Line	TTL	Bahan	30
	11. Jigger	JGR	Aranyas/pamundo/ilad (ulang-ulang)	3258
5. Long Lines	1. Bottom Set Longline	BSLL	Parangli/Palangri	884
	2. Tuna Longline	TLL	Pahawin	176
6. Pull or drag nets	1. Beach Seine	BS	Baling	80
	2. Modified Seine		Sahid-sahid	No data
7. Surrounding Nets	1. Ring Net	RN	Kubkuban -commercial	44
8. Set impounding nets	1. Fish Corral	FC	Bungsod/paugmad	74
9. Traps	1. Fish Pot	FP	Bubo/Panggal	201

Among municipal fishers, both the boat operator and crew equally shared the day's proceeds which are quite fair as compared to commercial fishing vessels whereby 50% went to the boat owner or the operator and 25% each to the boat captain and its crew. This owner-crew sharing scheme effected among commercial fishers would imply that the more crew the fishing vessel has, the less bulky is the fisher's pocket. Based on this scheme, a mean estimated amount of PHP 7, 994.94 is handed to each crew per fishing trip. This value is quite big for one fishing trip but earnings are not computed on a daily or monthly basis. For instance, some fishers earn this much only once a month or in two months.

Ownership of a fishing boat or vessel provided a greater advantage to fishers as compared to having none at all. The net daily income would be relatively bigger if the boat was owned by the fisherman and not rented while fishing was done by one person such as in hook and line (PHP 730.00/fisher/day). The lack of fishing vessels and gears incidentally was also reported as a major problem in earlier studies conducted by Herrin et al. (1978) cited in Smith et al. (1980).

Cost of fishing varied among fishers which could be lower for those using non-motorized boats (bancas) as compared to those using motorized boats which ranged from PHP 180.00 to PHP 1,181.54.00/trip since much of the total fishing cost involved fuel expenses. Larger fishing vessels with more tonnage, like ring nets, had higher operational costs incurring about PHP 10,125.00 to PHP 15,000.00/trip. Repair and maintenance also involved an enormous amount of money for boat owners.

As shown in Table 3, a paltry income from fishing using the multiple handline 1 amounted only to PHP 222.19 and the bottom set gillnet at PHP 288.55 per fisher/trip, using a motorized boat. Some FGD participants declared that they also obtained negative income from using these fishing gears on few down income days when the catch was very minimal or when the cost of fishing was more than their revenues from a day's fishing. However, on few occasions when fishers could bring home as much as PHP 2,000.00 to PHP 3,000.00, using the same gears, could overturn the down income days.

### **Non-fishery-based income sources**

Income primarily derived from fishing can be irregular, especially during poor weather or when catches comprising fish species of low commercial value. To compensate for the insufficient income, fishermen and members of their households

engaged themselves in other income-generating activities. Some fishers involved themselves in two or more non-fishery based livelihood activities.

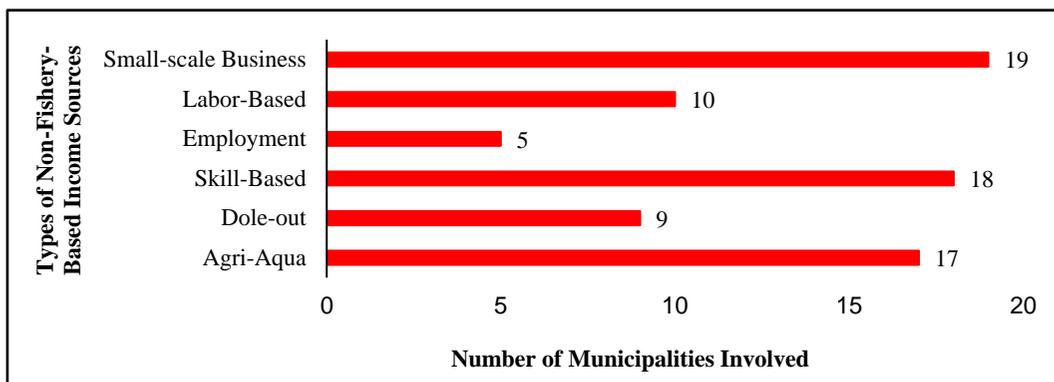
**Table 3.** Estimates of catch per trip and income from fishing using various gears in the coastal municipalities and cities along Iligan Bay based on FGDs conducted between September to October 2017.

Fishing Gear	Local name	Crew size	Mean catch per trip (kg)	Mean Gross Income/Trip (pesos)	Mean Cost/Trip (pesos)	Mean net income/trip (pesos)	Net income (pesos/fish /trip)
<b>Commercial</b>							
1. Ring net	kubkuban/lantsa	45	3,097.50	369,897.50	10,125.00	359,772.50	7,994.94
<b>Municipal</b>							
2. Bagnet	basnig/tapay	3	29.88	2,595.00	180.00	2,415.00	805.00
3. Bottom set gill net	pukot palugdang	3	9.47	1,008.38	142.73	865.65	288.55
4. Bottom set longline	Parangli/ palangri	3	13.54	1,583.41	557.32	1,026.10	342.03
5. Drift gill net1	pukot palutaw	2	27.80	2,290.15	376.82	1,913.33	956.67
6. Encircling gill net	likos/kayagkag	11	59.23	5,446.54	1,181.54	4,265.00	387.73
7. Multiple handline1	bundak/bira-bira	3	10.64	951.32	284.74	666.58	222.19
8. Multiple handline2	lampurnas	2	14.77	1,394.09	290.91	1,103.18	551.59
9. Simple handline	pasol	1	10.00	1,080.00	350.00	730.00	730.00
10. Troll longline	subid	2	16.67	1,663.33	465.56	1,197.78	598.89

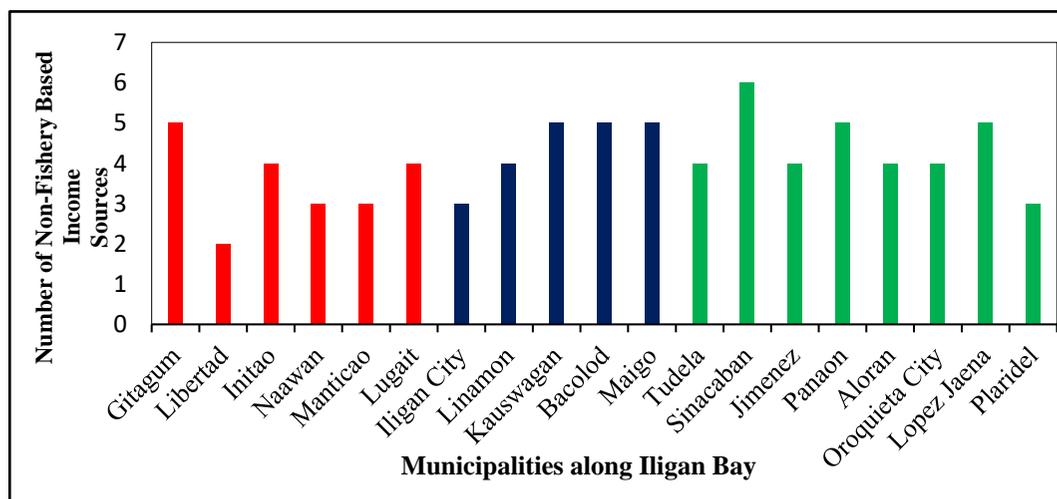
The three most common types of non-fishery-based income sources of households along Iligan Bay included small-scale businesses, skill-based income sources, and agri-aqua income sources (Fig. 3). Most fishers and either their wives or children engaged themselves in small-scale business such as operating a sari-sari store, cooking and selling food products. Carpentry, haircutting, and massaging were the most common skill-based activities of some fishers while others were into livestock raising and farming. Other types of non-fishery-based income sources were labor-based activities like construction labor, coconut husking, and coconut-meat shelling.

As to dole out, some households partly depended on financial support from their relatives working abroad or from government subsidies such as the 4Ps Program.

There were only a few fishing households working in both public and private agencies, particularly those requiring educational background and political influence, as in cases of elected positions. Among coastal communities, fishing households in Sinacaban, Misamis Occidental had the highest number of non-fishery-based income sources while those in Libertad, Misamis Oriental had the lowest number based on the six listed categories below (Fig. 4).



**Figure 3.** The number of municipalities along Iligan Bay involved in the different types of non-fishery-based income sources.



**Figure 4.** The number of non-fishery-based income sources in the different municipalities along Iligan Bay.

The diversity of non-fishery-based income sources in municipalities along Iligan Bay implies the degree of hardship and economic struggle of households to meet their needs. For instance, fishers usually opt for fewer income sources if their financial needs are met but look for more engagements to address their needs that cannot be

provided by relying on income from fishing, especially for big households composed of seven or nine children. The least diverse non-fishery-based income sources observed in Libertad, Misamis Oriental probably indicate either that income from fishing sufficiently supports the fishing households or that they lack financial support and/or opportunities to start an alternative livelihood.

### ***Distribution of Household Expenditures***

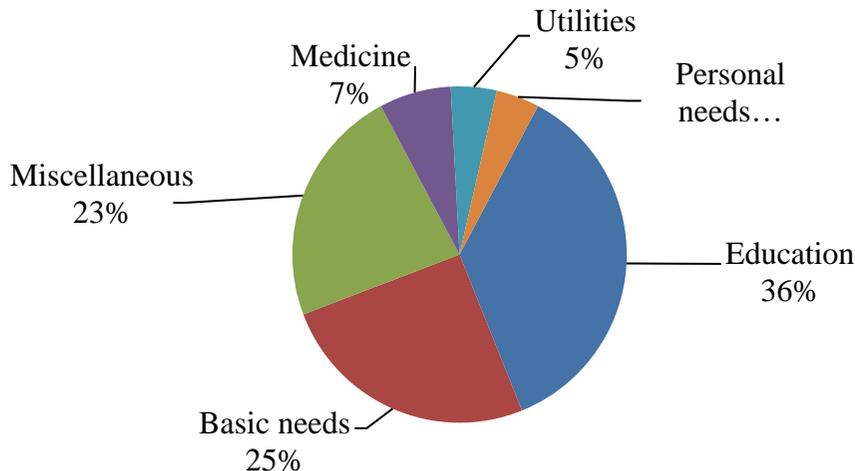
Despite a meager income from fishing, FGD participants averred that their children's education was of primary consideration and took the largest fraction (36%) of the household monthly expenditure (Fig. 5). Household expenses were also higher for their basic needs such as food and clothing with a monthly budgetary allocation of 25%. Cellphone loads and loan payments took a portion of the fishers' income at 23%. Personal needs such as soap and other hygiene paraphernalia and household utilities such as electric and water bills had the least monthly budgetary allocation of only 4% and 5%, respectively. On top of the monthly expenditures, FGD participants also valued commemorating special occasions like birthdays, annual fiestas, Christmas, and New Year's Day. Some spent beyond their means while others rejoined that a plate of pancit signifying "long life" would do to celebrate the birthday of a loved one.

Income and expenditure are critical for households whose heads are fishers with low income as poverty incidence is relatively high in these households (Israel, 2004). In the present study, fishers showed dissatisfaction with their low income despite some government interventions such as the establishment of marine protected areas devised to augment their catches. Earnings from fishing are not sufficient for their household needs, especially that they spend a greater portion on their children's education, which is a primary consideration.

### **C. Issues and Concerns**

Iligan Bay is an important fishing ground in the western part of Northern Mindanao. Its relatively vast fishing ground caters to a wide range of goods and services and quite a large number of resource users with diverse cultural values and perceptions. Often there is prejudice towards meeting one's wants more than careful regard on the effects of his/her actions. Accordingly, one undeniable truth about living in a limited environment is that once limits are reached or if fishing effort is beyond the natural capacity of the natural system to replenish itself then fish catch tapers off

(Townsend, 2004), and eventually declines much more if environmental stressors are anthropogenic in nature as the case in Iligan Bay.



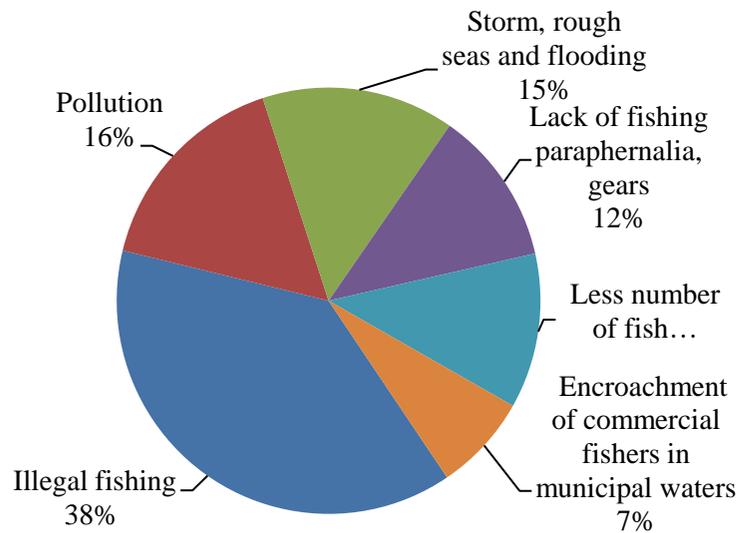
**Figure 5.** Distribution of the estimated monthly household expenses of municipal fishers in the coastal areas of Iligan City as disclosed during the Focus Group Discussions.

FGD participants coming from the different coastal areas along Iligan Bay identified several issues that they perceived to have affected their main source of livelihood. These can be categorized into three namely, institutional, environmental/biophysical, and socio-economic (Table 4.). Based on the number of respondents, illegal fishing in several forms recorded the largest percentage with 38% followed by pollution such as those coming from domestic wastes at 16% (Fig. 6). Israel (2004) stated that destruction of critical habitats like mangroves and coral reefs affect fish catch and, fisheries management more difficult (Palomares et al., 2014).

The issues identified in the present study were also identified in previous studies conducted in selected areas along Iligan Bay particularly in Jimenez, Misamis Occidental as reported by de Guzman et al. (2007) and in the Misamis Occidental side of the Bay covering the northern municipality of Plaridel down to the southern town of Tudela as described in Garces et al. (2013) as well as in the neighboring waters of Panguil Bay (MSUN-FSTDI, 2006).

**Table 4.** List of issues and concerns affecting fishermen in Iligan Bay based on FGDs conducted between October to December 2017.

<b>Classification/category</b>	<b>Specific issue and concern</b>
Institutional	<ol style="list-style-type: none"> <li>1. Illegal fishing <ul style="list-style-type: none"> <li>• Use of 2-ply and 3-ply nets</li> <li>• Use of Compressor</li> <li>• Use of fine-meshed nets</li> <li>• Dynamite fishing</li> <li>• Use of superlight</li> <li>• Trawl fishing</li> <li>• Use of poison</li> <li>• Use of “kubkub” or “kagulkol”</li> </ul> </li> <li>2. encroachment of commercial fishers in municipal waters</li> <li>3. encroachment of fishers from other areas</li> <li>4. Fishing inside MPA</li> <li>5. Lack of financial assistance to start alternative livelihood</li> <li>6. Dispute in beach ownership hence fishers have no mooring areas</li> <li>7. No municipal water zonation</li> <li>8. Size of MPA is too big</li> </ol>
Environmental/bio-physical	<ol style="list-style-type: none"> <li>1. Pollution <ul style="list-style-type: none"> <li>• Improper waste disposal</li> <li>• Oil spill</li> <li>• Domestic waste</li> <li>• Effluents from agriculture/rice fields</li> </ul> </li> <li>2. Storm, rough seas and flooding</li> <li>3. Habitat degradation <ul style="list-style-type: none"> <li>• Seagrass bed destruction</li> <li>• Mangrove cutting</li> </ul> </li> <li>4. Fishkill</li> </ol>
Socio-economic	<ol style="list-style-type: none"> <li>1. Lack of fishing paraphernalia, gears</li> <li>2. Less number of fish caught</li> <li>3. Small sizes of fish caught</li> <li>4. Lack of capital</li> <li>5. Low market prices of fish</li> <li>6. Too many fishers</li> <li>7. Insufficient supply of ice</li> </ol>



**Figure 6.** Distribution of major issues and concerns identified by municipal fishers along Iligan Bay during the focus group discussions.

## CONCLUSION AND RECOMMENDATIONS

The information generated from the survey provided awareness into the current status of the economic conditions of fishers in Iligan Bay. Based on the survey, income from fishing is unpredictable and insufficient to support the financial needs of most fishing households, except for those involved in commercial fishing, compelling fishers to engage in a variety of alternative means of livelihood especially during off-fishing seasons.

The problems mentioned by fisher participants during the FGDs and those from previous studies are recurrent issues that have something to do with human behavior and on the manner of law enforcement by concerned agencies. Hence, stringent enforcement of fishery laws is suggested to ensure sustainable and improved fishery production in Iligan Bay. The problem with the lack of start-up capital for alternative livelihood and problems resulting from legal implications as in disputes in beach ownership and area of MPAs are development challenges involving many sectors of the community. There is perhaps a need for local government units and concerned stakeholders to review and update the status of their fishery resources to evaluate the impacts of interventions and other activities.

While the foregoing data are mostly descriptive, these provide insights into several socio-economic indicators of fishing households across Iligan Bay, which are important considerations in its prospective fisheries management options.

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