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RESEARCH REPORT

No. 2009-RR5

Evaluation of Fisheries Management Options for the Visayan Sea, Philippines: The Case of Northern Iloilo

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This EEPSEA study from the Philippines assesses a number of potential management options that could help protect biodiversity in the Visayan Sea and help its fishing communities to earn a better living. The Visayan Sea is one of the most important and threatened marine areas in the Philippines. It is a source of income and food for thousands of people and an ecological resource of world importance. However, over exploitation means that fishing in the area is no longer sustainable, that fish stocks are suffering and that fishing communities are losing their livelihoods.

The study is the work of Alice Joan G. Ferrer from the University of the Philippines Visayas. It finds that the best way forward would be to use a combination of management options, including putting in place a marine protected area and implementing various fishing bans. The study also recommends that a single management body should be set up to oversee the implementation of this multi-pronged approach. It is clear that the current state of the Visayan Sea calls for immediate intervention to arrest further decline in the quality of the marine resource. Any delay in addressing the problems the sea faces will simply worsen the difficult situation many fishers already face. If action is delayed until the fishery resource in the sea totally collapses then a major social crisis will be unavoidable.

Published by the Economy and Environment Program for Southeast Asia (EEPSEA)
Tanglin PO Box 101, Singapore 912404 (www.eepsea.org)
tel: +65-6235-1344, fax: +65-6235-1849, email: eepsea@idrc.org.sg

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ISBN: 978-981-08-4584-1

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Alice Joan G. Ferrer

March 2009

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EEPSEA was established in May 1993 to support research and training in environmental and resource economics. Its objective is to enhance local capacity to undertake the economic analysis of environmental problems and policies. It uses a networking approach, involving courses, meetings, technical support, access to literature, and opportunities for comparative research. Member countries are Thailand, Malaysia, Indonesia, the Philippines, Vietnam, Cambodia, Lao PDR, China, Papua New Guinea, and Sri Lanka.

EEPSEA is supported by the International Development Research Centre (IDRC); the Swedish International Development Cooperation Agency (Sida); and the Canadian International Development Agency (CIDA).

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ACKNOWLEDGMENTS

This research was implemented with the generous funding of the Economy and Environment Program for Southeast Asia (EEPSEA).

I would like to sincerely thank EEPSEA Director, Dr. Herminia A. Francisco; Ms. Catherine Ndiaye for the administrative support; Dr. Nancy Olewiler for the technical assistance and guidance; and Dr. Vic Adamowicz and Dr. Dale Whittington, and Dr. Benoit Laplante for the valuable advice and comments during the proposal stage and during interim report presentation, respectively.

I would also like to thank Ms. Jinky Hopanda and Mr. Michael Orquejo for providing efficient research assistance, and Dr. Wilfredo Campos for useful advice and information shared.

Finally, my great appreciation to all the participants of the study: the owners and crew of the commercial fishing vessels based in northern Iloilo, the fishery managers (from the local government units and national government agencies) and fishery scientists. Their collaboration in providing useful information made this research possible.

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EVALUATION OF FISHERIES MANAGEMENT OPTIONS FOR THE VISAYAN SEA, PHILIPPINES: THE CASE OF NORTHERN ILOILO

Alice Joan G. Ferrer

EXECUTIVE SUMMARY

The paper examines the sustainability of fisheries and fishers' incomes in the Visayan Sea and identifies potentially viable options that could help achieve the dual goals of protecting the fish and helping fishers earn a living. The focus is northern Iloilo fisheries, which cover almost half of the Visayan Sea. Ten management options identified from various sources were presented to the different stakeholders: fishers, fishery scientists, and fishery managers. These consist of status quo, input controls (ban of commercial fishing, ban of commercial fishing with safety nets, marine protected area, closed season, reduction in the number of commercial and municipal fishers, localization, and rotational fishing regime), output control (quota), and the creation of a special management unit. These management options were evaluated at two stages where Stage 1 ruled out options with no or low impact on increasing fish stocks. Options that passed Stage 1 advanced to Stage 2 where each was evaluated using a set of criteria (impact on fishers, impact on resources, feasibility, cost to the government, and impact to the community). Feedback from the stakeholders was obtained through focus group discussions and in-depth personal interviews. The potentially viable options (fishing bans with and without safety nets, marine protected area, reduction in the number of municipal and commercial fishers, localization, and creation of a special management unit) were discussed. The use of a combination of options, rather than a single one, and the creation of a single management body, to be pilot tested in northern Iloilo, to implement any program of management in all portions of the Visayan Sea fishing ground and for all its fishers are recommended.

1.0 INTRODUCTION

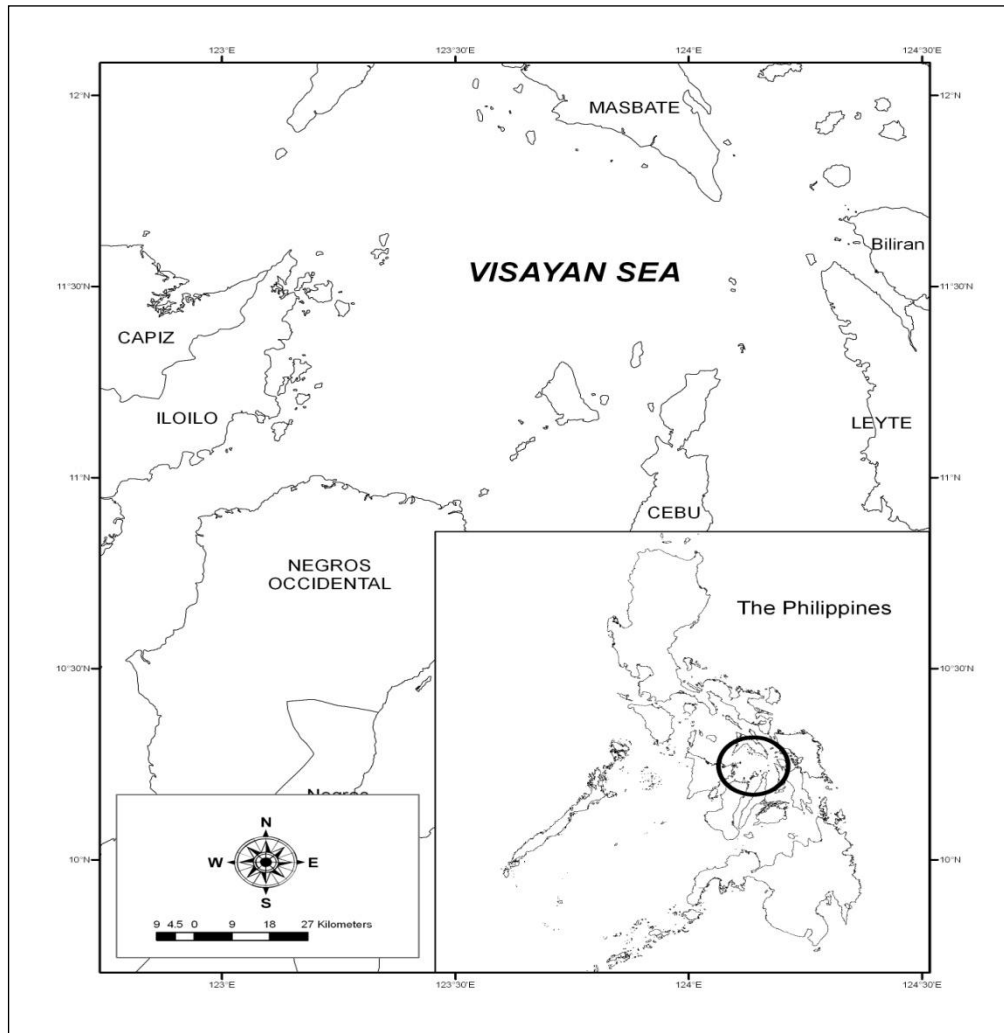
1.1 Background Information

The Visayan Sea in central Philippines covers an area of about 10,000 km² (Figure 1). It is located between 11° and 12° North latitude and 123° and 124° East longitude. It is bounded by 22 municipalities of the four provinces of Iloilo, Negros Occidental (Region 6), Cebu (Region 7), and Masbate (Region 5)¹. It is relatively shallow, with water depths of 40 m or less predominating (Armada 2004). It is divided into municipal (8460.30 km²) and commercial waters (1539.70 km²) (NAMRIA 2001).

The Visayan Sea has always been among the top three fishing grounds in the country (NSO 2001a; Hermes et al. 2004). It has been described as the “center of the center” after the Philippines was identified as the center of marine biodiversity in the

¹ Local government units in the Philippines are provinces (the largest unit), which are made up of several municipalities, which are in turn, made up of several barangays (the smallest unit).

world (Carpenter and Springer 2005). While about two-thirds of the total fisheries production in the area comes from commercial fishing, the Visayan Sea is identified as the most productive municipal fishing ground in the country (NSO 2001a).



Source: Moscoso, Alan. 2008. University of the Philippines Visayas.

Figure 1. Vicinity map of the Visayan Sea, Philippines

Relative to the other seas in the country, the Visayan Sea has received little attention. The richness of the area may have created the impression that it is inexhaustible, so that it has been “taken for granted.”² The current management regime fails to address the deteriorating resource quality. Based on the 1991 Local Government Code (RA 7160) and the 1998 Fisheries Code (RA 8550), local government units have jurisdiction over municipal waters; the national government through the Bureau of Fisheries and Aquatic Resources is in charge of resources outside the municipal waters.

² Personal communication with N. Armada (2007), a marine scientist who has done research in the Visayan Sea.

The management and conservation of the Visayan Sea is an enormous challenge given that the sea is the main source of livelihood of the people and the main revenue source of the municipalities surrounding it and that there is lack of data to guide the formulation of management decisions. Management measures have to be improved or implemented soon given the threat to the resources, to the fishers, and to the larger community. Management delay can have significant costs: exacerbate stock decline, longer rebuilding, and increased probability of stock collapse (Shertzer and Prager 2007).

1.2 Scope and Nature of the Problem

In the early 1990s, signs of resource depletion in the Visayan Sea have emerged. The commercial fisheries production went down from approximately 165 million kg in 1992 to 120 million kg in 1995 (NSO 2001a). A trawl survey conducted in July 2003 showed that the standing stock biomass of trawlable fisheries resources was 2.23 mt/km² only (Armada and Campos 2004). In 1948, it was 6.03 mt/km². The equivalent estimate from the July 2003 survey is 2.58 mt/km² and in March 2007, 2.06 mt/km² (Armada and Campos 2004).³ This indicates a big reduction (57%) in the trawlable biomass over a period of 55 years and 20 percent over a period of three years. Meanwhile, low trophic level of demersal catch and increasing abundance of small pelagic species had been observed in the 2003 and 2007 trawl surveys. There had been a large percentage of squid, cuttlefish, jellyfish, and crabs in the total catch and a reduction in abundance of carnivores.

Supporting the biological data is the perception of fishers surrounding the Visayan Sea of declining catch, rising proportion of low-value species in the catch, and the increasing number of fishers and fishing pressure (Siason et al. 2005).⁴ After a review of reports and studies on the Visayan Sea, Vakily (2005) concluded that the Visayan Sea is “definitely not underexploited, most probably fully exploited, and very likely overexploited”. Hermes et al. (2004) directly links the decreasing trend in the volume of catch from the Visayan Sea during years 1992 to 1995 to overfishing, destruction of habitat, overcapitalization, and non-limitation of fishing effort within the fishing ground.

Both municipal and commercial fishers coming from the area and adjacent regions exploit the Visayan Sea.⁵ Ushijima (1994), Yano (1994), and Zayas (1994) found a large number of commercial and municipal fishing boats operating in the area. Armada (2004) reported 18,650 municipal fishing boats operating in the Visayan Sea and 1157 commercial fishing boats were counted in different landing sites around the Visayan Sea in 1997. With the passage of the 1998 Fisheries Code by the Philippine government, the use of municipal waters was reserved for municipal fishers. The

³ N. Armada and W. Campos are marine scientists who have been conducting trawl surveys in the Visayan Sea in recent years. The information for March 2007 trawl survey provided here is from their unpublished trawl survey report..

⁴ The same perception among fishers was reported during the focus group discussion.

⁵ The 1998 Fisheries Code defines municipal fishing as fishing within municipal waters using fishing vessels of $\leq 3\text{gt}$, or fishing not requiring the use of fishing vessels, while commercial fishing is taking fishery by passive or active gear for trade, business or profit beyond subsistence, or sports fishing, using fishing vessels of $>3\text{gt}$. The policy on fishers' classification into municipal and commercial has been in effect since the 1960s.

commercial fishers who were used to unrestricted use of the 7 km and up area, was pushed to waters beyond 15 km from the municipality's general coastline.

While there are regulations that separate the two fisheries, there is still an overlap between the two fishing grounds. The commercial fishers, who perceive that the zoning regulation is unfair and that most fish stocks are found inshore, continue to operate in the municipal waters (Ferrer 2005; Siason et al. 2005)⁶. A conflicting provision in the 1998 Fisheries Code allows LGUs to issue permits to commercial fishing vessels to operate starting at 10.1 km from the coastline.

The competition over space and resources between the municipal and commercial fishers has resulted in conflicts between and within sectors (Siason et al. 2005). The municipal fishers blame the highly efficient commercial fishing gears for their low catch and declining fish stocks. The commercial fishers, on the other hand, abuse the privilege of continued access by operating in municipal waters, (i.e., less than the minimum allowable area of 10.1 km from the coastline).

The poor enforcement of the zoning regulation exacerbates the situation. The local enforcement groups (*Bantay Dagat* or sea patrol) are beset by logistical and operational problems, thus hindering their ability to effectively carry out their enforcement functions (Ferrer and Defiesta 2005). The maximum penalty of PhP 2,500 (USD 52.63) for a violation as stipulated in the 1991 Local Government Code is too low to deter violation or encourage compliance to regulations. Therefore, the fishery is basically open access, with regulations that do not help sustain the fish stocks.

Meanwhile, the declining fish stocks, resulting from excessive fishery activities translates to low fishing income. The municipal fishers basically fish for sustenance; any income earned from the surplus is barely enough for family survival. Their huge number continues to increase yearly, with more young people entering fishing (Ferrer et al. 2005).⁷ The commercial fishers, on the other hand, has been described in recent years as a “dying industry” in the face of the declining number of commercial fishing vessels due to losses from operation.⁸

For the small-scale commercial fishers (i.e., using active gears and vessels of 3-20 gross tons), who are the dominant players in commercial fishing, the chances of offshore fishing are poor. Their boats are too small, too poorly constructed (made of wood), and lack the necessary equipment (such as geographic positioning device) to fish farther offshore.⁹ The boats are designed for shallow fishing only. In Philippine waters, waters beyond 15 km are already deep and the fish are not as aggregated as near shore.¹⁰ Similar to the municipal fishers, the crew members of commercial fishers have low educational attainment and lack employable skills, preventing them from moving into other employment. Given the level of economic development in the area, other employment opportunities are scarce. Farming is marginal in island barangays.

⁶ The same was reported during the focus group discussion.

⁷ No updated and accurate number of municipal and commercial fishers in the area is available. There is poor registry of municipal fishers (at the LGU level) and commercial fishers (at BFAR and MARINA).

⁸ Interview with key informants from the LGU and national agencies.

⁹ From the focus group discussions with the study participants.

¹⁰ Personal communication with W. Campos (2007), a marine scientist who has done research on the Visayan Sea

In view of the above, there is a need for a more robust regulatory environment to protect both the fish and the fishers, especially since there are only a few livelihood alternatives to fishing. Management measures have to be improved or implemented soon given the threat to the resources, fishers, and the larger community. In the next five years, if no intervention will be introduced to sustainably manage the Visayan Sea, most of the catch will be composed of organisms belonging to the low trophic level of the food chain.¹¹

Some policy proposals have been made by stakeholders, notably a five-year total ban on commercial fishing, the creation of a special management unit, closed season, among others. The policy problem is to examine the nature of the fishery and to identify policies that would help the dual goals of protecting the fish and helping fishers earn a living. This paper presents the results of an evaluation of the fisheries management options for the Visayan Sea, with focus on northern Iloilo. The goal is to identify potentially viable options and to recommend a future course of action.

1.3 Objectives

The general objective of this research is to evaluate the different fisheries management options for the Visayan Sea, with focus on northern Iloilo fisheries.

This study specifically aims to:

- 1) identify potentially viable fisheries management options;
- 2) evaluate the identified fisheries management options using a criteria set:
likely impact on fishers, likely impact on resources, enforceability, costs to the government, and likely impact to the community; and
- 1) recommend a future course of action for the Visayan Sea.

2.0 FOCUSING ON THE NORTHERN ILOILO AREA

2.1 Rationale

Northern Iloilo has a number of unique characteristics that pose as a challenge to fishery management. Seven of the 22 coastal municipalities facing the Visayan Sea are in the area (Ajoy, Balasan, Batad, Carles, Concepcion, Estancia, and Carles) (Table 1, Figures 2 and 3). The 15 other municipalities and cities are in the provinces of Negros Occidental (Cadiz City, Sagay City, Manapla, and Escalante City, also in Region 6), Masbate (Balud, Cawayan, Esperanza, Placer, and Milagros, in Region 5), and Cebu (Bantayan, Daan Bantayan, Madridejos, Medellin, Sta. Fe, and San Remegio, in Region 7).

Almost half of the entire Visayan Sea comprises the municipal waters of the seven municipalities in northern Iloilo (Table 1). The municipality of Carles, the last municipality in northern Iloilo has the widest surface water area from among the 22 municipalities; it covers a little more than one-third of the entire Visayan Sea (3,577 km²). The vastness of the area makes it the most popular fishing ground for commercial

¹¹ Personal communication with N. Armada, a marine scientist who has done research in Visayan Sea

fishers not only from local and neighboring municipalities but also for others in Iloilo Province and the neighboring provinces.

The presence of 12 offshore islands farther than 15 km from the shoreline in the municipalities of Carles and Concepcion poses a big challenge for fisheries management (Table 1). Two interpretations exist regarding the point of reckoning of municipal waters: the general coastline and the farthest island.

Table 1. Area of municipal waters and number of islands in the Visayan Sea.

<i>Province</i>	<i>Number of coastal municipalities facing the Visayan Sea</i>	<i>Surface area of municipal waters (km²)</i>	<i>No. of islands within 0-10 km from the shoreline</i>	<i>No. of islands within 10-15 km from the shoreline</i>	<i>No. of islands farther than 15 km from the shoreline</i>
Iloilo	7	4258 ^a	41	8	12
Negros Occidental	4	900	5	2	1
Masbate	5	598 ^b	2	2	1
Cebu	6	1992 ^c	19	4	1
TOTAL	22	7748 ^d	67	16	15

Source of raw data: Visayan Sea Project Aquatic and Fisheries Resources Database, 2005

^a for Ajuy, Balasan, Carles, Concepcion, and Estancia. No data for Batad and San Dionisio.

^b for Cawayan, Balud, Esperanza, and Placer. No data for Milagros.

^c for Bantayan, Daanbantayan, Madridejos, Santa Fe, and San Remigio. No data for Medellin.

^d total for those with data only

The area contains a large number of small-scale commercial fishing boats using different gears. Table 2 shows that a little more than half of the owners of commercial fishing boats covered in the latest commercial fishing vessel inventory conducted in January to July 2004 by the Bureau of Fisheries and Aquatic Resources (Central Office) were based in four coastal municipalities of northern Iloilo (Carles, Concepcion, Estancia, and San Dionisio). They owned, on average, two fishing vessels. This is half fewer than what the Cebu-based owners had (four boats, on average). On the average, the commercial fishing vessels based in northern Iloilo are smaller than the fishing vessels based in Cebu and Negros Occidental. The gears used were relatively more varied.

Northern Iloilo commercial fishers are typical fishers in the Visayan Sea. Siason et al. (2005) found that the socio-demographic and economic characteristics of the fishers in Concepcion in Iloilo Province are not so different from those in other major fishing areas such as Escalante in Negros Occidental Province, and Daanbantayan in Cebu Province (Table 3). It is notable that the proportion of landowners is low for fishers from Escalante, Negros Occidental because most of them reside in private sugar plantations.

The population growth rate of 2.8 (for years 1995-2000) for the seven northern Iloilo municipalities is higher than the national growth rate of 2.32 for the same period, making them the fastest growing municipalities in the Visayan Sea area (Table 4). The municipality of Ajuy registered the highest population growth rate at 3.54. Moreover,

northern Iloilo registered the second highest projected population density for 2008 at 456 persons/km², much higher than the projected national average of 301 persons/km² in the same year.

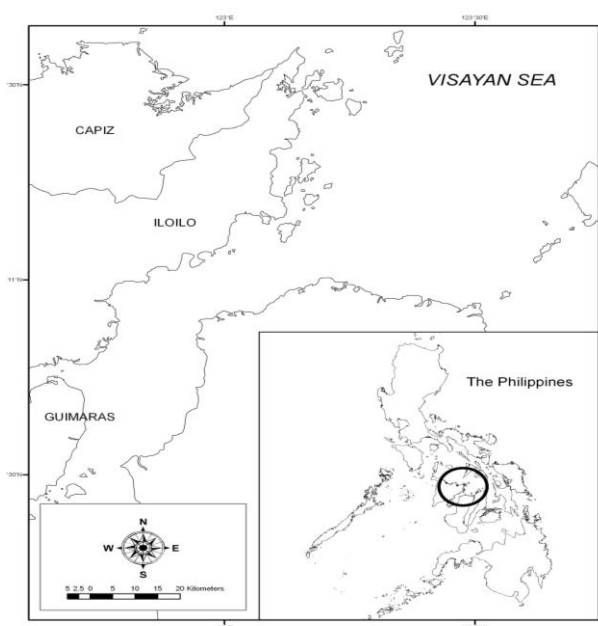


Figure 2. Vicinity map of northern Iloilo.
Source: Moscoso, Alan, 2008. University of the Philippines Visayas

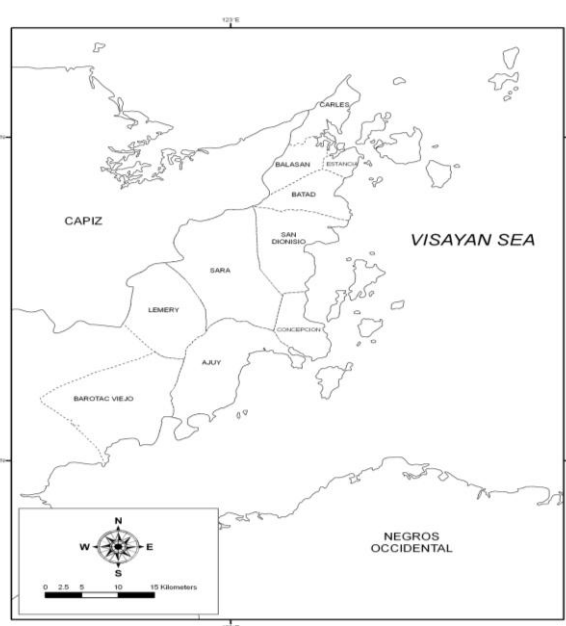


Figure 3. Northern Iloilo municipalities.

Table 2. Number of owners and commercial fishing vessels in provinces facing the Visayan Sea.

	<i>Iloilo</i> ^a	<i>Cebu</i> ^b	<i>Negros Occidental</i> ^c	<i>Masbate</i> ^d	<i>All</i>
Number of owners	77	38	24	8	147
Number of vessels	130	149	91	11	381
Gross tonnage (mean)	14.07	21.99	58.90	8.13	26.86
Classification of fishing vessel (number)					
Small (3.1 to 20 GT)	94	98	5	7	204
Medium (20.1 to 150 GT)	19	44	57	-	120
Large (> 150 GT)	-	1	1	-	2
Net Tonnage (mean)	9.28	13.91	31.53		15.87
Gear (number)					
Danish seine	44	137	2	9	183
Trawl	43	-	47	-	90
Ring net	37	12	-	-	49
Purse seine	1	-	14	-	15
Bagnet	-	-	-	2	2

^a Carles, Concepcion, Estancia, and San Dionisio; ^b Bantayan, Daanbantayan, Medridejos, and San Remigio

^c Cadiz City and Escalante City; ^d Balud, Cawayan, and Milagros

Source of raw data: Inventory of Philippine Commercial Fishing Vessels conducted from 21 January 2004 to 21 July 2004 by the Bureau of Fisheries and Aquatic Resources (Central Office).

Table 3 . Commercial fishers^a in three municipalities facing the Visayan Sea.

	<i>Concepcion, Iloilo n=55</i>	<i>Escalante, Negros n=38</i>	<i>Daanbantayan, Cebu n=30</i>
Individual Level			
Age (mean)	33.96	35.42	36.57
Age start fishing (mean)	15.64	18.65	20.17
Number of years fishing (mean)	18.82	17.57	16.07
Married (%)	72.7	65.8	66.7
Reached/graduated elementary (%)	69.1	55.2	52.3
Reached/graduated high school (%)	23.6	39.5	40.0
Reached/graduated college (%)	7.3	5.2	7.7
Household Level			
Annual income (PhP, mean)	55,094	41,969.74	61,060.53
Household size (mean)	4.8	5.5	5.2
Own land where house is built (%)	65.5	21.0	56.7
Access to electricity (%)	80.0	71.0	90.0

Source: Siason et al. (2005); ^a include owners, boat captains, and crew

Table 4. Population growth, projected population and population density for 2008 in 22 municipalities in four provinces facing the Visayan Sea.

<i>Province</i>	<i>Number of municipalities facing the Visayan Sea N=22</i>	<i>Population growth rate (1995-2000)</i>	<i>Projected total population for 2008^a</i>	<i>Estimated total land area (km²)^b</i>	<i>Projected population density for 2008 (persons/ km²)</i>
Iloilo	7	2.87 ^c	276,559	606.4	456.07
Negros Occidental	4	1.26 ^c	442,805	1,102.7	401.56
Masbate	5	1.68 ^d	194,628	1,317	147.78
Cebu	6	1.69 ^e	310,857	383.6	810.37

Source of basic data: ^a NSO 1996; ^b NSO 2001b; ^c NSO 2001c; ^d NSO 2001d; ^e NSO 2001e

The seven Iloilo municipalities are members of the Northern Iloilo Alliance for Coastal Development (NIACDEV) formed in 1998 and registered with the Securities and Exchange Commission (SEC) in 1999. The alliance aims to make northern Iloilo as Western Visayas' capital for fish and other marine products by addressing coastal resource management problems. Collaboration among member-LGUs has been achieved at the policy level but very minimally at the operational level of project implementation (Ferrer 2005). As agreed upon by member-LGUs, their respective municipal waters are open to municipal fishers coming from member-LGUs that use legal gears and have secured the necessary permits. This policy is unique to northern Iloilo municipalities.

2.2 State of Northern Iloilo Fisheries

2.2.1 Declining Fish Catch

Northern Iloilo, once referred to as the “Alaska of the Philippines” for its rich fishing ground, was described in 2006 as being on the “verge of total collapse” (The

Law of Nature Foundation and the Visayan Sea Squadron 2006)¹² Catch landing data at municipal fishing ports indicate the declining status of the resource. In Estancia Fishing Port, the recorded catch landings in February to April and June to August for years 2006 and 2007 showed a declining trend (ranging from 6.88% to 77.19%) for commercial fishing vessels using Danish seine (Table 5). For ring net, a positive change was observed in July 2007 only. Similarly, landings per fishing vessel recorded at Concepcion Fishing Port for two commercial fishing gears (Danish seines and trawl) and four municipal fishing gears (beach seine, drift gill net, ring net, and encircling gillnet) in June to September for years 2005 and 2006 show a generally declining trend (Table 6).

In Ajuy Fish Landing Site, the monthly catch rates (kg/fishing gear) of major municipal fishing gears (Danish seine, encircling gill net, bottom set gill net and, stationary lift net) in June to September 2005 and 2006 were declining also (Table 7). Moreover, catch landings (in kg) per municipal fishing vessel using Danish seine also in March to August in 2006 and 2007 showed the same decreasing trend (Table 8).

Table 5. Catch landings in kilograms per commercial fishing vessel using Danish seine and ring net at Estancia Fishing Port, 2006 & 2007

<i>Gear/month</i>	<i>2006</i>	<i>2007</i>	<i>% Change</i>
Danish Seine			
February	6,849.66	1,562.32	(77.19)
March	7,081.67	5,644.07	(20.30)
April	7,879.38	5,735.08	(27.21)
June	6,039.69	5,624.06	(6.88)
July	7,028.00	6,248.59	(11.09)
August	7,573.12	5,969.09	(21.18)
Ring Net			
February	2,341.50	516.00	(77.96)
March	2,642.50	650.70	(75.40)
April	1,991.50	672.00	(66.26)
June	1,818.75	1,335.44	(26.57)
July	982.90	1,152.69	17.27
August	1,545.57	801.00	(99.47)

Source of Raw Data: Report from field enumerator for the National Stock Assessment Project Region 6 assigned at Estancia Fishing Port Complex and available at Estancia Municipal Agriculture Office.

¹² This was the conclusion made by the Law of Nature Foundation and the Visayan Sea Squadron after conducting a “Reconnaissance Survey of Biological Marine Resources in Three Islands Around Visayan Sea ” in 18 sites in northern Iloilo in 2006 using the method from the Global Coral Reef Monitoring Network.

Table 6. Monthly catch rates (kg/fishing gear) of major municipal fishing gears
Concepcion Fishing Port.

<i>Gear/month</i>	<i>2005</i>	<i>2006</i>	<i>% Change</i>
Beach Seine			
June	212.69	322.78	51.72
July	210.00	99.00	(52.86)
August	97.14	32.00	(67.06)
September	104.50	19.38	(81.45)
Drift Gill Net			
June	18.45	10.19	(44.77)
July	19.13	23.98	25.35
August	21.77	20.35	(6.52)
September	40.76	20.84	(48.87)
Ring Net			
June	285.60	325.26	13.89
July	305.00	525.00	72.13
August	418.65	357.00	(14.73)
September	586.91	302.27	(48.48)
Encircling Gill Net			
June	127.5	72.29	(43.30)
July	16.52	43.93	165.92
August	87.69	60.71	(30.77)
September	54.63	35.56	(34.91)

Source of raw data: Report of National Stock Assessment Project Region 6
available with the Coastal Resource Management Officer, Municipality of Concepcion.

Table 7. Monthly catch rates (kg/fishing gear) of major municipal fishing gears in June to September 2005 and 2006 recorded at Ajuy Fish Landing Site.

<i>Gear/month</i>	<i>2005</i>	<i>2006</i>	<i>% Change</i>
Danish Seine			
June	98.03	44.2	(54.91)
July	96.01	65.10	(32.19)
August	94.48	51.56	(45.43)
September	61.75	42.74	(30.79)
Bottomset Gill Net			
June	35.12	15.6	(55.58)
July	19.95	18.66	(6.47)
August	23.90	14.76	(38.24)
September	22.54	16.51	(26.75)
Encircling Gill Net			
June	127.5	72.29	(43.30)
July	16.52	43.93	165.92
August	87.69	60.71	(30.77)
September	54.63	35.56	(34.91)
Stationary Lift Net			
June	90.24	24.10	(73.29)
July	50.61	51.22	1.21
August	76.25	63.84	(16.28)
September	102.63	59.91	(41.63)

Source of raw data: Report of National Stock Assessment Project Region 6 available with the Agricultural Technician in Fisheries, Municipality of Ajuy.

Table 8. Catch landings in kilograms per municipal fishing vessel using Danish seine recorded at Ajuy Fish Landing Site, various months, 2006 and 2007.

<i>Month</i>	<i>2006</i>	<i>2007</i>	<i>% change</i>
March	31.28	28.17	(9.94)
April	34.05	25.67	(24.61)
May	34.96	29.59	(15.36)
June	38.54	33.56	(12.92)
July	51.69	38.98	(24.59)
August	42.28	37.59	(11.09)

Source of raw data: Report of National Stock Assessment Project Region 6 available with the AT in Fisheries, Municipality of Ajuy.

The key informants from the LGUs were in agreement that the seas are already “overfished.” One proof cited is the presence of destructive gears and forms of fishing like *hulbot-hulbot* (Danish seines, most destructive), dynamite fishing, and cyanide fishing. Likewise, testimonies of fishers (more details in Section 2.5.3) also point to the declining volume of catch through the years. This trend is expected to continue if no management intervention will be introduced to reverse the situation.

2.2.2 Increasing Number of Fishers

The poor quality of the registry of municipal fishers by the local government units and commercial fishers at the Bureau of Fisheries and Aquatic Resource (BFAR) for the gear and at the Maritime Industry Authority (MARINA) for the vessel accounts for the lack of data needed to show an accurate trend in fishers' population. Based on testimonies of key informants and the fishers during the focus group discussions (FGD), the number of municipal fishers has been increasing. The number is expected to increase in the future because the children of the fishers who lack formal education and other employable skills have no other employment options. The increasing population and the limited employment opportunities in the area also account for the increasing number of fishers. Table 9 shows the number and status of boats of municipal fishers in northern Iloilo.

Table 9. Information on municipal fishers in northern Iloilo.

<i>LGU</i>	<i>Number</i>	<i>As % of total population</i>	<i>As % of coastal population</i>	<i>Number of municipal fishing boats (motorized)</i>	<i>Number of municipal fishing boats (non-motorized)</i>
Ajuy	1,369	3.03	5.04	533	649
Balasan	200	0.79	12.96	5	46
Batad	394	2.32	5.78	200	144
Carles	n.a.	n.a.	n.a.	2,934	3,623
Concepcion	2,211	6.46	7.69	932	704
Estancia	425	1.12	1.55	232	165
San Dionisio	1,311	3.38	5.76	253	233

Source: Visayan Sea Aquatic and Fisheries Resources Database (2006), Visayan Sea Project of GTZ and DA-BFAR, 2003 – 2005.

The trend is less clear for commercial fishing. Some key informants report the declining number of commercial fishing vessels in the area due to operational losses. The fishers are pushed far into the sea (beyond 15 km from the mainland shoreline, and to more distant municipalities like in Carles and Concepcion with many offshore islands), requiring more fuel consumption than before. Others had left the industry because they were using gears that are highly regulated or banned.

Statistical records seem to show otherwise. A comparison of the results of the “Registration for Inventory of Philippine Commercial Fishing Vessels” conducted by BFAR in 2004 and the field validated list of commercial fishers conducted by the researcher in late 2007 shows an increase in the number of commercial fishers (Table 10). One possible explanation for the increase would be that the 2004 inventory was not able to intercept most of the commercial fishing vessels operating in the area for the period. For instance, other studies (Ferrer 2005; Visayan Sea Aquatic and Fisheries Resources Database 2006) report that about 300 commercial fishing vessels were based in Concepcion at about the same time. The discrepancy may also be due to the unlicensed commercial fishing vessels in the area.

The LGUs and the BFAR have been blaming each other for the continued operation of unlicensed commercial fishing vessels. The LGU accuses BFAR for

granting license to commercial fishers (even during the period of moratorium of granting licenses) but according to a key informant from BFAR, the incentive to register as a commercial fishing vessels with BFAR (for the gear) and MARINA (for the fishing vessel) dissipates when municipal governments grant small commercial fishing vessels the permit to fish starting from 10.1 km.

Table 10. Number of commercial fishers in northern Iloilo municipalities from inventory list^a and validated list.^b

List	Ajoy		Carles		Concepcion		Estancia		San Dionisio		All	
	O	V	O	V	O	V	O	V	O	V	O	V
2004 BFAR Inventory ^a	0	0	27	56	11	15	24	41	15	18	77	130
2007 field validated list ^b	1	1	54	71	108	127	29	54	12	12	204	265

O – number of owners; V – number of vessels

^a Registration for Inventory of Philippine Commercial Fishery Vessels from January 21, 2004 to July 21, 2004.

^b Raw data (list for years 1999 to 2007) sourced from MARINA Region 6 and other sources were validated by the researcher at the field with the assistance of local fishery managers: AT in Fisheries or CRM Officer, BFAR Provincial Personnel, group of commercial fishers.

2.3 State of Fishery Law Enforcement in Northern Iloilo

Enforcement issues and concerns regarding the fishery laws in the area have rendered them weak and inconsistent. These include: 1) lack of coordination and cooperation among the different national and local agencies authorized to enforce fishery laws; 2) logistical and operational problems hindering the agencies from effectively carrying out their law enforcement function; 3) persistence of violations; 4) difficulty with existing laws or their interpretation; 5) difficulty with the judicial system; and, 6) perceived susceptibility to corruption of the law enforcers.

2.3.1 Lack of Coordination and Cooperation

By virtue of the 1991 Local Government Code and the 1998 Fisheries Code, the municipalities in northern Iloilo are at the frontline in fishery law enforcement in their territorial waters (municipal waters). Five of the seven municipalities were reported to have formed or reactivated their *bantay dagat* (fishery law enforcement group) in the past 10 years. *Bantay dagat* is a composite team headed by the local chief executive; the rest of the members include the local police, the deputized fish wardens, and technical personnel. At present, no formal or informal coordination had been forged in their activities. The authority of each *bantay dagat* is interpreted to be enforceable only in its territorial waters.

Unique to northern Iloilo is the presence of the Provincial Bantay Dagat (PBD) that was created in 2001. The PBD's focus on northern Iloilo is a result of the perception that it is a "troublesome area" (Ferrer and Defiesta 2005). They conduct active seaborne patrol, apprehension, and filing of cases independently from the local *bantay dagat* groups in northern Iloilo. The municipalities "resent" the presence of the PBD in their area, viewing it as "intruding" in the municipal territory and "undermining" local autonomy.

The same issues are raised against the Visayan Sea Squadron (VSS), a private group advocating for the sustainable management of the Visayan Sea. The local chief executive of the municipality where the group is based has issued a directive to barangay captains to report the presence and operation of different groups claiming to be guarding the sea in order to identify legitimate groups from the so-called pirates who are operating in the area.

Meanwhile, BFAR, the agency tasked to protect the country's commercial waters, has deputized the Philippine Coast Guard (PCG) to do the job of law enforcement. However, the PCG has lost its original function of being the "police at sea" in 1991 to the Philippine National Police-Maritime Group. The PCG now concentrates on promoting safety of life and property at sea, a function deputized by MARINA.

In contrast to the PCG, the Philippine National Police-Maritime Group (PNP-MARIG) is a member of the Philippine criminal justice system and is mandated to enforce the 1998 Fisheries Code. In northern Iloilo, the PNP-MARIG has a station (10 personnel on shifting basis) in Estancia and a special operating team based in Concepcion (3 persons). In terms of law enforcement, PNP-MARIG focuses on intelligence operation against illegal fishers, smugglers, and all sea-related violations in and out of municipal waters. With their independent operation from the local enforcement teams, the PNP-MARIG often clashes with local chief executives.

2.3.2 Poor Enforcement Capability

The local enforcement teams conduct mostly seaborne operations aboard outrigger crafts. Even the most advanced (in terms of capability) among these local enforcement groups, the *bantay dagat* of the municipality of Concepcion, faces constraints for a more effective operation. These includes the high cost of operation (particularly fuel and maintenance of patrol boats); inadequate number and kind of equipment (patrol boat, geographic positioning system device, communication facilities, among others); high-risk operation (threats, violence); lack of incentive (insurance coverage and other provisions); and inadequate number of personnel (police officers and deputized fish wardens).

The PBD face similar constraints, having only 14 personnel and PhP 1.5 million annual budget. Its operation in northern Iloilo covers the municipal waters of seven coastal municipalities (Ajuy, Batad, Balasan, Carles, Concepcion, Estancia, and San Dionisio) that face the Visayan Sea. The PBD field team leader saw that his team's effectiveness is being hampered by cost cutting measures adopted recently like not being allowed to use the speedboat (which has a gasoline-fueled Volvo engine). Now, using only outrigger boats during seaborne operations, the PBD is at a disadvantage against faster commercial fishing boats that are also fully equipped with communication and fish-finding devices. The team also has to maintain its distance from big commercial fishing vessels who threaten to ram down its outrigger boat. Moreover, the PBD is not capable of operating during bad weather, the time when many illegal fishing operations are committed.

The lack of resources also hampers the PCG's operation. In northern Iloilo, the PCG station has only five personnel (on shifting basis) on board outrigger boats during random seaborne operations. When necessary, backup personnel are sent from the main regional office in Iloilo City. The PCG has three outrigger boats and one multi-purpose vessel docked at Iloilo River. The multi-purpose vessel is a search and secure vessel of 56 meters long and capable of carrying 200 persons, with fire-fighting ability and a decompression chamber.

As the Regional Superintendent of the PNP-MARIG put it succinctly, "we are a maritime unit but do not have floating assets." The regional office has only 60 personnel scattered in the region (of 6 provinces). The station in Estancia has 10 personnel and the special operating team in Concepcion has three personnel. They use rented outrigger boats and wear ordinary clothes during surveillance activities. With limited resources, they operate "as the need arises." They mostly rely on "native talent" by training barangay residents for intelligence activities and depend on them to supply information via cellular phones. They link with nongovernment organizations to improve their image with the public.

2.3.3 Difficulty with the Laws

The conflicting provisions in the 1998 Fisheries Code reserving the municipal waters (15 km from the shoreline) to municipal fishers while allowing LGUs to issue permit to commercial fishing vessels to fish starting at 10.1 km have created problems. The PBD strictly observes the 15 km zone for exclusive use of the municipal fishers. Many commercial fishers are confused and had complained during the FGD.

The problem is bigger in municipalities with offshore islands. With no clear interpretation of the point of reckoning of the 15-km distance, the LGUs follow the 1998 Fishery Code that states that it should be from the general coastline. The PBD, in contrast, interprets it as based from the farthest island. The confusion arises because of the Department Administrative Order 17 issued by the Department of Environment and Natural Resources (DENR), which imposes a stricter interpretation of the limits of municipal waters using the farthest offshore island rather than main coastline as the point of reckoning for distance. This was revoked by the Department of Justice, which ruled that the DENR has no authority to issue such directive. BFAR, which has the mandate to issue such directive, has been silent. The case filed to set the interpretation for LGUs with offshore island has been sleeping in the Supreme Court. Moreover, the 1991 Local Government Code stipulates that the LGUs can only impose a fine of up to a maximum of PhP 2500. This amount is too low to deter the commission of violations or to change behavior. In fact, there is a high percentage of repeat violations in the area.

2.3.4 Problems with the Judicial System

To avoid the tedious and expensive process of a legal battle, not all apprehensions by the LGUs have resulted in cases being filed in court. Alleged violators who plead guilty and agree to pay a compromise penalty (which is a measly PhP 2500) are no longer brought to court. For instance in Concepcion, 1054 apprehensions were made in 2001 to 2004, but only 76 (7%) were brought to court (Ferrer and Defiesta 2005).

On the other hand, the PBD brings to court all apprehensions it makes. The problem, however, is it must file the case at the Hall of Justice located in Iloilo City. This would mean bringing the entire fishing crew (about 10-25 people) to the city and providing them with transportation and food; they have no budget for this.. The same is true for apprehensions made by PNP-MARIG. With the slow and complex judicial process, one law enforcer was led to say, “let us make less frequent apprehensions.” Moreover, municipalities far from the city have no BFAR personnel, who are the acceptable technical witnesses in court. The complexity of the legal proceedings has become an advantage for violator in such municipalities.

2.3.5 Lack of Credibility

One of the most serious problems cited by the small-scale commercial fishers during the FGD is the selective and irresponsible apprehensions made by the law enforcement teams. They feel they are the constant target of anti-violation campaigns. In many instances, they are apprehended without knowing their violations. Most often, they are charged of encroaching into municipal waters. They mostly rely on experience and not on devices (e.g., geographic positioning devices) to get to their fishing area, hence are unable to determine their exact location.

To the small-scale commercial fishers, court cases are costly. To avoid this, they give “protection money” to groups claiming as law enforcers. The rates differ by location of the “protector”: a monthly minimum of PhP 5,000 per boat or a monthly lump sum ranging from PhP 30,000 to PhP 60,000. A number of fishers reported bringing money during fishing operations for use as payment in case of apprehension. They also complained that most violations are actually committed by medium commercial fishers from the other provinces but they are not apprehended. The popular belief is that the different enforcement teams present in the area are in the payroll of these big fishers.

The fishers think that there is a “mafia” operating in the seas. They are confused by the number of groups claiming to be law enforcers but who ask for “protection money” in lieu of a court case. Many have experienced being held by groups (they call “pirates”) asking for “ransom money.” Three fishing operators claimed that they have used a money transfer company in ransom payoff. The local term is “*hulidap*” (a combination of “*huli*” which means “caught” and “holdup”).

2.4 Profile of Northern Iloilo Municipalities

2.4.1 Basic Profile

Table 11 shows the basic profile of the seven municipalities in northern Iloilo facing the Visayan Sea. The nearest to Iloilo City is Ajuy and the farthest is Carles. They are relatively poor municipalities, mostly classified as fourth class municipalities based on income. Fishing and farming are the major sources of income of the people, with the majority highly dependent on the fishing industry. Tourism is being developed to play as the third major industry in the area. The industrial and service sectors are relatively small. Most of the population live in coastal/island barangays; except in San Dionisio. The population density in these municipalities is very high compared with the national average of 260 persons/ km².

Table 11. Basic information on the seven municipalities in northern Iloilo facing the Visayan Sea.

<i>LGU</i>	<i>Income class^a</i>	<i>Distance from Iloilo City (km)^b</i>	<i>Land area (km²)^c</i>	<i>Number of barangays (coastal/island)^d</i>	<i>Percent of population in coastal/island barangay^e</i>	<i>Population density for 2007 (persons/km²)^f</i>
Ajuy	3 rd	87	152.3	34 (18) 23 (2)	60.1	309.346
Balasan	4 th	130	54.3	24 (6)	6.1	504.336
Batad	5 th	120	53.1	33 (32)	40.1	344.60
Carles	3 rd	146	104.1	25 (18)	40.3	554.02
Concepcion	4 th	112	86.1	25 (16)	83.9	428.35
Estancia	4 th	135	29.4	29 (11)	72.2	1,342.82
San Dionisio	4 th)	111	127.1		58.7	253.12

^a COA 2008, ^b NSO 2001b, ^c NSO 1996, ^d Figures inside the parenthesis refer to the number of coastal/island barangays, ^e Ferrer 2005, ^f Visayan Sea Project Aquatic and Fisheries Resources Database 2005, ^f 2007 population data are available at www.nscb.gov.ph

2.4.2 Fishery Resources Characteristics

Carles and Concepcion have the widest water area and have offshore islands (Table 12). Batad, Ajuy, and San Dionisio have limited water areas. Ajuy has no water area beyond 15 km, while San Dionisio's fishing ground is below 7 km. Balasan is basically an aquaculture municipality and its fishers are confined to Bagongon River (part of municipal waters).

Table 12. Geographic profile of the seven municipalities in northern Iloilo facing the Visayan Sea.

<i>LGU</i>	<i>Surface area of waters (km²)</i>	<i>Length of shoreline (km)</i>	<i>Number of islands within 0-10 km from shoreline</i>	<i>Number of islands within 10-15 km from shoreline</i>	<i>Number of islands farther than 15 km from shoreline</i>
Ajuy	250	75.83	8	0	0
Balasan	1	32.00 ^a	0	0	0
Batad	n.a.	8.00 ^a	2	0	0
Carles	3,677	124.50	16	4	10
Concepcion	320	120.00	11	4	2
Estancia	10	28.51	3	0	0
San Dionisio	n.a.	26.00 ^a	1	0	0

Source of raw data: Visayan Sea Project Aquatic and Fisheries Resources Database 2005,

^a Excluding islands ; n.a.- not available

Despite the fisheries resources being the main source of municipal revenue, the budget for their management as a percentage of the total municipal budget is very low (less than 1% in five municipalities; Concepcion registered the highest at 2.95%). The personnel tasked to manage fisheries are also expected to manage farming, livestock, high-valued crops, and other agricultural programs. These reflect the low attention and importance attached by most of the municipalities to fisheries resource management.

All municipalities have formed their Municipal Fisheries and Aquatic Resource Management Council (MFARMC), an organization of fishers in the municipality that is expected to provide advice to the LGU on fisheries management (Table 13). Five municipalities have a local enforcement team but only three are active.

Table 13. Coastal resource management profile of the seven municipalities in northern Iloilo facing the Visayan Sea.

<i>LGU</i>	<i>CRM budget (in PhP, % of annual total budget)</i>	<i>With local office for CRM /with agricultural technician in fisheries</i>	<i>With MFARMC</i>	<i>With active local enforcement team</i>	<i>Number of marine protected areas (km² and % of territorial waters)</i>
Ajuy	100,000 (0.27)	Yes/yes	Yes	Reactivated in 2007	3 (3, 1.2)
Balasan	100,000 (0.31)	Yes/yes	Yes	No	Not applicable
Batad	200,000 (1.04)	Yes/yes	Yes	Yes	3 (n.a.)
Carles	100,00 (0.32)	Yes/yes	Yes	Reactivated in 2007	2 (26.75, 0.73)
Concepcion	970,000 (2.95)	Yes/yes	Yes	Yes	12 (17, 5.31)
Estancia	100,000 (0.3)	Yes/yes	Yes	Yes	1 (n.a.)
San Dionisio	100,000 (0.27)	Yes/yes	Yes	No	0

MFARMC – Municipal Fisheries and Aquatic Resources Management Council ; CRM – Coastal Resource Management

2.5 The Commercial Fishers of Northern Iloilo

2.5.1 General Profile

The information presented here is based mostly on the 27 focus group discussions conducted and participated in by 166 participants: 36 owners, 22 boat captains, 16 chief machinists, and 92 other crewmembers of commercial fishing vessels based in Concepcion, Estancia, and Carles.

In every 10 fishers who participated in the FGDs, nine were natives of the municipalities in northern Iloilo (Table 14). Most of the non-natives were fishing crew members from the provinces of Capiz, Negros Occidental, and Cebu. The owners were

in their late 40s and older by six years than the boat captains, 10 years than the chief machinists, and 16 years than the other crew members. It was observed, however, that young people were on board the fishing vessels as ordinary crew members. Although child labor is illegal, this is tolerated by the boat owners because they cannot refuse the young people who insist to offer their services in exchange for food and a small amount of money -- a life survival strategy. This usually happens during lean months in the area.

In general, the level of education across types of fishers is low; the owners are relatively better educated than the crew. On the average, the former completed high school while the chief machinists and the ordinary crew were mostly elementary graduates only. The boat captains had the lowest number of years in school at 5 years. Seven in every 10 participants were married. A higher percentage of the ordinary crew members were single.

The household size of all types of participants was higher than the national average of 5.5 persons. The households of owners and chief machinists were bigger by one person than those of boat captains and fishing crew members.

Table 14. General profile of commercial fishers who were study participants.

<i>Characteristic</i>	<i>Owner</i> <i>n=36</i>	<i>Captain</i> <i>n=22</i>	<i>Chief Machinist</i> <i>n=16</i>	<i>Crew</i> <i>n=92</i>	<i>All</i> <i>N=166</i>
Native Resident (%)	97.14	100.00	100.00	86.95	91.57
Age (mean)	47.22	41.15	38.93	31.33	36.74
Years in school (mean)	10.00	5.00	6.74	6.79	7.24
Married (%)	94.28	95.45	75.00	59.78	72.89
Household size (mean)	6.33	5.86	6.12	5.57	5.83
Number of children (mean) ^a	3.88	4.28	4.08	3.41	3.75
Number of years in fishing	24.62	26.91	23.25	13.46	18.60

^a Only for those with children

The fishers, except for the other crewmembers, have spent at least half of their lives in fishing. The boat captains have the longest fishing experience (27 years), followed by owners (25 years), and machinists (23 years). Most owners inherited the business from their parents or have put up their own business after having enough funds, either from savings or from loan, to buy a commercial fishing vessel.

Most crewmembers started at a young age (9-10 years old) as an apprentice to their parents who were also fishers. Most were engaged in fishing on a part-time basis as they were still in elementary school. By teenage (14-17 years old), they become full time fishers helping their parents or as crew of commercial fishing vessels. As crew of fishing vessels, they start at the lowest position (as “*bodegero*” or utility worker). For the young crew members in commercial fishing, they normally do not stay in one vessel; they move from one commercial fishing vessel to another. The boat captain and the machinist learned their skills through experience and not by any formal training.

Having spent most of their lives at sea and in fishing, their labor and skills are locked in this occupation.

2.5.2 Fishing Operation

The FGD participants represented 53 fishing vessels using five different gears: 23 Danish seines, 17 trawls, 7 beach seines, 5 purse seines, and 1 ring net (Table 15). On the average, the purse seine fishers were medium-scale commercial fishers and the rest were small-scale commercial fishers. Except for one ring net fisher, the rest have been in operation for some years ranging from 3 to 28 years. The investments varied by size of fishing vessel and type of gear used. Danish seines, ring nets and purse seines amount to more than a PhP 1 million; the purse seine is the most expensive (PhP 3.6 million on average).

The beach seine fishers go to sea every day. They operate within 7 km from the shoreline following the fish path of their target species (anchovies). Fishers that use other gears operate farther offshore, which explains their lower number of trips in a month (3-7 trips) and the number of days per fishing trip (3-8 days). Users of Danish seines reported operating about five trips in a month and having four days per trip. The trawl fishers reported operating about seven trips a month at three days per trip. In a fishing day, about 12 hours is spent on actual fishing. The reported number of crew members differed by fishing vessel. The users of purse seines have the most number of crewmembers (30 persons), followed by the Danish seine fishers (20 persons).

As expected, the purse seine fishers reported the highest volume of catch per trip. Those using Danish seines and ring nets came next but their catch was only one-third of that by purse seine fishers. Accordingly, the value of catch per trip is highest for the purse seine fishers. The operating cost of purse seine fishers is almost PhP 500,000. Those incurred by Danish seine and ring net fishers come next but are way below that by purse seine fishers.

Profit sharing is generally practiced. After deducting the operating cost from gross revenue, the owners and the crew share the profit. The sharing system differs by type of fishing method. The simplest sharing system is practiced by trawl fishers: the net profit is equally divided between owner and crew. Among the crew, the boat captain receives two parts; the remaining one part is divided by the rest of the crew. In some bigger fishing vessels, the crew receives a monthly salary and a fixed amount for every tub sold. There are also shares based on every kilogram sold.

The estimated annual income received from fishing differed by gear and by position in the fishing vessel. The owners received the highest income, many times more than the income of the crew. Purse seine owners received the highest and the lowest were the trawl owners. The crew received relatively low income from their labor, particularly the crew of beach seine even when owners' income was second to purse seine.

Table 15. Profile of fishing vessels and income from fishing of focus group discussion participants.

<i>Details</i>	<i>Danish seine</i> <i>n=23</i>	<i>Trawl</i> <i>n=17</i>	<i>Beach seine</i> <i>n=7</i>	<i>Purse seine</i> <i>n=5</i>	<i>Ring net</i> <i>n=1</i>
Local name	Zipper/ Super hulbot	Trawl	Sinsoro	Purse seine	Likupan
Ave. gross tonnage	17.82	6.56	5.46	52.54	12.00
Ave. age of vessel in years)	8.33	10.00	12.60	10.50	1.00
Ave. total amount invested (PhP)	1,093,750	288,000	285,286	3,600,000	2,800,000
Operation					
Ave. no. of fishing trips/month	4.78	6.71	30.17	3	5
Ave. no. of days/trip	3.58	2.81	1	8	1
Ave. no. of hours of actual fishing/trip	12.44	11.13	13	12	12
Ave. no. of crew	20	4.67	12	30	8
Production and Revenue					
Ave. volume of catch/trip (kg)	1,593.18	237.39	258.33	4,987.5	1,500
Ave. value of catch/trip (PhP)	75,533.33	15,992.5	10,528.57	780,000	80,000
Ave. value of operating cost/trip (PhP)	45,342.11	11,937.5	4,000.00	478,400	40,000
Ave. gross profit/trip ^a (PhP)	30,191.22	4,055	6,528.57	301,600	40,000
Estimated Annual Income ^b					
Owner	535,590	100,000	590,195	1,950,000	537,728
Boat captain	64,402	60,462	148,265	761,280	159,883
Machinist	63,958	42,383	39,915	761,280	70,307
Other crew member	57,809	32,543	34,003	671,280	63,963

^aShared by owner and crew

^b Estimated using share on profits and “sideline” received during regular, peak, and lean months for the past 12 months prior to interview.

2.5.3 Perception of the Current State of the Visayan Sea

The fishers’ perception of the current state of the Visayan Sea is that of declining resource quality. The majority of commercial fishers in the FGD claimed that the volume of fish catch in the past (1980s-1990s) is higher than the present. The higher catch in the past is due to fewer fishers, few high-efficiency gears, and lack of regulations restricting commercial fishing activity. With lower fuel prices before, the fishers were able to visit many fishing grounds and undertake fishing trips more frequently. The FGD participants blamed the other commercial fishers like those using

purse seines and destructive forms of fishing (such as cyanide and blast fishing) and transient fishers for destroying the fishing areas, thus resulting in lower catch in the present.

The FGD participants also claimed that they used to have shorter fishing time because it was easier and quicker to find fish. The longer fishing time now is attributed to the implementation of regulation requiring commercial fishing beyond 15 km of municipal waters. They are forced to fish farther at sea, requiring longer travel time to the fishing ground where the fish are also difficult to find. That is, they spend a longer time now fishing for the same amount of fish they used to catch before, thus reducing catch per unit effort. Most expect longer fishing time in the future because there would be many more fishers chasing fewer fish. When on a fishing trip, fishers always wait for a catch because fishing is their only source of income to buy family's needs.

In terms of catch composition, the FGD participants reported the disappearance of many high-value species. They also observed that the fish now are smaller than the 1980s' catch. On the other hand, some hold on to the belief that the seas will never be depleted as it is a "gift from God".

2.5.4 Capability for Offshore Fishing

For the dominant players in commercial fishing - the small-scale commercial fishers - the chances of offshore fishing are poor. During the FGD, the fishers identified the following constraints: 1) small size of boats; 2) the boats are made of wood; 3) low technology (they do not have even a geographic positioning device); 4) high fuel cost; and 5) difficulty of finding fish in deep waters. These claims are supported by the key informants who mentioned that the small-scale commercial fishers could not survive offshore fishing because their vessels are designed for shallow fishing only. In Philippine waters, waters beyond 15 km are already deep and the fish are not as aggregated as in near shore. The medium- and large-scale commercial fishers can go to other seas in the country where law enforcement is less strict. Moreover, observation on board the vessel by the researcher confirmed the crude navigational devices, lack of space (given the number of crew), and poor living conditions.

2.5.5 Coping with the Current Situation

With declining catch, higher operating cost, and implementation of the regulation allowing commercial fishing only beyond 15 km from shoreline, income from commercial fishing has declined. To cope with the situation, operation practices have changed. Fishers now spend longer time at sea and move from one location to the next where fish are observed or known to aggregate. Reduced days at sea are estimated to have a substantial negative impact on profit. This practice has resulted in additional excess capacity, poor product quality, sporadic availability of supply, and erratic fluctuations in fish landings and profits.

Fishers believe that fish are abundant nearshore. Aside from saving on fuel, this observation attracts commercial fishers to encroach in municipal waters. When they do, they face the risk of being arrested by local enforcement groups. If the local *bantay dagat* makes the apprehension, the fishers can pay a compromise penalty. If the apprehending team is not the local team, they have two options: bribe or face the court. Between the two options, bribing is less costly (see Section 2.3.5).

Fishers maintain relationships with big fish buyers that provide them a credit line for fishing inputs (fuel, ice, food provision). With this, the buyers are assured of a steady supply and the fishers are assured of being able to continue their fishing operation. Other fishers also maintain a credit line with suppliers of the fishing inputs.

With low fishing income, the distribution of income shares is done quarterly (or after 12 fishing trips). In a fishing trip, however, the fishing crew receives what they call “sideline”, an amount ranging from PHP 50 to PHP 300, depending on gross profit earned and discretion of the owner. The boat captain and machinist receives higher “sideline” than the ordinary crew. This practice has made the crew members economically dependent on the owner and serves as a venue for other forms of economic exploitation. The crew incurs huge debts from the boat owners so that nothing of their shares is left come distribution time. This practice has locked the labors of the indebted fishing crew to a particular boat and owner.

3. METHODOLOGY FOR POLICY ANALYSIS

3.1 Data Collection

Multiple field data collection methods were used from September 2007 to April 2008 to generate information used in the analysis. These include focus group discussions (FGDs), key informant interviews, secondary data collection, and observation.

3.1.1 Focus Group Discussion

Although the FGDs are neither objective nor representative, it was the main method used to collect data from the fishers. It permitted the researcher to elicit a multitude of views that cannot be obtained as easily through individual interviews, and the participative nature of the discussion permitted the researcher to explore and contrast the views of different participants.

Organization, Composition, and Implementation

Twenty-seven FGDs, altogether having 166 participants, were carried out in three municipalities (Table 16). Nine FGDs were conducted in Carles, 10 in Estancia, and eight in Concepcion. In each location, separate discussions were held with the owners (36 participants), boat captains and machinists (38 participants), and crew members (92 participants).

Gatekeepers in the area helped in organizing the FGDs. The municipal Agricultural Technician (AT) in fisheries facilitated the initial FGDs with the owners from Carles. Owners who participated in the initial FGD facilitated the succeeding ones with other owners and crew. In Estancia, the provincial BFAR personnel facilitated all the FGDs. Similarly, in Concepcion, the coastal resource management officer assisted in organizing the FGDs.

It was the first time for commercial fishers in the area to participate in a research project of this nature. Organizing the FGD for the crew was a challenge given that they were at sea most of the time or resting after a three- to four-day fishing trip. Proper

timing in the schedule and holding the FGD as close to the residence of the participants were observed.

To promote constructive group dynamics and active participation, the participants invited were from different commercial fishing vessels and were not informed in advance of the groupings and members of the discussion group. Within-group status homogeneity was achieved by separating the owners, boat captains and machinists, and the crew, thereby creating conditions for open discussion.

Table 16. Type and number of focus group discussions and participants.

<i>Location</i>	<i>Owner</i>		<i>Boat captain/ Machinist</i>		<i>Crew</i>		<i>All</i>	
	<i>FGD</i>	<i>Participants</i>	<i>FGD</i>	<i>Participants</i>	<i>FGD</i>	<i>Participants</i>	<i>FGD</i>	<i>Participants</i>
Carles	2	14	3	17	4	47	9	78
Concepcion	5	18	1	5	2	9	8	32
Estancia	2	4	1	16	7	36	10	56
TOTAL	9	36	5	38	13	92	27	166

The discussions were semi-structured, following a prepared interview guide that served as a check-list for the topics discussed, and were held at locations that minimized distraction. Each participant was interviewed first to collect basic information, then was given identification numbers. In the introduction, the researchers informed the participants of the purpose of the discussion, the importance of open and honest participation, and the full confidentiality of any information disclosed during the discussions. The discussions were held in the local language.

A list of management options and the corresponding definition in the local language were written on a manila paper and presented to the participants. In ranking the options, prepared score cards were used and placed near the option corresponding to the decision of the participants. Each session lasted approximately three hours and was audio recorded.

Information Generated

The information generated mainly included a description of fishing operations, perception of the state of fishery resources, and perception of the likely impacts of the different management options on fishing activities, fishery resources, and the larger community. The FGDs participants were asked to rank the management options qualitatively, thus reflecting their acceptance or preference.

Transcription and Analysis

All FGDs were transcribed, providing a full record of each of the discussions. Given the style in note taking, it was possible in some instances to systematically relate opinions to specific participants. The discussion transcripts were synthesized and contextualized. This was done by identifying key themes in the transcripts, focusing on issues that were mentioned frequently or consistently, that received particular emphasis, or for which views expressed in the interviews diverged in systematic ways.

3.1.2 Key Informant Interviews

Interviews were conducted to learn about the perspectives of fishery managers, fishery scientists, and other individuals in the fishery industry identified as authorities in the topic for which they were being interviewed. It was an opportunity to learn about their personal feelings and opinions about the state of the fisheries and fishery management.

Organization, Composition, and Implementation

Twenty-six key informants were interviewed on various topics. They were composed of 15 fishery managers (4 local chief executives, 2 municipal agricultural officers, 3 AT in fisheries, 1 coastal resource management officer, 2 municipal legislative council members, 2 municipal administrators, 1 municipal planning and development officer), six marine scientists, heads of three law enforcement teams (regional superintendent of the Philippine National Police Maritime Group, regional chief of the Philippine Coast Guard, and team leader of the Provincial Bantay Dagat), and Bureau of Fisheries and Aquatic Resources personnel (Head of Fishery Resource Management Project, Region 6; provincial field personnel). The interviews were conducted person-to-person and through questionnaires sent via electronic mail.

Information Generated

The purpose of the key informant interviews was to generate information on fishery management, alternative fishing grounds for the Visayan Sea commercial fishers, enforcement and monitoring capabilities, readiness of commercial fishers in the Visayan Sea for offshore fishing (compliance on safety, manning, and other requirements), alternative jobs and livelihood for the fishers, and insights on the different fishery management options, among others.

Transcription and Analysis

Similarly, all interviews were transcribed, providing a full record of each of the interviews. The information was also organized thematically and in matrix form. The fishery managers ranked the management options in terms of enforceability/feasibility, susceptibility to corruption, prevalence of illegal fishing, and overall preference using the same process as in the FGDs.

3.1.3 Secondary Data Collection and Assessment

To complement data from methods mentioned above, relevant secondary data were assessed. The assessment involved compiling, evaluating, and reviewing the data related to the study. Secondary data were collected from official and unofficial documents, statistical reports, reports of previous assessments and surveys, research reports, documentation of previous or ongoing projects, experiences in other areas on fish ban, among others. The sources of information included local government units, Bureau of Agricultural Statistics, National Statistics Office, Maritime Industry Authority (MARINA), Philippine Coast Guard, Bureau of Fisheries and Aquatic Resources (main office), and university libraries.

3.1.4 Observation

The observations were limited to the characteristics of the households and barangays where the crewmembers of commercial fishing vessels were residing, the characteristics of the commercial fishing vessels, and the fish landings at Estancia, Carles, and Concepcion fishing ports. The information derived from this method was used to validate information gathered from other methods.

3.2 Management Options

The options ranged from the continuation of the present management regime to a complete ban of commercial fishing. These management options were identified from various sources, among them newspapers, previous studies, and preliminary consultation with commercial fishers, fishery managers and marine biologists from September to October 2007. The list of management options was presented to the fishers during the FGDs and to the key informants during interviews, adjusting the language and format to be appropriate for each, in January 2008 to April 2008. The options are:

Status quo - This refers to the ‘business as usual’ situation. This means continued fishing for the fishers and no changes in regulations.

Ban commercial fishing for 5 years – This refers to no commercial fishing in the Visayan Sea for five years to allow the rehabilitation of the depleted resources.

Ban commercial fishing for 5 years with safety nets- The main difference from the second option is the accompanying safety net (such as income loss compensation, credit assistance, boat buy-back schemes, among others) to protect the affected fishers.

Marine Protected Area - The ‘MPA’ is a popular term used to mean an area in the fishing ground where fishing activity is not allowed (“no-take zone”). It may include a buffer zone area where activities are regulated.

Special Management Unit - This entails the creation of a special management unit (SMU) with authority to manage, regulate, and enforce laws. Under such regime, the SMU would conduct the science, implement proper licensing and registration of fishers, effort control, and implement and administer a conservation-based management system that includes monitoring and enforcement.

Quota/ITQ - This refers to the limitation to total harvest allowed during a fishing season in a fishing ground. Commercial fishers will be assigned quotas of fish or limits on their catch. To allow more flexibility, the quotas can be traded among the fishers.

Closed Season - This refers to no commercial fishing in four months and open commercial fishing in the next eight months.

Tenurial Rights/Localization - This refers to preferential access given to local fishers of a certain municipality over the defined waters of the municipality. Although the 1998 Fisheries Code reserves the municipal waters (15 km from shoreline) to municipal fishers, it also allows LGUs to grant license to small and medium scale commercial fishers to fish from 10.1 km.

Reduction in the number of municipal fishers and commercial fishers - Both municipal and commercial fishers contribute to marine habitat degradation and resource extraction. Their current number is more than the capacity of the resource.

Rotational Fishing Regime - This option requires dividing the municipal waters 7 km from the shoreline into several sectors. Each year, a decided upon number of sectors are opened to commercial fishing. A sector will be opened to fishing only when stock assessment finds the area sustainable for fishing.

3.3 Stages of Evaluation and Criteria for Analysis

The evaluation focused on the likely effects on the “bioeconomics” (fish stocks and the fishers) under possible fishery management options. The evaluation procedure involved two stages. In Stage 1, the goal was to rule out options with no or low impact on significantly increasing the fish stocks. Options that passed Stage 1 advanced to Stage 2 where evaluation was done in terms of likely impact on fishers, enforceability, likely cost of implementation, and likely impact on the community. A qualitative analysis was done.

Table 17 presents the criteria and the specific indicators under each criterion that were used in evaluating the options. Each criterion was evaluated using a simple three-point scale (high, moderate, low), where the definition differed for each criterion. In Stage 1, the expected number of years an option can demonstrate recovery of resources (increase fish stocks) became the basis of evaluation. In Stage 2, to highlight similarities and differences of the options in terms of their likely impact on fishers, cost of implementation, and likely impact on the community, one point was assigned whenever an option is not likely to meet an indicator. In terms of enforceability, one point was assigned whenever an option is likely to meet an indicator (even in the most lenient sense). The information was based on data collected from fishers, fishery managers, fishery scientists, and secondary data.

3.3.1 Likely Impact on Resources

The option must first be able to address the protection, conservation, rehabilitation, and sustainability of resources. In this criterion, the main sources of information are fishery scientists with contribution from fishery managers and fishers. An option was rated high if it demonstrates likely recovery of resources (increase fish

stocks) within two years of implementation, moderate if in three to five years, and low if beyond five years.

Table 17. Criteria in evaluating the options involving two stages

<i>Stage 1</i>	<i>Stage 2</i>			
<i>Impact on resources</i>	<i>Likely impact on fishers</i>	<i>Enforceability</i>	<i>Likely cost of implementation</i>	<i>Likely impact on the community</i>
Recovery of fish stocks	Income loss	Supported by law	High enforcement and monitoring cost	Worsen poverty
	Investment Loss	Preferential ranking by fishers		Higher unemployment
	Labor displacement	Preferential ranking by fishery managers	High cost of data collection	Worsen peace and order situation
	Intensify conflict between municipal and commercial fishers	Implemented in other areas in the country	High political cost	Contribute to food insecurity
	Intensify conflict within types of fishers	Can be implemented by national and local agencies	High cost of coordination and collaboration among LGUs	Encourage migration
			High cost of coordination and collaboration between the national government and the LGUs	

3.3.2 Likely Impact on Fishers

An appropriate fishery management option should take full cognizance of its likely impact on fishers for they mainly depend on the sea and the fishery resources for their livelihood. Important likely impacts will be observed on the fishers' livelihood, income and investment, and the conflicts between and within types of fishers. The options are rated based on the number of points earned by not likely meeting the indicators (income loss, investment loss, labor displacement, intensified conflicts between the municipal and commercial fishers, and conflict within types of fishers): high if four to five points, moderate if three points, and low if one to two points. High is interpreted as "good". In this criterion, the main sources of information are fishers with contribution from local fishery technicians.

3.3.3 Enforceability

The success of a management option hinges on the extent to which it is supported by law and accepted by fishers and fishery managers and has been implemented in other areas of the country as well as its demonstrated capability for implementation by responsible agencies of the national government and local government units. The options are rated based on the number of points earned by meeting the indicators: high if four to five points, moderate if three, and low if one to

two points. In this criterion, the main sources of information are fishery managers (local government and national agencies), fishers, and secondary sources of information.

3.3.4 Likely Cost of Implementation

The proper management regulation should take full account of the implementation cost. Cost would include research, enforcement and monitoring, political cost, and the cost of coordination and collaboration among LGUs and between the local and national governments. These costs can be regarded as cost of preserving the fisheries. The options are rated based on the number of points earned by not likely meeting the indicators: high if four to five points, moderate if three points, and low if one to two points. A “high” rating means lower cost of implementation. In this criterion, the main sources of information are fishery managers (local government and national agencies) and fishery scientists.

3.3.5 Likely Impact on the Community

An appropriate management option should take full cognizance of its likely effects on the community. These may include impacts on poverty, unemployment, peace and order, food security, and demographics. The options are rated based on the number of points earned by not likely meeting the indicators (worsen poverty, worsen peace and order situation, contribute to food insecurity, encourage migration, and higher unemployment): high if four to five points, moderate if three points, and low if one to two points. A “high” rating means that the community is not worse off in terms of the indicators used. In this criterion, the main sources of information are fishers with contribution from local fishery managers (fishery technicians and local officials).

3.4 Preference Ranking of Options

The 10 management options were subjected to collective ranking by fishers during the FGDs (22 of the 27 FGDs) and by fishery managers during interviews with them. Each FGD group or fishery manager was requested to rank the options based on their preference, with the most preferred option given Rank 1 and the least preferred option given Rank 10. The procedure allowed the participants to provide direct ordinal judgments and placed minimum demands on their memory. The rankings were tabulated and the ranks given to each option were summed up. The overall ranking (with the most preferred option having the lowest sum of ranks and the least preferred option having the highest sum of ranks) was determined and converted into a qualitative description using the schedule: rank 1-2, very high; rank 3-4, high; rank 5-6, moderate; rank 7-8 low; and rank 9-10, very low.

4.0 EVALUATING THE OPTIONS FOR THE FUTURE

The evaluation involved two stages.¹³ In Stage 1, options that did not meet the crucial criterion of resource recovery were ruled out. The options that advanced to Stage 2 were evaluated on their likely impact on fishers, enforceability, likely cost of implementation, and likely impact on the community. The main goal is to identify potentially viable options.

¹³ Appendix A provides an evaluation matrix of the 10 options.

4.1. Stage 1: Evaluating the Options on Their Likely Impact on Resources

A management option must be able to demonstrate first its impact on resources. There is no sense in considering options that cannot likely increase fish stocks. Options are classified as having high impact if they will likely increase fish stocks in two years' time, moderate if in three to five years, and low impact if beyond five years (Table 18).

Table 18. Evaluation of 10 options in terms of likely impact on resources.

<i>Option</i>	<i>Increased fish stocks within five years time</i>
With likely no or low impact on resources Status quo Implement quota system Implement rotational fisheries regime Implement "closed season"	No; continuous decline No; not possible None to low None to negative impact
With likely moderate to high impact on resources Ban commercial fishing for five years Ban commercial fishing for five years with safety nets Establish a marine protected area Reduce the number of municipal and commercial fishers Create a Special Management Unit Implement localization	High High High High Moderate to high Low to moderate

4.1.1 Options with No or Low Impact on Resource Recovery

Four fishery management options were identified to have no or relatively low impact on increasing fish stocks; hence, they did not advance to the next stage of evaluation. These were status quo, quota, closed season, and rotational fisheries management.

Under the status quo option, no improvement in the biological condition and productive capacity of stocks is expected. There will be no increase in size of fish in catches and no increase in catch volume. The gradual (almost indiscernible) decrease in quality and quantity of fish will continue. It is "indiscernible" because the rate of change (decrease) at this late stage is already very slow that it would seem that there is no decrease at all.

Trawl surveys conducted at different times in the past show a continuous decline in the fish biomass (see Section 1.2). According to a marine scientist¹⁴, if no intervention will be introduced to reverse the course, then catch will be composed of organisms belonging to low trophic levels of the food chain. Testimonies of fishers during the FGDs and of fishery managers during interviews point to the "overexploited" status of the Visayan Sea and, in particular, of the northern Iloilo fisheries: declining catch, smaller fish size, disappearance of high-value species and dominance of low class

¹⁴ Personal communication with N. Armada, a marine scientist.

fish, longer fishing time than before, and increasing number of fishers (see Section 2.5.3).

The state of the Visayan Sea is no different from the Philippines' other seas, which are characterized by depleted fishery resources and degraded coastal environment and critical fisheries habitat (Luna et al. 2004). Campos et al. (2003), using a bioeconomic model, estimated a yield of 413 mt in 2002 under a status quo option in Lamon Bay (southern Luzon) and a yield decline of 13.5% annually thereafter. Jabatan (2004) reported that research conducted by the Bureau of Fisheries and Aquatic Resources (BFAR) showed that the average fish catch in the Visayan Sea continues to decline at 4% annually.

On the other hand, the quota option will not work based on information from marine scientists and available studies. Data on Total Allowable Catch (TAC) and Maximum Sustainable Yield (MSY) for the Visayan Sea and for other seas in the country are not available. They are difficult or impossible to generate in a multispecies fisheries. Enforcing quotas on multispecies fisheries is not practical because of the natural fluctuation of stocks, the fluidity of the catch, and the fluidity and dispersion of the fleet (Sprout, n.d.; Porter 2004). The fishery has numerous users landing at a multitude of landing points, and the fish can be readily sold directly to the public. Even when feasible to implement, the quota option is expected to have minimal effect. If the quota system is imposed for a long term (i.e., continuous), it may eventually contribute to a disruption of the decreasing trend in catch rates. The time of recovery would depend on the amount of the quota, but likely well over five years.

Similarly, no significant impact on the resource is expected under a rotational fishing regime, which is commonly used with sedentary species. The pelagic fish are highly migratory and the productive areas are in the 7-km area. The option is expected to likely encourage wasteful expansion of effort as the fishers attempt to make the best of the open areas. Moreover, this is practical only in municipalities with large municipal water areas like Carles and Concepcion.

Meanwhile, the suggestion of a group of commercial fishers for a closure of commercial fishing for four months and opening in the next eight months was right away rejected by key informants and by other groups of commercial fishers because resource rehabilitation takes longer than four months. Similar to rotation fishing regime, this option will likely encourage wasteful expansion of effort as the fishers attempt to make the best of the open seasons. The adverse consequences of the increased fishing intensity and the resulting increase in overall fishing costs may more than offset any beneficial effects of the four-month closure on the productivity of the stocks. On the other hand, no studies are available to show the significant resource impacts of the current closed season for species observed for sardines, herring, and mackerel every November 15 to March 15.

4.1.2 Options with Relatively Higher Impact on Resource Recovery

Six fishery management options (referred to hereafter as the six options) were identified to have relatively moderate to high impact on resource recovery: (1) ban of commercial fishing for five years, (2) ban of commercial fishing for five years with safety nets, (3) marine protected areas, (4) localization, (5) reducing the number of

municipal and commercial fishers, and (6) establishment of a special management unit. They advanced to Stage 2 for more evaluation.

Banning commercial fishing for five years is expected by marine scientists to likely arrest the continuous decline in the quality of resources in the status quo. The resources are expected to improve within the first two years but it is not certain how much the improvement will be. For sure, five years would not be enough for the stocks and habitat to recover to their levels before being overexploited (presumably in the mid-1970s to 1980s, when catches in most fishing grounds seemed to have breached sustainable levels). Catches will likely increase within the first two years but may slow down or even stagnate again soon after or the improvement will likely be short-lived if heavy fishing effort from the municipal fishers will still be there, and perhaps even take up the slack left by the commercial sector. If commercial fishing resumes after five years, conditions would likely revert to pre-ban levels within a year or two if no measures are in place to protect the resources.

Meanwhile, the positive impacts on resources of a fishing ban are well documented. Campos et al. (2003) found that the banning of shiner and fish cage accompanying high enforcement increases production by 9 mt per year in Lamon Bay. Adams et al. (2000) found also a positive impact of the net ban on the resources in Florida, USA: stock size of finfish improved. In contrast, in Newfoundland, cod fishing has been banned for more than 15 years and yet no significant rebound on cod fisheries has been observed.

If the ban is accompanied by safety nets, a similar impact on the resources is expected as with the previous option; however, the scenario after the five-year ban may be better if those previously displaced were successful in other livelihoods. This would mean a less rapid return of commercial fishing pressure to pre-ban levels (after the five-year ban).

If properly sited and managed, marine protected areas (MPA) are expected to deliver desired results within two years according to fishery managers with experience on MPAs. According to marine scientists, the impact of MPA on the resources is expected to be different when it is accompanied by other measures. For example, opting to go for MPA in combination with a five-year commercial fishing ban (assuming that the MPA size and location are “meant” to ensure improved recruitment) would result in improvements in the productive capacity of local stocks; increased catches shortly after implementation that would likely continue although indiscernibly. If commercial fishing resumes after five years, there will still likely be a return to pre-ban conditions (overexploited) although at a slower rate. Many experiences with MPA show positive results in the Philippines and elsewhere, particularly of increasing fish stocks (White et al. 2006; Hilborn et al. 2004; De Guzman 2004; Alcala et al. 2004; Adan 2004; Gell and Roberts 2002; UP-MSI et al. 2002; Dalby and Sorensen 2002).

Similarly, reducing the number of municipal and commercial fishers would mean less fishing pressure and is expected to show positive impact within a year. Even just having a cap (i.e., no further increase) may arrest further decrease in catch rates within three to five years.

The reduction of the number of municipal fishers in nine bays in the country that face overfishing has been recommended (MEAF 2006). For sustainable management, a

Fisheries BioEconomic (FISH-BE) simulation reveals that a large reduction in the number of municipal fishers (31%-84% or an average of 49%) is necessary. If the bays are representative of the municipal fisheries in the country, then there are twice as much fishers in coastal waters than can be sustainably supported.

Under the special management unit (SMU) option, the present decreasing trend in catch rates is expected to be arrested within the five-year period. This is probably the least that can happen, since this would likely be the minimum target for any management body. With improvement in the condition of stocks, catches may slowly increase and may continue to do so in the long term, depending on the management interventions taken. Since the current status of the fisheries requires a wide array of interventions, possible impact will also cover a range.

Under the localization option, some fishing effort will be removed, which would mean less pressure on the resources. This option is highly favorable to local government units with wide water areas. The opposite is true for those with small fishing grounds. Compared with the ban options, localization is expected by fishery scientists and fishery managers to take longer (3-5 years) to become effective, although this may be good for the stock on the whole and in the long term.

4.2. Stage 2: Detailed Evaluation of the Options

4.2.1 Likely Impact on Fishers

The options have a direct impact on the livelihood and income of the fishers and on the conflict between and within types of fishers. With “high” impact taken to mean good impact, the marine protected area and the special management unit were rated highly. In contrast, commercial fishing ban got a low rating. With safety net, the ban may have moderate impact on fishers. Localization and reduction in the number of fishers were rated to have moderate impact on fishers.

A complete departure from the status quo option, a commercial fishing ban will deprive commercial fishers of access to the fisheries, which, in turn, would threaten their livelihood and economic survival. The negative impacts would be huge, with the fishing crew (boat captain, machinist, and utility workers) shouldering more of the burden.

For the fishing crew, the ban would likely result in labor dislocation and loss of income (Table 15). This is a concern given that fishing has been their main or sole source of livelihood. Their options are limited because of their lack of employable skills, which is a result of their low formal education, isolation, preference for a particular way of life, and lack of knowledge and exposure to opportunities. Moreover, alternative sources of income and chances to diversify income sources are very limited in the area.

With commercial fishing banned, the conflict between commercial and municipal fishers and among commercial fishers will disappear. However, given that fishing elsewhere is not an option for small-scale commercial fishers (see Section 2.5.4), their exit from commercial fishing may mean entry to municipal fishing for sustenance. With their transfer to municipal fishing, the competition for space and resources in the municipal waters would intensify. Moreover, given the hard life they

lead, the fishers expressed that they may be forced to engage more in illegal fishing (fishing despite the ban).

Aside from income loss, the owners were concerned with investment losses. The reported invested amount varied depending on the size of the boat and gear used (Table 15). They expressed willingness to venture to other business or sell their boats anytime there is a buyer. Others were optimistic that they could move to other businesses.

Table 19. Evaluation of the Six Options in terms of likely impact on fishers.

<i>Option</i>	<i>Loss of income</i>	<i>Loss of investment</i>	<i>Displace labor</i>	<i>Intensify conflicts within type of fishers</i>	<i>Intensify conflicts between type of fishers</i>	<i>Indicator summation and overall description^a</i>
Establish marine protected areas	No	No	No to commercial fishers	Yes among municipal fishers	No	4 High
Create a special management unit	No to those using legal gears	No to those using legal gears	No to those using legal gears	Yes	No	4 High
Ban commercial fishing for five years with safety nets	Yes, but may be offset by safety nets	Yes, but may be offset by safety nets or by moving operation offshore	Yes	No	No, but crew may transfer to municipal fishing	3 Moderate
Implement localization	No to local fishers	No	No to local fishers	Yes	Yes	3 Moderate
Reduce the number of municipal and commercial Fishers	No to current fishers	No to current fishers	No to current fishers	Yes	Yes	3 Moderate
Ban commercial fishing for five years	Yes	Yes, but may move operation offshore	Yes	No	No, but crew may transfer to municipal fishing	2 Low

^a The higher the score, the better. Range: 1 to 5; Scale: 1 to 2 - low impact, 3- moderate impact, 4 to 5 – high impact. High means good.

On the other hand, the medium- (use active gears and vessels of 20.1-150 gross tons) to large-scale commercial fishing vessels (use active gears and vessels >150 gross tons) may move their operations elsewhere. This would mean increased fishing pressure

in other fishing grounds. The decision to move fishing operations elsewhere could be constrained by high maintenance and fuel cost. The nearest alternative seas are Samar Sea (111 km), Camotes Sea (114 km), Tañon Strait (134 km), and Guimaras Strait (154 km).

The municipal fishers will likely benefit from commercial fishing ban. Although commercial fishing grounds are not accessible to municipal fishers, this option would involve a reallocation in favor of the municipal fishers, who may or may not employ less efficient type of gear. With heavy fishing effort from the municipal fishers, the improvements in the resources may be short-lived. Municipal fishers may take up the slack left by the commercial sector.

Meanwhile, discussions with key informants and fishers elicited comments that commercial fishing ban may become acceptable if there are accompanying safety nets for the affected fishers. That is, a superior alternative has to be put in place before the fishing ban becomes acceptable. Under this option, labor displacement is expected but the likely economic impact on the fishers' income and investment is ambiguous given the accompanying safety net program (see Section 4.2.3). Some fishers may be able to use the assistance programs to leave fishing and move to other livelihoods or diversify sources of income. One safety net measure could be the vessel buy-back scheme or providing support for offshore fishing.

Although the location of MPAs should depend on biological assessment and other factors, MPAs are usually established in municipal waters (within 15 km from the shoreline). There is no threat of displacement and income loss among commercial fishers given that they fish far from the shore where MPA are usually sited. However, the establishment of MPAs in municipal waters would reduce the area for open fishing. This could lead to higher levels of congestion on the remaining grounds, intensifying the competition for space and resources among municipal fishers. There is also the attraction of encroachment into the "no-take" zones. However, relative to status quo, the fishers during the FGD and the fishery managers expect that their catches and their income will likely increase with the establishment of MPAs. The fishers understood that fish breed and grow near the shore before migrating offshore.

Under a special management unit (SMU) option, the welfare of fishers is expected to be promoted. However, only legal fishing activities are expected to remain. Those using illegal gears may shift to using legal gears or may exit from fishing. Conflict within types of fishers will likely intensify, particularly between legal and illegal gear users.

It is highly favorable to local fishers if they are given priority in the use of municipal waters, especially to fishers in municipalities with wide water areas like Concepcion and Carles. This, however, will intensify conflict among transients (who are used to fishing in the area) and local fishers (who are given the preferential right) and between municipal and commercial fishers (now denied to fish at 10.1 km from the shoreline).

Both commercial and municipal fishers function as central drivers in Philippine marine habitat degradation and resource extraction (Green et al. 2003). Banning commercial fishing but allowing an increase in the number of municipal fishing is similar to the status quo condition. Reducing the number of municipal and commercial

fishers by restricting new entrants to the fishery or by providing income diversification opportunities for existing fishers will not negatively affect the current fishers. Overtime, the number of fishers will decline with the retirement of old fishers. The declining number of fishers would be advantageous to the remaining fishers (with less competition and likely better income) and resources (with less pressure). However, those who are banned from entering may insist and engage in illegal fishing. This will likely intensify conflict among fishers.

4.2.2 Enforceability

The six options that proceeded to the Stage 2 evaluation were classified into highly enforceable (MPA), moderately enforceable (localization, commercial fishing ban with safety nets and special management unit), and least enforceable (commercial fishing ban and reduction in the number of municipal and commercial fishers) (Table 20). The result almost coincided with the preferential ranking of the fishers.¹⁵

Having MPAs, the only highly enforceable option (also very highly preferred by fishers), poses the least threat to commercial fishing operation. Section 81 of the 1998 Fisheries Code stipulates that every municipality in the country should reserve at least 15% of its municipal waters for fishery refuge or sanctuaries. In the country, an area where fishing is not allowed is popularly called marine protected area (MPA).

The Philippines has more experience in MPAs and has a larger number of community-based MPAs than any other country (Pollnac 2002). Although the establishment of MPAs started in mid-1970s in the country, many LGUs are yet to be encouraged to adopt MPAs as a strategy for coastal resource management and support their establishment. White et al. (2006) point out that in 2003, out of the 54 MPAs in the country, only 40% are managed in a sustainable manner.

Both fishers and fishery managers gave a high rating to MPA relative to the other management options. As previously mentioned, the fishers during the FGD did not see MPAs as creating any negative impact in their operation (see Section 4.2.1); similarly, the fishery managers believed that the resources can recover in six months to two years with MPA (see Section 4.1).

In northern Iloilo, MPAs are found in four municipalities (Ajuy, Carles, Concepcion, and Estancia). The areas established as MPAs are far below the suggested size of the 1998 Fisheries Code (i.e., 15% of municipal waters). Most are not managed sustainably and are MPAs on paper only. During the FGD, some fishers reported ignorance about the existence or location of the MPAs. The local fishery technicians expressed that they have the capability to manage the MPA but are constrained by the lack of resources (personnel and financial) for enforcement and monitoring.

The localization option is only moderately enforceable even when very highly preferred by fishers. Although the municipal waters (15 km from the shoreline) are reserved for municipal fishing, the local municipality may allow small- and medium-scale commercial fishing starting at 10.1 km from the shoreline. It is to the advantage of

¹⁵ Appendix B and C provide the preferential ranking of fishers and fishery managers of the 10 management options, respectively

local fishers if they have preferential access to their municipal waters as stipulated in Section 7 of the 1998 Fisheries Code.

Table 20. Evaluation of the six options in terms of enforceability.

<i>Option</i>	<i>Supported by law</i>	<i>Preferential ranking by fishers^a</i>	<i>Preferential ranking by fishery managers^a</i>	<i>Done in other areas in the country</i>	<i>Capability to implement by local and/or national agencies</i>	<i>Indicator summation and overall description^b</i>
Establish marine protected area	Yes	Very high	Very high	Yes	No	4 High
Implement localization	Yes but LGUs have agreement to share resources	Very high	Moderate	Yes	No	3 Moderate
Create a special management unit	No	Moderate	High	Yes under special laws	Yes, but only the national government	3 Moderate
Ban commercial fishing for five years with safety nets	Yes	Moderate	Very high	No	No	3 Moderate
Ban commercial fishing for five years	Yes	Very low	High	No	No	2 Low
Reduce the number of municipal and commercial fishers	Yes	Very low	Very low	No	Yes	2 Low

^a One point is given to the option ranked moderate to very high, none otherwise.

^b The higher the score, the better. Range: 1 to 5; Scale: 1 to 2 – low enforceability, 3 – moderate enforceability, 4 to 5, high enforceability,

As members of Northern Iloilo Alliance for Coastal Resource Development (NIACDEV), however, the seven municipalities of northern Iloilo are bound to share their fishery resources among fishers in the alliance. Municipal fishers can fish anywhere in northern Iloilo for as long as they use legal gears and secure the necessary permits. The reason for such policy of granting access rights to outsiders within an exclusive sea territory of a municipality was to afford fishers from municipalities with small or resource-poor territories access to better fishing grounds (Ferrer 2005).

Moreover, the municipalities are viewed not to have the capability to implement the localization option given the state of their local law enforcement teams (see Sections

2.3.1 and 2.3.2). In practice, the northern Iloilo waters (particularly Carles and Concepcion) are popular to transient fishers from nearby provinces of Masbate, Negros Occidental, Capiz, and Cebu. Local fishers blame transient fishers for the destruction of their fishing grounds. In addition, one municipality adopted in 2008 a revenue measure of allowing transient fishers (from anywhere) to fish in their waters for as long as the fish catch are landed in the municipal fishing port.

Similarly, the special management unit (SMU) option is moderately enforceable only although it may offer a better arrangement and can reverse the self-destructive course to one of conservation and sustainable management of coastal resources. A special law can be created granting a particular body the authority to manage, regulate, and enforce environmental laws in the Visayan Sea. This is not impossible given that there are examples of special bodies much like the concept of the SMU that have been working in other parts of the country with support from the national government. For instance, the Palawan Council for Sustainable Development is a multi-sectoral and inter-disciplinary body created in 1992 under the Strategic Environmental Plan (SEP) for Palawan Act (RA 7611). It is charged with the governance, implementation, and policy direction of the law. It is directly under the Office of the Philippine President. A second case is the Laguna Lake Development Authority established in 1966 as a quasi-government agency that leads, promotes, and accelerates sustainable development in the Laguna de Bay region. Regulatory and law-enforcement functions are carried out with provisions on environmental management, particularly on water quality monitoring, conservation of natural resources, and community-based natural resource management.

The fishers only moderately prefer this option because they doubt the sincerity and capability of the SMU to bring about improvement in the fishery resources and their livelihood. On the other hand, the option is highly preferred by fishery managers. This reflects the managers' perception of the failure of the local government units to properly manage and protect the fishery resources. Moreover, they do not oppose the proposal to temporarily take away from them the responsibility of managing the resources. Some key informants also expressed that the SMU is a better alternative to the LGUs because the former can be held accountable, unlike the local chief executives who come and go every three years. They, however, expressed their reservation that the option can only be effectively implemented if the national government has the will to do so. It has to be credible and have the necessary logistics and clear functions and responsibilities.

While Section 9 of the 1998 Fisheries Code supports banning commercial fishing, no such attempt has been made in any sea in the country. The economic and political costs accompanying this option could be the reason. This can be mitigated by safety nets. As observed, the safety nets make a difference in the preference of the fishers and in the overall evaluation as regards the enforceability of the commercial fishing ban. With safety nets, banning commercial fishing is moderately preferred by the fishers; without safety nets, it is the least preferred option.

The fishers, however, were skeptical about the sincerity and capability of the government to provide safety nets. Experiences with government assistance program have bred mistrust among fishers. In contrast, the fishery managers highly preferred the option of banning commercial fishing with or without safety nets. This reflects their belief that the resources are "overexploited" and need rehabilitation.

Similar to banning commercial fishing, the option of reducing the number of municipal and commercial fishers is least enforceable. The local government units can implement this option but are constrained because this is politically unpopular. Both fishers and fishery managers least preferred this option. The fishers' preference is understandable as this option is a direct threat to fishing. Depending on the strategy to reduce the number of fishers, this would mean temporary or permanent exit from fishing for those currently in fishing or no entry for those who are planning to enter. For fishery managers, it is not the number of fishers that is the problem but the kind of gears they use. Also, displaced fishers have nowhere to go.

4.2.3 Cost of Implementation

Five of the six options are costly to implement (reduction in the number of fishers, ban commercial fishing for five years, ban commercial fishing for five years with safety nets, special management unit, and localization) (Table 21). Establishing an MPA is moderately costly.

Hilborn et al. (2004) warned that MPAs require careful planning, evaluation, and appropriate monitoring. Without these, there is a "risk of unfulfilled expectations, the creation of disincentives, and a loss of credibility of what is potentially a valuable management tool." Relative to the status quo option, the implementation of MPAs will increase management costs because of the need for additional monitoring and enforcement. If there is little or no monitoring of the MPAs, then the expected biological benefits might not be realized. There is a strong incentive to poach, especially when the area is remote. In addition, the monitoring and enforcement costs are likely to depend on factors such as size, location, local fishing practices and customs, among others.

High enforcement and monitoring cost is expected if the MPA option is implemented in a centralized manner (or by the LGU). Enforcement and monitoring cost would be reduced if the MPA is co-managed by the concerned community and local government or is community-based. In a study of De Guzman (2004) of a marine protected area in Danao Bay, Philippines, community involvement in the management of the bay played a significant role in the successful implementation of the marine reserve and in sustaining the coastal fishery of Danao Bay. White et al. (2006) pointed out that the salient characteristic of all successful MPAs in the country is the strong involvement of communities and the local government in planning and enforcement. Social factors largely determine the long-term sustainability of MPAs (Christie 2004).

The option to reduce the number of municipal and commercial fishers is highly costly. Given that it is to be implemented by LGUs, the option is highly costly in terms of enforcement and monitoring, data collection, and political cost. The LGUs have to make sure that those who have exited from fishing do not return or those who plan to enter are blocked from entering. The cost of data collection to determine the optimal number of fishers to fish would be high. Political cost would be high as this is not a popular option. There will likely be no substantial cost in terms of collaboration among LGUs and between the LGUs and the national government.

Table 21. Evaluation of the six options in terms of the cost of implementation.

<i>Option</i>	<i>High enforcement and monitoring cost</i>	<i>High cost of data collection</i>	<i>High cost of coordination and collaboration among LGUs</i>	<i>High political cost</i>	<i>High cost of coordination and collaboration between the national government and LGUs</i>	<i>Indicator summation and overall description^a</i>
Establish marine protected area	Yes, but reduced if co-managed by community or community-based	Yes	No	Yes	No	3 Moderate
Reduce the number of municipal and commercial fishers	Yes	Yes	No	Yes	No	2 High
Ban commercial fishing for five years with safety nets	Yes	Yes	Yes	Yes, but may be offset by the safety nets	Yes	1 High
Ban commercial fishing for five years	Yes	No	Yes	Yes	Yes	1 High
Create a special management unit	Yes	Yes	No	Yes	Yes	1 High
Implement localization	Yes	Yes	Yes	Yes	No	1 High

^a The higher the score, the lower the cost of implementation. Range: 1 to 5; Scale: 1 to 2 – high cost , 3 – moderate cost 4 to 5 – low cost

The enforcement and monitoring costs of a commercial fishing ban would be high. Moreover, available resources needed to enforce compliance are scarce despite the autonomy of LGUs to generate fiscal and other revenues. Ferrer and Defiesta (2005) showed the need for large annual budgets (up to PhP 1 million or USD 21,280) to be set

aside by a municipality for a regular *bantay dagat* operation. Similarly, Campos et al. (2003) found that an annual budget of about PhP 614,000 (USD 13,060) is required to ensure compliance of regulations in Lamon Bay.

The required concurrence of the 22 municipalities around the Visayan Sea would be difficult to achieve for this may mean loss of political support from the commercial fishing sector. In addition, enforcement would likely be poor given the financial, personnel, and technical constraints faced by the LGUs and national agencies (BFAR, PNP-MARIG, Philippine Coast Guard). It could lead to more corruption in law enforcement than the current level as this option faces significant active opposition from commercial fishers (this is their least preferred option). Without any other means of economic survival, even a strict implementation of a fishing ban will not stop commercial fishing. The need to meet family needs and the lack of other job opportunities are strong forces motivating fishers to defy rules and regulations.

Financing a safety net program would increase the cost of a commercial fishing ban. The realization of this safety net program would depend on the government's ability to carry off a big budget or find funding source. If one component of the safety net is income compensation, then the minimum budget required would be PhP 172.5 million (USD 3.7 million) annually or PhP 862.5 million (USD 18.35 million) in five years for northern Iloilo (Table 22). The amount of compensation would depend on the gear used and on the position held in the fishing boat. The compensation would be largest for the crew given their number. If the boat buy-back scheme will be employed, this would require a minimum budget of PhP169.71 million (USD 3.61 million) for fishing boats based in northern Iloilo. The breakdown would be PhP 48.13 million (USD 1.02 million) for Danish seine, PhP 12.38 million (USD 0.26 million) for trawl, PhP 2.00 million (USD 0.04 million) for beach seine, PhP 3.60 million (USD 0.08 million) for purse seine, and PhP 103.60 million (USD 2.20 million) for ringnet.

Table 22. Estimated annual compensation income for northern Iloilo commercial fishers in case of commercial fishing ban with safety nets

Position	<i>Danish seine</i>	<i>Trawl</i>	<i>Beach seine</i>	<i>Purse seine</i>	<i>Ring net</i>	<i>All</i>
Owner	23,565,960	4,300,000	4,131,365	1,950,000	19,895,936	53,843,261
Boat captain	2,833,688	2,599,866	1,037,855	761,280	5,915,671	13,148,360
Machinist	2,814,152	1,822,469	279,405	761,280	2,601,359	8,278,665
Other crew members	50,871,920	6,996,745	238,021	20,138,400	18,933,048	97,178,134
All	80,085,720	15,719,080	5,686,646	23,610,960	47,346,014	172,448,420

Note: Calculated using data from Tables 2 and 15: annual income per position x number of fishing vessels using a particular gear operating in northern Iloilo x number of individuals in a particular position per fishing vessel.

In Newfoundland, the cod moratorium in 1992 cost the Government of Newfoundland about CAD 4.5 billion to assist about 19,000 families displaced by the moratorium. The safety nets made people stay in the fishery and looked forward to the

opening of the cod fishery again. Fifteen years have passed with no clear signs of the reopening of the cod fishery.

In Florida, following the net ban affecting 1500 fishing families, the state government spent for assistance programs including net buy-back program, unemployment compensation, and job retraining (Adam et al. 2000). These assistance programs were said to have failed to meet the needs of many families. The reasons include the perceived lack of coordination among various participating agencies, a lack of start-up-capital for aquaculture and ecotourism investments, and insufficient information targeted to specific needs.

On the other hand, according to Porter (2004), income subsidies in the form of income support to crew members, unemployment insurance to crew, and payments to owners for temporary stoppage (“laying up” of vessels) may not be able to deliver as expected. They can be harmful or possibly harmful if the fishery is overcapitalized and lacks economic incentives to eliminate the “race for fish” and when a fishery is underutilized but open access prevails.

Determining the right beneficiaries of a safety net program and keeping the necessary records are costly. Without safety nets, the data needed to implement the commercial fishing ban would largely involve the identities of the current commercial fishing vessels. The information is available and even if it is imperfect it would not pose a big problem. The commercial fishing vessels can easily be spotted on the waters.

Meanwhile, the special management unit (SMU) option may promise a quick and straightforward solution to different problems in the Visayan Sea. However, it is highly likely to encounter significant resistance and insufficient support from the local government units who are mandated to manage municipal waters. The experience of the VisSea Project in promoting a Joint Management Plan in the 22 municipalities in the Visayan Sea (but which failed at the implementation stage) could provide a lesson on the difficulty of soliciting the support from the LGUs (VisSea Final Report 2005; Vakily 2005).

The SMU would also require a substantial budget allocation in order to function efficiently. Based on the VisSea Project, the minimum budget would be about PhP 131.3 million (USD 2.8 million).¹⁶ The national government may finance this or it may be financed as a foreign-assisted project. The large budgetary requirements had made the study participants (fishers and fishery managers) doubt the feasibility of this option.

Similarly, implementing the localization option would be costly in terms of enforcement and monitoring and data collection. Although it is highly favorable for Carles and Concepcion, which have large territorial waters, this option would likely disrupt the harmonious relationship among municipalities in northern Iloilo. Such was observed in 2008 when one municipality decided to pursue local revenue measures requiring fishers to land catches in their own and newly established fishing port. This created conflict between the two local chief executives and led to the resignation of one

¹⁶ The Integrated Visayan Sea Coastal Resources and Fisheries Management Program (VisSea) funded by the German Technical Cooperation (GTZ) had a budget of Euro 2.05 million for 2002 to 2010 operation. The VisSea aimed to address the issues of fisheries resource depletion and persistent poverty among fisherfolk in the Visayan Sea. The VisSea, however, did not proceed after 2005.

of them as Chair of the Board of their CRM alliance. The strong culture of sharing in the area runs counter to this option; moreover, the area has no tradition of tenure. These factors may render this option ineffective.

4.2.4 Likely Impact on the Community

In terms of the likely impact on the larger community, the six options were equally classified into: with high impact (MPA, commercial fishing ban with safety nets, and special management unit) and with low impact (localization, reduction in the number fishers, and commercial fishing ban) (Table 23). High impact means good: the community is not worse off in terms of poverty, peace and order, food security, outmigration, and unemployment.

Table 23. Evaluation of the six options in terms of likely impact on the community.

<i>Option</i>	<i>Worsen poverty</i>	<i>Worsen peace and order situation</i>	<i>Contribute to food insecurity</i>	<i>Encourage migration</i>	<i>Higher unemployment</i>	<i>Indicator Summation and overall description^a</i>
Establish marine protected area	No	No	Yes, possibly in the short run	No	No	4 High
Create a special management unit	No	No	No	No	No, but fishers using illegal gears will be out of fishing	4 High
Ban commercial fishing for five years with safety nets	Yes, but maybe offset by safety nets	Yes, but maybe offset by safety nets	Yes, possibly in the short run	Yes, but maybe offset by safety nets	Yes, but maybe offset by safety nets	4 High
Implement localization	Yes	Yes	Yes	No	Yes	1 Low
Reduce the number of municipal and commercial fishers	Yes	Yes	No	Yes	Yes	1 Low
Ban commercial fishing for five years	Yes	Yes	Yes possibly in the short run	Yes, but crew may just transfer to municipal fishing	Yes	1 Low

^a The higher the score, the better. Range: 1 to 5; Scale: 1 - 2 – low impact, 3 – moderate impact, 4-5, high impact. High means good

The MPA option was seen to likely have good impact on the community in general. It is not likely to worsen poverty or peace and order situation in the community or increase unemployment. In the short run, however, the many MPAs that will be established may reduce the supply of fish in the area due to the reduction of open fishing grounds.

Available studies also show the positive social impacts of MPAs. According to White et al. (2006), the likely benefits of MPA include cash income from tourism. Gell

and Roberts (2002) identified positive social impacts of marine reserve to include: a) increased environmental awareness among the locals; b) educational opportunities for the locals; c) increased community harmony; d) reduced conflict between user groups and managers as they work together and make decisions; and e) venue where fishers, tourist business operators, and local politicians interact.

The impact of the special management unit (SMU) option on the community will depend on how acceptable it is to the stakeholders, particularly the LGUs. Failure to enforce and maintain the SMU in the face of resistance from local government units would likely result in a complete lack of regulation or revert to status quo, perhaps for a significant period. Assuming LGU support, the SMU can work to respond to the needs of the resources and fishers. Under SMU, it is expected that illegal fishing will be minimized if not totally eliminated. This will be good to the remaining fishers and resources but will contribute to unemployment. The displaced fishers can shift to using legal gears or engage in other income-generating activities.

Effort reduction schemes (banning and reducing the number of fishers) will likely result in higher unemployment in the coastal area. No work means no income and more hunger. That is, the municipal fishers and the crew of commercial fishing boats will be further impoverished. This will further breed social and economic problems and thus, the peace and order situation will be threatened. Illegal fishing activities and other criminal activities like theft and robbery are expected to increase, according to the FGDs. The possibility of outmigration by the young people is high in order to find employment to support their families.

For these reasons, the fishers during the FGDs viewed these options as “inhuman”, not feasible and will host a number of social problems. But if accompanied by safety nets, the social problems may not be as worse as without safety nets. The local government units need national government support in providing safety nets to the fishers. There must be programs for income diversification and other programs to help the affected fishers. Given the cushion provided by the safety nets, the community may not be worse than expected. Under the condition of working safety nets, the communities are expected to be in same situation or better. Under the condition of non-working safety nets, the communities will be worse off.

Similarly, the implementation of the ban will not only affect the livelihood of the fishers but also several stakeholders: fish middlemen (commission men, wholesalers, retailers), fishing input suppliers, fish processors, and consumers. The ban is expected to hurt not only northern Iloilo but the whole island of Panay. With low fish supply, prices are expected to go up.

Estancia, the center of fish marketing in northern Iloilo will be greatly affected by the ban. Most of the established business enterprises are related or support the fishing industry. Farming is marginal and cannot absorb the labor that will be displaced from fishing. Similarly, an “economic collapse” would likely happen in Carles, 95 percent of which are islands whose topography makes agriculture difficult if not impossible.

Adams et al. (2000) reported the following changes that have occurred in Florida, USA after the net ban: decline in landings, effort, dockside value, and ex-vessel

price, as well as changes in income sources, business management activities, fishing patterns, species target, and participation in assistance program.

4.3 Potentially Viable Options

Table 24 presents the evaluation summary matrix for the six management options. There is no ideal option or an option that fully satisfies the criteria. An ideal option is one with high (which means good) impact on the resources, fishers, and community, and highly enforceable at a low cost of implementation.

Among the six options, the MPA closely approximate the ideal option with the only difference of being moderately costly to implement. At the other end is the option to ban commercial fishing, which only meets the goal of protecting the resources but fails in the rest of the criteria.

Table 24. Summary evaluation matrix of the six options.

<i>Option</i>	<i>Impact on resources</i>	<i>Impact on fishers^a</i>	<i>Enforceability</i>	<i>Cost of implementation</i>	<i>Impact on the community^a</i>
Establish marine protected area	High	High	High	Moderate	High
Reduce the number of municipal and commercial fishers	High	Moderate	Low	High	Low
Create a special management unit	Moderate to high	High	Moderate	High	High
Ban commercial fishing for five years with safety nets	High	Moderate	Moderate	High	High
Implement localization	Low to moderate	Moderate	Moderate	High	Low
Ban commercial fishing for five years	High	Low	Low	High	Low

^a high means good

4.3.1 Tradeoffs Among Options

Tradeoffs accompany the options. For instance, reducing the number of fishers will have high impact on resources and moderate impact on fishers but is low in terms of enforceability and impact on the community and highly costly to implement. The special management unit option has moderate to high impact on resources, high impact on fishers and the community but costly to implement and only moderately enforceable. Banning commercial fishing with safety nets has high impact on resources and the

community, with moderate impact on fishers but highly costly to implement and only moderately enforceable. Similarly, the localization option has high impact on fishers but only low to moderate impact on resources, low impact on the community, and only moderately enforceable at a high cost of implementation.

The presence of tradeoffs suggests the need to use a mix of options rather than a single option. The weakness of an option in one criterion can be balanced by its strength in another criterion or can be offset by the effect of another option. The use of a mix of options is in order given that the current status of the Visayan Sea fisheries, specifically northern Iloilo, requires a wide array of interventions.

It is expected that the impact of the MPA option on the resources would be more extensive in space when it is accompanied by other measures than when it would be just alone. For instance, a five-year commercial fishing ban combined with a reduction in the number of municipal fishers and establishment of MPAs whose size and location are meant to ensure improved recruitment could result in bigger improvements in the productive capacity of local stocks and likely of the entire Visayan Sea. Moreover, catches would increase shortly after implementation and would likely continue. If accompanied with safety nets, this combination of options would lead to a much better scenario when commercial fishing resumes after five years. Those who have become successful in other livelihood are expected no longer to return to fishing. The creation of the SMU to implement these options may be a better option than the LGUs.

4.3.2 Possible Implementation

The LGUs can be encouraged to establish and sustainably manage MPAs. Scientific biological surveys are needed to generate the needed biological information that will guide the siting of MPAs. For MPAs already sited but not managed sustainably, management practices can be improved. The support of the community must be mobilized for the long-term sustainability of the MPAs.

At the same time, efficient fishery registration and licensing must be conducted at the LGUs. This is a necessary requirement when the plan to reduce the number of municipal and commercial fishers is to prevent the entry of more fishers in the area, particularly by the young people and those using illegal gears or practices destructive fishing methods. Income diversification will also ease fishing pressure by removing some fishing effort.

With regards banning commercial fishing or reducing their number, the national government has to decide on this but with concurrence of the LGUs. Banning commercial fishing is a potential option if accompanied by a credible safety net program. The need to protect the resources must be balanced with the needs of the people. Opposition to the ban is likely because it threatens the survival of the people. To most fishers, fishing is their only option. A safety net program must be responsive to the needs of the fishers and leave them with same level, if not improved, welfare as before any intervention. The first to be directly affected by a fishing ban or any effort reduction management scheme would be the owners and crew of commercial fishing vessels.

Two possible support for the owners are buying back their vessels or providing support for offshore fishing. The owners are willing to surrender their fishing vessels if

they will be paid of their investments. Some of them claimed that they borrowed money to put up their business.

On the other hand, the 1998 Fisheries Code (Section 35) states that fishing vessel operators are encouraged to fish farther into the Exclusive Economic Zone (EEZ) and beyond by granting them incentives for improvement of fishing vessel and the acquisition of fishing equipment in addition to incentives already available from the Board of Investment. During the FGDs, the owners of small-scale commercial fishing vessels expressed unawareness of any support program for vessel upgrading. Some are willing to go offshore if given the needed support, while others are reluctant given their beliefs that fishing offshore is difficult, especially during the typhoon season. They also believe that fish concentrate in shallow waters.

If they stop fishing, the crew members are worried about their daily source of income. They indicated that they will leave fishing only if everyone does and when there are support available for them to move out of fishing. The support may be in the form of alternative livelihood, income loss compensation, education and skills training program, provision of credit and land to till, among others.

For boat captains and crew, only an alternative employment that will enable them to earn as much as they earn in fishing will persuade them to get out of fishing. Most of them entered fishing because of their limited skills and knowledge for other jobs. To many, fishing is a dangerous and tedious work. If they can find work on land, they would be willing to go out of fishing. Some boat owners encourage their crew to look for better jobs than fishing and are willing to let them go if they found one.

The current state of the fishery resources reflects the poor state of management regime led by the LGUs. A special management unit (SMU) with authority to manage, regulate, and enforce laws can be created by the national government and pilot tested in northern Iloilo. It must be a credible body with allocated budget, capable personnel, and clear framework of functions, programs and activities. Under such regime, the SMU would conduct the science, implement proper licensing and registration of fishers, effort control, implement and administer a conservation-based management system that would include monitoring and enforcement. The safety nets will also be more credible when their implementation is delegated to a special body rather than to the LGUs. This is to avoid politicalization of the program and corruption.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The current state of the Visayan Sea calls for immediate intervention to arrest further decline in the quality of the resource. The future of the people and the communities surrounding it rests on its sustainability. The sea is an important source of livelihood, income, and food for thousands of people. Delay in intervention may only mean that the difficult situation many fishers are in now will worsen, particularly when the sea collapses.

The need to protect the fishery resources must be balanced with the needs of the fishers. This study aimed at identifying potentially viable options. Management options were recommended by some sectors that have to be ruled out at the beginning because

they failed to meet the crucial criterion of improving the resources. None of the potentially viable options can fully satisfy the criteria set. There are tradeoffs. For instance, effort reduction schemes like banning commercial fishing and reduction in the number of fishers (municipal and commercial) can help the stocks recover fast but will displace a number of fishers, resulting in loss of income. Localization will protect the local fishers but compared with fishing ban, this would take longer to become effective. An MPA, when not properly managed, will not bring about any improvement in the condition of the habitat and fish stocks. Having a special management unit may provide a better alternative than the current management regime but would be expensive to implement. A combination of options is expected to have more beneficial impacts than any single option.

Opposition to fishing effort reduction schemes (like fishing bans and reduction in the number of fishers) is likely because such schemes threaten the survival of the people. To most fishers, fishing is their only option. A safety net program that is responsive to the needs of the fishers and leave them with same level of, if not improved, welfare as before any intervention, must accompany any fishing effort reduction management option. Short-term support to the fishers can be in the form of income loss compensation, credit assistance, or boat buy-back schemes. Any income support, however, may encourage the fishers to wait to return to fishing, thus perpetuating the cycle. A solution to break the cycle must be found. Long-term solutions that deal with community issues, such as education to expand employment opportunities, must be considered.

The persistence and the intensification of the problems in the Visayan Sea and in northern Iloilo in particular are manifestations that the current management arrangement is not capable of solving the problems. The current management regime is clearly not responsive to the needs of the resource and the people. Having a special management unit for the Visayan Sea may offer a better arrangement and can reverse the self-destructive course to one of conservation and sustainable management of coastal resources. The implementation of a pilot program in northern Iloilo may be considered.

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Appendix A. Evaluation summary of the management options.

<i>Option</i>		<i>Likely Impact on fishery resources</i>	<i>Likely Impact on Fishers</i>	<i>Enforceability</i>	<i>Cost of implementation</i>	<i>Likely Impact to the Community</i>
1	Status quo	- No improvement in biological condition and productive capacity of stocks - No increase in size of fish in catches - Continuous decline in quality of fish and quantity of fish catch	- Declining income - Exit of small-scale commercial fishers or of the less efficient ones - Intensification of conflicts among resources users - More illegal fishing	- To continue in the absence of serious effort to reverse the situation - Low preference among fishery managers - High preference among fishers	Politically unsustainable	- Poverty to worsen - Fish crisis - Poorer health and nutrition - Intensification of social problems (more theft/robbery) - Peace and order situation more threatened
2	Ban commercial fishing for 5 years	- Improvement in the biological condition and productive capacity of stocks within two years (not certain how much the improvement will be) - If commercial fishing resumes after five years, conditions would likely revert to pre-ban levels within a year or two if no measure against return to pre-ban levels is put in place.	- Exit from fishing of small-scale commercial fishers or of the less efficient ones. - Displacement of fishers resulting in loss of income - Loss of capital investment for owners - Owners may shift to other forms of business - Crew members may shift to municipal fishing; intensifying conflict - Potential increase in effort before the ban - Medium to large commercial fishing vessels may be able to fish elsewhere - More illegal fishing - Favorable to municipal fishers	- Has the support of the law (Section 9 of the 1998 Fisheries Code-Establishment of Closed Season) - Difficult to enforce - Needs concurrence of affected LGUs - Moderately preferred by fishery managers - Very low preference among fishers - No experience in the Philippines - Requires strong coordination between the LGUs and the national government and among LGUs	- Enforcement and monitoring cost would be too high - Loss of political support from the commercial fishing sector - Stock assessment and other biological and oceanographical studies required - High cost of collaboration between the LGUs and national government and among LGUs	- Poverty to worsen - Higher unemployment - Contribute to food insecurity in northern Iloilo and nearby provinces - With less supply, fish prices to go up - Intensification of social problems (more theft/robbery) - Peace and order situation more threatened - Outmigration is likely - Children out of school - To affect several groups providing support to fishing industry

Appendix A. (Continued)

<i>Option</i>		<i>Likely Impact on fishery resources</i>	<i>Likely Impact on Fishers</i>	<i>Enforceability</i>	<i>Cost of implementation</i>	<i>Likely Impact to the Community</i>
3	Ban commercial fishing for 5 years with safety nets	• Similar to Option 2 but the scenario after the ban period may be better if those previously displaced were successful in other livelihoods. • After the ban, there will be a tendency for conditions to return to pre-ban levels, although over a slightly longer period of time.	• Exit from fishing of small-scale commercial fishers or of the less efficient ones. • Loss of income for owners and crew of commercial fishing vessels • Labor dislocation among crew of commercial fishing vessels • Loss of capital investment for owners of commercial fishing vessels • Owners may shift to other forms of business • Crew members may shift to municipal fishing, intensifying conflict • Potential increase in effort before the ban • Fishing elsewhere not possible given technology and cost of operation • More fishers may engage in illegal activities • Favorable to municipal fishers • Safety nets may make fishers wait for resources to open for fishing	• Has the support of the law (Section 9 of the 1998 Fisheries Code-Establishment of Closed Season) • Difficult to enforce • Needs concurrence of affected LGUs • Moderately preferred by fishers • Highly preferred by fishery managers and fishery scientists • Success stories of income diversification projects among fishers. • Requires coordination between the LGUs and the national government and among LGUs	• Enforcement and monitoring cost would be too high • Likely loss of political support from the commercial fishing sector • Large budget requirement for the safety net program • Stock assessment and other biological and oceanographical studies required • High cost of collaboration between the LGUs and national government and among LGUs	• Less fish supply, high prices • The likely impact on poverty, peace and order situation, unemployment and migration decisions would depend on the safety net program. • Rise of new business as owners may rechannel their capital

Appendix A. (Continued)

<i>Option</i>		<i>Likely Impact on fishery resources</i>	<i>Likely Impact on Fishers</i>	<i>Enforceability</i>	<i>Cost of implementation</i>	<i>Likely Impact to the Community</i>
4	Marine protected area	- Improvement in the biology and productive capacity of resources within two years if properly implemented - Evidence of positive impact on resources in MPA - The increased effort in open areas may reduce the nonprotected stocks to very low levels.	- No expected negative impact on commercial fishing operation - Risk of unfulfilled expectations, creation of disincentives, and loss of credibility of MPA - May intensify conflicts – congestion in open fishing areas; attraction to poach - May increase effort at areas outside and especially along the boundaries of MPA	- Requires careful planning, evaluation, and monitoring - Very highly preferred by fishers and fishery managers - Has the support of the law (Section 81, 1998 Fisheries Code-Fish Refuge and Sanctuary) - Popular management tool in the country - Positive experience with MPAs in some parts of the country	- High enforcement and monitoring cost - High cost in mobilizing the community to manage MPA - Requires community ownership for be successful - Costly biological and oceanographical assessments - Politically costly when not accepted by resource users	- May or may not contribute to poverty alleviation - May promote social cohesion - If community based, can promote community empowerment - Tourism-related income opportunities
5	Special Management Unit	Improvement in the stocks and later catches within three years	- Continued fishing for legal gears - Possible shift to legal gears - Reduction in the number of fishers - Loss of income among users of illegal gears - Intensification of conflicts among users of legal and illegal gears within types of fishers	- Requires careful planning, evaluation, and monitoring - Opposition from the LGU - Needs creation of law - High preference among fishery managers - Medium preference among fishers - High feasibility according to fishery managers - Positive experience with SMU type in some parts of the country	- High administration cost - Political implication of shifting management authority	Impact would depend on the success of the SMU interventions

Appendix A. (Continued)

<i>Option</i>		<i>Likely Impact on fishery resources</i>	<i>Likely Impact on Fishers</i>	<i>Enforceability</i>	<i>Cost of implementation</i>	<i>Likely Impact to the Community</i>
6	Quota/ITQ	- Difficult to determine TAC and MSY in multispecies fisheries - The impact on the stocks would depend on TAC; may arrest decline of fish catch in the long run	- Income reduction/loss - Displacement of some crew members - May encourage dumping - More illegal fishing	- Information on calculation quota not yet available or difficult to generate - Has the support of the law (Section 8, 1998 Fisheries Code- Catch Ceiling Limitation - Low preference among fishers - Moderate preference among fishery managers - Impractical - Highly susceptible to corruption	- Large and enforcement and monitoring cost - Very high cost of data collection cost - Restructuring of offices required - Large collaboration and coordination cost between the national and local governments - Susceptibility to corruption	- Market gluts - Reduced income - Worsen peace and order situation - May contribute to unemployment
7	Closed season	Gains during four months of closure more than offset by intense fishing pressure during eight months open fishing	- Loss of income during closure - Excess effort during open season	- Requires creation of law - Moderately preferred by fishers and fishery managers - Impractical - Highly susceptible to corruption	- High enforcement cost - Requires study of the appropriate periods of ban	- Poverty may worsen during the closed fishing period. - More theft/robbery - Peace and order condition threaten
8	Reduce the number of municipal and commercial fishers	Less pressure on the resources; recovery in first two years	- Displacement of fishers or non-entrance to fishing - Loss of income for displaced fishers - Intensification of conflict among fishers (current and those insistent - More illegal fishing	- Low preference from both fishers and fishery managers - Low feasibility of being enforced - Has been recommended for a long time	- High enforcement and monitoring cost - High cost of collection of information - Politically costly - Necessitates safety nets	- Poverty to worsen - Unrest - Higher unemployment - Encourage migration

Appendix A. (Concluded)

<i>Option</i>		<i>Likely Impact on fishery resources</i>	<i>Likely Impact on Fishers</i>	<i>Enforceability</i>	<i>Cost of implementation</i>	<i>Likely Impact to the Community</i>
9	Localization/Territorial utilization rights	• May be good on the stocks over long term • Favorable only to large water area	• Displacement of transient fishers • Fishers in LGUs with small water area will suffer from reduced catch and lower income	• Local ownership provides vested interest in sustainability. • Variable response by the fishers from different municipalities • Very highly preferred by fishers • Moderately preferred by fishers • No tradition of tenure • Has the support of the law (Section 7 of the Fisheries Code (Access to Fishery Resources))	• Politically costly • High enforcement and monitoring cost • Conflict with local culture of sharing and caring • Large collaboration and coordination cost between the national and local governments • Susceptibility to corruption	• Promotes local involvement in management process • Negative impacts on communities with small water area • Positive impact on communities with wide water area • Favorable on community given transient are illegal fishers
10	Rotational fishing regime	• Gains during months of closure maybe more than offset by intense fishing pressure during open fishing season • Favorable only to large water area	• Access to municipal waters • Shortage of catch and income • More illegal fishing	• Impractical • Requires creation of law • Susceptibility to corruption	• High enforcement and monitoring cost • Politically costly • Costly biological assessments	• Poverty to worse • Unrest • Higher unemployment

Appendix B. Preference ranking of the options by fishers

<i>Management Option</i>	<i>Owner</i> $n_1=9$ $m_1=36$	<i>Boat captain</i> <i>/Machinist</i> $n_2=4$ $m_2=27$	<i>Crew</i> $n_3=9$ $m_3=68$	<i>Sum of</i> <i>ranks</i>	<i>Overall rank</i> $N=21$ $M=131$
Very High Preference					
Localization	1	1	2	4	1
Marine protected area	2	2	3	7	2
High Preference					
Status quo	3	4	1	8	3
Closed season	4	5	5	14	4
Moderate Preference					
Special mgt. unit	6.5	6	4	16.5	5
Ban commercial fishing for five years with safety nets	8	3	6	17	6
Low Preference					
Rotational fisheries management	5	8	8	21	7
Quota	9	7	7	23	8
Very Low Preference					
Reduce municipal fishing effort	6.5	9	9	24.5	9
Ban commercial fishing for five years	10	10	10	30	10

$n_1 + n_2 + n_3 = N$ is the number of focus group discussions; One FGD group = 1Vote

$m_1 + m_2 + m_3 = M$ is the number of FGD participants

Appendix C. Preference ranking of options by fishery managers

<i>Management Option</i>	<i>Overall Rank N=9</i>
Very High Preference	
Ban commercial fishing for five years with safety nets	1
Marine protected area	2
High Preference	
Special management unit	3
Ban commercial fishing for five years	4
Moderate Preference	
Closed season	5
Localization	6
Low Preference	
Quota	7
Rotational fish management	8
Very low Preference	
Reduce municipal fishing effort	9
Status quo	10

The nine key informants were 3 AT in fisheries, 1 CRM officer, 1 Executive Director of NIACDEV, 1 Municipal Agricultural Officer, 2 members of the municipal legislative council, and 1 BFAR field personnel