

Sustainability of Municipal Fisheries Resources of the Coastal Municipality of Infanta, Pangasinan, Philippines

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Abstract - *Infanta is one of the coastal municipalities of the province of Pangasinan located along the West Philippine Sea. It has seven coastal barangays of Cato, Poblacion, Nayom, Atel-Batang, Bayambang, Maya and fatima, and 6 non-coastal barangays of Bamban, Nangalisan, Potol, Doliman, Babuyan and Pita. The sustainability of the municipal fisheries resources of Infanta was studied by conducting a survey on the socio-demographic and socio-economic profile of the 201 municipal fisherfolks, the types of fishing gears and fishing boats used, and the species of fish caught.*

Results showed that most of them (88%) had a monthly household income of less than ₱5,000.00, and had 1 to 30 years of fishing experience while 12% had longer years of fishing experience which ranged from 31 to 55 years. They spent 1 to 9 hours of fishing in the municipal waters and spent one week of fishing operation outside the municipal waters.

Hook and lines were the most commonly used fishing gears which can be simple, multiple or modified hooks and lines. Others used seine net, gill net scoop net, bottom set net and spear gun. Almost all of the respondents (93.03%) used motorized boat in fishing.

The most common species of fish caught in the municipal waters of Infanta include frigate tuna and oceanic trigger fish, while yellowfin tuna, skipjack tuna, big-eyed tuna, dolphin fish and Spanish mackerel were the species caught outside the municipal waters. Squid was also a part of their catch for they used squid lure in fishing.

Keywords: *Municipal fisheries, municipal fisherfolks, socio-demographic, socio-economic, municipal fishing gears,*

INTRODUCTION

Infanta is one of the coastal municipalities located along the West Philippine Sea. It is divided into 13 barangays broken down into seven coastal barangays of Cato, Poblacion, Nayom, Atel-Batang, Bayambang, Maya and Fatima, and 6 non-coastal barangays of Bamban, Nangalisan, Potol, Doliman, Babuyan and Pita. Geographically, it is bounded on the north by the Bayambang River, on the east by the Zambales mountains, on the south by Nayom River and on the west by the West Philippine Sea. It has a total area of 240 square miles.

As a coastal municipality, it is endowed with rich coastal and marine resources that provide income and livelihood to the fisherfolks and other members of the community. Hence, there is a need to assess these natural resources to find out their existing conditions for proper management and utilization. The study was then conducted to determine the socio-demographic and socio-economic profile of the fisher folks in Infanta, Pangasinan; determine the fisheries resources of the coastal municipality of Infanta which is categorized into fishing gears and fishing boats owned by the fisher folks, species composition of fish catch by the fisher folks, and volume of fish catch by the fisher folks.

MATERIALS AND METHODS

A descriptive-survey method of research was used in the study to describe the existing condition of coastal and fisheries resources of the municipality of Infanta, Pangasinan and describe the practices employed to maintain the sustainability of the municipality's fisheries resources.

A total of 201 fisher folks from the seven coastal barangays of Cato, Poblacion, Nayom, Atel-Batang, Bayambang, Maya and Fatima in the municipality of Infanta, Pangasinan were personally interviewed with

the aid of a survey questionnaire on their socio-demographic and socio-economic profile, the status of their coastal and fisheries resources to include fishing gears and fishing boats, the species composition of their fish catch, and the volume of their fish catch. The identification and classification of fish species commonly caught by the fisher folks was done using books on fishes [1]-[4]. Their management practices were also surveyed to determine how they managed to maintain the sustainability of the municipal fisheries resources.

All responses of the respondents were tallied, tabulated and analyzed using descriptive statistics such as frequencies and percentages.

RESULTS AND DISCUSSION

Table 1. Socio-Demographic Profile of fisherfolks of Infanta, Pangasinan

	Variable	Total Frequency	(%)
Sex	Male	201	100
	Female	-	-
Age Bracket	16 to 20	7	3.48
	21 to 25	20	9.95
	26 to 30	30	14.93
	31 to 35	30	14.93
	36 to 40	22	10.94
	41 to 45	16	7.96
	46 to 50	30	14.93
	51 to 55	22	10.94
	56 to 60	16	7.96
	61 to 65	5	2.49
Civil Status	66 to 70	3	1.49
	Single	53	26.37
	Married	144	71.64
No. of Household Members	Widowed	4	1.99
	1 to 3	54	26.87
	4 to 6	102	50.75
	7 to 9	36	17.91
	10 to 12	6	2.98
Religious Affiliation	15 to 17	3	1.49
	Roman Catholic	145	72.14
	Mormon's Church	1	0.50
	Protestant Church	1	0.50
	<i>Iglesia ni Cristo</i>	30	14.92
	Baptist Church	18	8.95
	Church of Christ	6	2.99

Of the 201 surveyed fisherfolks (Table 1) of Infanta, Pangasinan, all of them (100%) are males which shows that only the males are involved in fishing. Table 1 also shows that the youngest fisherfolks in Infanta belong to the age bracket of 16 to 20 while the oldest fisherfolks belong to the age

bracket of 66 to 70 years. The computed average age of the fisherfolks is 39.77 years.

In terms of civil status, result shows that 71.64% of the fisherfolks are married while only 26.37% are single and 1.99% are widowed. Fifty percent of the fisherfolks had 4 to 6 number of household members. The average number of household members is 5.

Result also shows that the fisherfolks of Infanta, Pangasinan are mostly members of the Roman Catholic Church with percentage value of 72.14%. Some of them are members of other churches such as "Iglesia ni Cristo", Baptist Church, Mormon's Church, Protestant Church, and Church of Christ, Inc. (CCI).

Table 2. Socio-Economic Profile of fisherfolks of Infanta, Pangasinan(N=201)

Variable	Total Frequency	%
Educational Attainment		
Vocational	4	1.99
Elementary Undergraduate	29	14.43
Elementary Graduate	51	25.37
High School Undergraduate	30	14.93
High School Graduate	77	38.31
College Undergraduate	7	3.48
College Graduate	3	1.49
Monthly Family Income		
PhP 999.00 and below	47	23.38
PhP1,000 – PhP1,999.00	37	18.41
PhP2,000 – PhP2,999.00	40	19.90
PhP3,000 – PhP3,999.00	27	13.43
PhP4,000 – PhP4,999.00	15	7.46
PhP5,000 – PhP5,999.00	6	2.99
PhP6,000 – PhP6,999.00	1	0.50
PhP7,000 – PhP7,999.00	1	0.50
PhP8,000 – PhP8,999.00	6	2.98
PhP9,000 – PhP9,999.00	19	9.45
PhP10,000 – and above	2	1.00
Other Sources of Income		
Contract Labor	7	3.48
Poultry Raising	14	6.96
Carpentry	1	0.50
Small-Scale Store	4	1.99
Vending	7	3.48
Rice Farming	6	2.98
Shellcraft/ HandyCraft	8	3.98
Government Employee	1	0.50
Mining	1	0.50
Salt maker	2	1.00
Pedicab driver	9	4.48
Plastic merchants	5	2.49
None	136	-

Table 2 shows that most of the fisherfolks had low educational attainment. A percentage value of 38.31% are high school graduates and 14.93% are high school undergraduates), while 25.37% are elementary graduates and 14.43% elementary undergraduates. Result in Table 2 also shows that the fisherfolks of Infanta, Pangasinan had low monthly family income which ranged from PhP1,000.00 to PhP 5,000.00.

Survey result also shows that in addition to fishing, they also engaged in different income generating activities such as poultry raising, vending, rice farming, salt making, contract labor, and as pedicab drivers.

Table 3. Fishing Experiences of fisherfolks in Infanta, Pangasinan (N=201)

Variable	f	%
No. of Years of Fishing Experience		
1 to 5	35	17.41
6 to 10	28	13.93
11 to 15	28	13.93
16 to 20	46	22.88
21 to 25	14	6.97
26 to 30	26	12.93
31 to 35	9	4.48
36 to 40	11	5.47
41 to 45	2	1.00
46 to 50	1	0.50
51 to 55	1	0.50
No. of Fishing Hours		
1 to 3 hours	9	4.48
4 to 6 hours	36	17.91
7 to 9 hours	89	44.28
1 day to 6 days	43	21.39
1 week	24	11.94
Frequency of Fishing Operation		
daily	132	65.67
twice a week	11	5.47
thrice a week	17	8.46
Once a month	8	3.98
twice a month	12	5.97
thrice a month	14	6.97
4 time a month	7	3.48

Result in Table 3 shows that the 88% of the fisherfolks had 1 to 30 years of fishing experience while the other 12% had longer years of fishing experience which ranged from 31 to 55 years. The fisherfolks spent 1 to 9 hours in fishing along the coastal areas of Infanta but those who were fishing outside the municipal waters, they usually spent 1 week of fishing operation. The frequency of fishing operation was daily for those who are near the coastal areas, but for those who went fishing outside the

municipal waters, fishing was done only 4 times in a month.

Table 4. Types of Fishing Gears and fishing vessels Used by the Fisherfolks (N=201)

Variable	f	%
Types of Fishing Gears Used*		
Hook and Line	39	19.40
Spear Gun	9	4.48
Gill Net	35	17.41
Simple Hand line	17	8.46
Multiple Hook & line	15	7.46
Modified Hook & line	43	21.39
Seine net	53	26.37
Scoop net	1	0.50
Bottom Set net	4	1.99
Kiw-kiw (squid lure)	11	5.47
Sayosdud (Scissor net)	3	1.49
Types of Boat Owned*		
Motorized Boat	187	93.03
Non-Motorized Boat	7	3.48
None	9	4.48

* Multiple Response

Table 4 also shows that almost all of the respondents are using motorized boat in fishing. Only very few used non-motorized boats. The fisherfolks used 11 kinds of fishing gears (Table 4). The most common fishing gears they used were Hook and Lines which can be simple, multiple or modified hooks and lines. Others used seine net, gill net scoop net, bottom set net and spear gun. Zaragoza et al. (2004) noted that there is a variety of fishing gears used to catch tuna. They mentioned that the municipal fisheries employ a wider variety of fishing gears such as hook and line, gillnet, ringnet, troll line, purse seine, longline, beach seine, fish corral and other gears.

Table 5. Fish Species Caught by the Fisherfolks.

Fish Species	Volume of Catch	Price/Kg
Yellowfin Tuna (<i>Thunnus albacares</i>)	2,190	PhP 85.5
Big-Eyed Tuna (<i>Thunnus obesus</i>)	835	PhP 78.5
Skipjack Tuna (<i>Katsuwonus pelamis</i>)	1,291	PhP 67.00
Eastern little tuna (<i>Euthynnus affinis</i>)	1,107	PhP 61.50
Dolphin fish (<i>Coryphaena hippurus</i>)	501	PhP 63.50
Spanish mackerel (<i>Scomberomorus commerson</i>)	158	PhP 113.00
Frigate tuna (<i>Auxis thazard</i>)	20	PhP 60.00
Oceanic trigger fish (<i>Canthidermis maculate</i>)	6	PhP 40.00
Squid	251	PhP 58.00

Table 5 shows that Yellowfin tuna (*Thunnus albacares*) are the most common species of fish caught by the fisherfolks, followed by skipjack tuna (*Katsuwonus pelamis*), Eastern little tuna (*Euthynnus affinis*), big-eyed tuna (*Thunnus obesus*), Dolphin fish (*Coryphaena hippurus*), Spanish mackerel (*Scomberomorus commerson*), Frigate tuna (*Auxis thazard*) and Oceanic trigger fish (*Canthidermis maculate*). Squid was also a part of their catch for they used squid lure in fishing.

The yellowfin tuna comprised the highest volume of catch by the fisherfolks in the coastal waters of Infanta, Pangasinan. Aguila et al. [5] reported that yellowfin tuna (*Thunnus albacares* (Bonnaterre, 1788) covers majority of the Philippines' tuna catch and is one of the major fisheries resources in the country. Hence, there is a need for sustainable management of these tunas to prevent stock depletion.

Result revealed that the coastal waters of Infanta, Pangasinan are productive fishing ground for tunas in Western Pangasinan. Zaragoza et al. [6] stated that tunas are caught throughout Philippine waters but the most productive fishing grounds are the Sulu Sea, Moro Gulf and waters extending to the north of Celebes Sea. However, viable tuna fisheries also exist in waters off Western Negros, as well as Northwestern and Southern Luzon.

Table 6. Management Intervention of the municipal government of Infanta, Pangasinan to sustain its municipal fisheries resources

Management Practices and Intervention	f	%
1. Stop charcoal making along the coastal area	201	100.00
2. Continuous Mangrove Reforestations	200	99.50
3. Strict Enforcement of Fishery Laws and Ordinances	195	97.01
4. Coastal Clean up	190	94.53
5. Information, Education and Communication (IEC) program in Coastal Resource Management	185	92.04

Several management practices and interventions implemented by the municipal government of Infanta, Pangasinan were identified by the fisherfolks that contribute to the sustainability of coastal and fisheries of the municipality which include the enactment of fishery ordinance to stop charcoal making along the coastal area, continuous mangrove reforestations, strict implementation of fishery laws and ordinance, coastal clean-up and implementation of Information,

Education and Communication (IEC) program in Coastal Resource Management.

Charcoal making is one of the sources of income of some fisherfolks which involved the cutting of mangroves and other trees. This activity was prohibited by the municipal government because of the bad effects to the coastal areas like soil erosion and deterioration of water quality of the river water with direct connection to the sea. White and De Leon [7] reported that cutting of mangroves for fuelwood, charcoal making and construction is the second most pervasive intrusion of mangrove resource. They mentioned that the demand of these products leads to illegal cutting, overharvesting and subsequent degradation of the habitat and ecosystem which in turn contributes to the decline of nearshore fisheries. The implementation of "No or Stop Charcoal making" in the locality of Infanta had resulted to the improvement of the water condition of the coastal waters of the municipality and there is great reduction of cases in the illegal cutting of mangroves.

There is also continuous mangrove reforestation activities in the municipality of Infanta, Pangasinan with the full support of the provincial government of Pangasinan by providing saplings for mangrove planting and reforestation. White and De Leon [7] stated new policies that support sustainable use and management of mangroves such as prioritization must be given to saving and managing existing forest and habitat; the participation, will and capacity of individuals and groups in the community must be strengthened to protect and use the resource wisely.

The enforcement of fishery laws and ordinances was also identified by the fisherfolks as one effective way of managing the fisheries resources of Infanta, Pangasinan. Guidote (2004) recommended that training and continuing education of fisheries law enforcers must be done. He mentioned that the growing sophistication of the modus operandi and instruments used by violators at times outdate the skills and knowledge of law enforcers to detect and stop them.

Coastal clean-up had already a regular activity of the municipality involving the participation of the fisherfolks and other stakeholders and even students. This activity contributed to the improvement of water quality condition of the coastal waters of Infanta, Pangasinan. McGlone et al. (2004) stated that marine water quality or the observed intrinsic characteristics of marine waters affecting their ability to support life or facilitate biological processes has been linked to

problems such as eutrophication, contaminants and harmful algal blooms.

The fisherfolks identified the implementation of the Information, Education and Communication (IEC) of the Coastal Resource Management Program of the municipality of Infanta as one of the most effective tools in creating awareness in effective management and protection of the municipal fisheries resources. IEC programs include the dissemination of information on the economic and ecological importance of coastal habitats such as mangroves, seagrasses and corals such as flyers or brochures, putting up of signages along coastal roads and conduct of training-seminars and capability building among fisherfolks and other stakeholders. According to DENR, BFAR, DA and DILG [9], IEC is a process through which information is imparted to the public to increase their awareness, understanding and appreciation of the coastal environment and its importance and this process is designed to create an environment conducive to the transformation of social norms, a crucial step toward changing individual behaviour in favor of the objectives of Coastal Resources Management (CRM).

CONCLUSION

Based on the findings of the study, the fisherfolks who are engaged mainly in fishing activities in the coastal municipality of Infanta, Pangasinan are all males with an average age of 40 years, most of them are married having 5 average number of household members, have low educational attainment and low socio-economic condition. The fisherfolks have long years of experience in fishing using their motorized boats and fishing gears such as hook and lines, seine nets, gillnets and spear guns.

The yellowfin tuna, Skipjack tuna, Eastern little tuna, Big-eyed tuna and Dolphin fish are the top five most commonly caught fish species in the coastal waters of Infanta, Pangasinan with yellowfin tuna formed the bulk of the fish catch of the fisherfolks.

The sustainability of the municipality's fisheries resources is being maintained by employing five management practices and intervention such as the enactment of fishery ordinance to stop charcoal making along the coastal area, continuous mangrove reforestations, strict implementation of fishery laws and ordinance, coastal clean-up and implementation of Information, Education and Communication (IEC) program in Coastal Resource Management. Continuous assessment of coastal habitats such as mangroves, seagrasses, and corals must be done

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