Operationalizing the Ecosystem Approach to Small-Scale Fisheries Management in the Philippines: The Iligan Bay Alliance of Misamis Occidental

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ABSTRACT

This paper describes the application of the participatory diagnosis and adaptive management (PDAM) framework to analyze the governance of small-scale fisheries and the potential for adopting the Ecosystem Approach to Fisheries (EAF) in Misamis Occidental, Philippines. Using the Rapid Appraisal of a Fisheries Management System (RAFMS) as a complementary methodology, the paper provides key information on stakeholders' perception on scaling-up of fisheries management. More specifically, the paper focuses on the strengthening of the Iligan Bay Alliance for Misamis Occidental (IBAMO), a multi-stakeholder body to provide a governance framework for inter-LGU collaboration. Stakeholder participation during the diagnostic phase is also described as well as potential areas for capacity building in addition to information and education activities that are needed to promote EAF in this important fisheries area.

Keywords: small-scale fisheries management; governance; Iligan Bay Alliance for Misamis Occidental; rapid appraisal and participatory diagnosis
JEL classification: Q20, Q22

INTRODUCTION

A vast majority of artisanal fishers live in developing countries where they dominate small-scale fisheries (SSF) operations (Mills et al. 2011). In these countries, small-scale fishing is a key livelihood strategy for millions of households in coastal and rural communities and plays an important role in food security and poverty alleviation. The small-scale fisheries sector employs 25–27 million full-time and part-time fishers in developing countries, with another 68–70 million people employed in post-harvest activities and in food processing (FAO 2010). Hence, it provides over 90 percent of all fisheries jobs, half of which are held by women (FAO/WorldFish 2008; Mills et al. 2011). As an archipelago, the Philippines typifies the dominance of SSF, with some 1.3 million fishers dependent on nearshore fisheries (Bureau of Fisheries and Aquatic Resources [BFAR] 2010).

An ecosystem approach to fisheries (EAF) balances diverse societal objectives by accounting for the components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically defined boundaries (FAO 2003). This systems approach binds integrated coastal management and ecosystem-level perspectives grounded on the principles of collaborative and adaptive approaches (FAO 2005). Simply, fisheries management is implemented in an ecosystem context (Link 2002).

Philippine coastal and marine fisheries are conventionally subdivided into municipal or small-scale fisheries and commercial fisheries according to the size of the boat. This main criterion groups boats that are less than 3 gross tons as small-scale, and those greater than 3 gross tons as commercial.

The legal and policy framework in support of SSF is quite comprehensive. The Local Government Code (LGC) of 1991 promotes local autonomy, thus enabling the local government units (LGUs) to become the key managers of natural resources, including the fisheries, within 15 kilometers of their territorial boundaries. Subsequently, the Agriculture and Fisheries Modernization Act (AFMA) of 1997 focused on fisheries production and food security.

Then, the Philippine Fisheries Code of 1998 (RA 8550) laid down the framework for the development, management, and conservation of the country's fisheries and aquatic resources. Specifically, it espoused poverty alleviation and provision of supplementary livelihood among small-scale fishers. Finally, Executive Order (EO) No. 533, issued in 2006, mandated the adoption of integrated coastal management (ICM) as a national strategy for the sustainable development of the coastal and marine environment. Corollary to this, fisheries management is considered better pursued in a multi-sectoral management system.

Against this backdrop, the European Commission (EC) funded the project *Implementing an Ecosystem Approach to Fisheries (EAF) in Small-scale Tropical Marine Fisheries*. WorldFish has been implementing the project from December 2011 to December 2014 in Indonesia, the Philippines, the Solomon Islands, and Tanzania to improve small-scale fisheries (SSF) management—a significant step to help reduce poverty. Framed on EAF, the project specifically aims to (1) assess existing institutional arrangements and understand how an EAF can contribute to more effective integrated SSF management, (2) identify and pilot EAF strategies and actions that are appropriate for developing countries, and (3) strengthen the capacity of target groups to collaborate and work within the EAF framework.

The Philippine study covers eight coastal LGUs in the province of Misamis Occidental in northern Mindanao—namely, Aloran, Jimenez,

Lopez Jaena, Panaon, Plaridel, Sinacaban, Tudela, and Oroquieta City. Organized as the Iligan Bay Alliance of Misamis Occidental (IBAMO), these LGUs agreed to operationalize EAF in the area through a multi-agency governance structure

The IBAMO emerged from an initiative called the Iligan Bay Coastal Resource Management Project (ICRMP) implemented from 2005 to 2009 by the Philippine-Australia Community Assistance Program (PACAP) (AusAID 2011). In 2009, a Department of Science and Technology-Philippine Council for Aquatic and Marine Research and Development (DOST-PCAMRD)-funded project continued the ICRMP (De Guzman et al. 2008; De Guzman and Ruiz 2009) and formed an alliance involving 14 coastal municipalities of Misamis Occidental. In 2010, IBAMO was formally organized, with only the four PACAP-assisted areas—Panaon, Jimenez, Sinacaban, and Tudela—as initial members.

From 2011 to 2013, WorldFish implemented the project titled *From Ridge to Reef (R2R): An Ecosystem-based Approach to Biodiversity Conservation and Development in the Philippines* in collaboration with several partners and LGUs such as the World Agroforestry Center (ICRAF), Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), and national government agencies, such as the Department of Agriculture-Bureau of Fisheries and Aquatic Resources (DA-BFAR), Department of Environment and Natural Resources (DENR), and DOST. By this time, two more LGUs, namely Aloran and Oroquieta City, participated in the project funded by the United States Agency for International Development (USAID).

Re-established and expanded, IBAMO thus provided the governance framework for inter-LGU collaboration and improvement of coastal resources management initiatives. With these developments, two more LGUs, namely Plaridel and Lopez Jaena, joined the IBAMO.

This paper provides a brief description of fisheries governance in the study areas. It highlights key information on stakeholders' perception about governance towards scaling-up of fisheries management through IBAMO. It also provides insights on stakeholders'perceptions of up-scaling, including the potential role and structure of IBAMO as a governance mechanism to support EAF.

METHODOLOGY

Study Areas

The Province of Misamis Occidental is in the northwestern part of Mindanao, Philippines (Figure 1). It is bounded by two mountain ranges in the west, by the Mindanao Sea in the northeast, by Iligan Bay in the east, and by Panguil Bay in the southeast. From the town of Plaridel in the north to the town of Tudela in the south, the project area spanned a coastline of about 60.6 kilometers (km) of the total coastline of Misamis Occidental (i.e., 169 km). The coastal area is also endowed with fringes of mangroves and coral reef habitats.

A rapid rural appraisal revealed some key characteristics of the eight coastal LGUs of IBAMO (Table 1).

The study areas included the coastal marine waters (i.e., waters within 15 km from the shore) of eight LGUs along Iligan Bay in the Province of Misamis Occidental. In these areas, fisheries are multi-species and consist of reef fishes, small pelagics, and shellfish (invertebrates). Small-scale fishers use various gear, mainly hook-and-line (*pasul*) and gill nets (*pukot*). They also use other major gear such as fish traps (*bobo*) for big fish and crab; and a smaller derivative made of bamboo, (*panggal)* for smaller fish, crab, and squid.

Figure 1. Map of the study area in Misamis Occidental in northern Mindanao

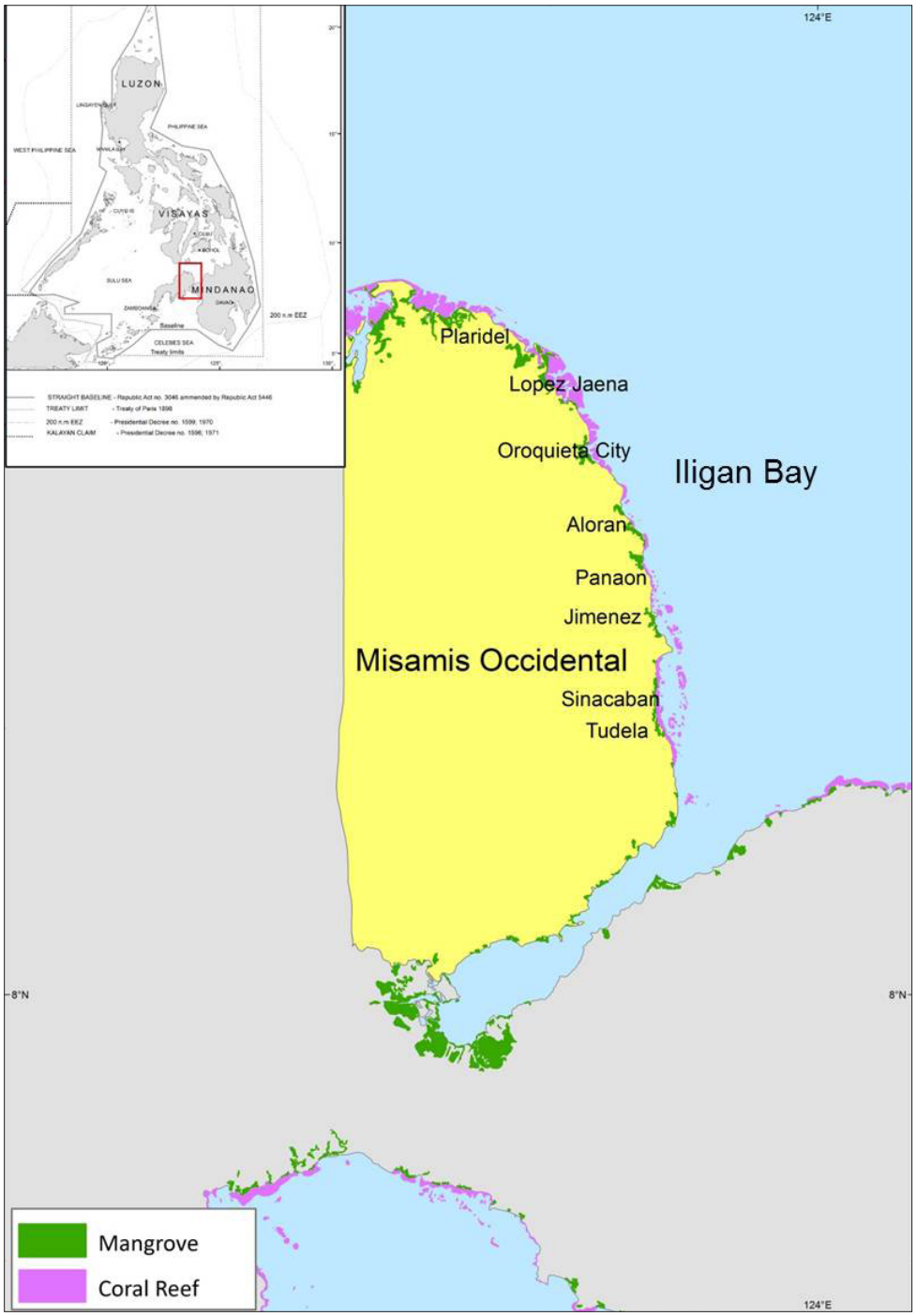


Table 1. Socio-economic and biophysical characteristics of the eight LGUs in the study site

Local Government Units (LGUs)	No. of Coastal Barangays[1]	Coastline Length (km)	Population (NSO 2010)	Income Class	CRM Coordinating Office[2]	Municipal Resolutions on CRMP	Date of Survey
Aloran	5	8.0	26,630	4th	MPDO	For approval	24 August 2012
Jimenez	3	4.5	25,234	3rd	MPDO	74-2009 (8 May 2009)	17 August 2012
Lopez Jaena	9	9.0	23,767	4th	MPDO	For approval	2-3 October 2012
Oroquieta City	12	9.0	68,945	4th	CENRO	For approval	13-14 August 2012
Panaon	3	5.5	10,176	5th	MAO	20-2009 (October 2009)	16 August 2012
Plaridel	12	14.0	35,251	3rd	MPDO	For approval	4-5 October 2012
Sinacaban	5	5.5	18,597	5th	MAO	46- S. 2009 (19 June 2009)	7 September 2012
Tudela	4	5.1	27,371	4th	MPDO	09-270 2009 (28 Sept 2009)	15 Aug 2012
Total	53	60.6	235,971				

Notes: Total respondents key informant interviews = 157, other respondents included provincial and regional level (see also Table 3)
1 Administratively, a 'barangay' corresponds to a village government
2 CRMP = Coastal Resources Management Plan; CENRO = City Environmental and Natural Resources Officer; MAO = Municipal Agriculture Officer; MPDO = Municipal Planning and Development Officer

Fish landing surveys conducted from June to September 2011 as part of the *Ridge to Reef* (R2R) project revealed 23 distinct fishery gear used in the six municipalities covered by the project. The gear differed in occurrence, catch contribution, and catch per unit of effort (CPUE).

Set gillnets and multiple hooks-and-lines were the most frequently used, producing CPUE of 8.4 kilograms per trip (kg/trip) and 3.9 kg/trip, respectively. However, the highest values of mean CPUE for small-scale fisheries were recorded from the beach seine (125.5 kg/trip), fishing in conjunction with fish aggregating devices known as *payao* (37.4 kg/trip), and fine mesh net (28.2 kg/trip). Additionally, a ring net operating in Oroquieta City produced an average CPUE of 900.1 kilograms (kg) per trip.

Catch in the area was comprised of 110 species from 59 families and dominated by small pelagic species such as big-eyed scad *(Selar crumenophthalmus),* anchovy *(Stolephorus oligobranchus),* and round scad *(Decapterus maruadsi)*. Big-eyed scad (*S. crumenophthalmus)* made up the greatest proportion of catch (38%) using municipal gear (i.e., excluding commercial ring nets), indicating that this species is one of the most exploited in Misamis Occidental (Garces et al. 2012). Based on length, fish caught by most of the gear were frequently below the size at first maturity, indicating overfishing. For example, the big-eyed scad (*S. crumenophthalmus*) caught in the area were smaller than 255 millimeters (mm)—the length at first maturity based on FishBase (Garces et al. 2012).

Description of PDAM Framework

The participatory diagnosis and adaptive management (PDAM) framework (Figure 2) can be used to analyze or implement management of SSF, in line with any of the major governance approaches, including the Ecosystem Approach to Fisheries Management (EAFM) (Andrew et al. 2007). The PDAM framework simplifies FAO's integrated assessment and advice framework specifically designed for EAFM (see Garcia et al. 2003).

The framework starts with the diagnosis phase wherein the fishery to be managed is defined and the fishery-specific issues that the management aims to address are identified. The key tasks within the diagnosis phase include (1) defining the fishery boundaries; (2) identifying fishery-specific challenges and opportunities (past, present, and future); (3) prioritizing issues; and (4) scoping potential management solutions (Andrew et al. 2007).

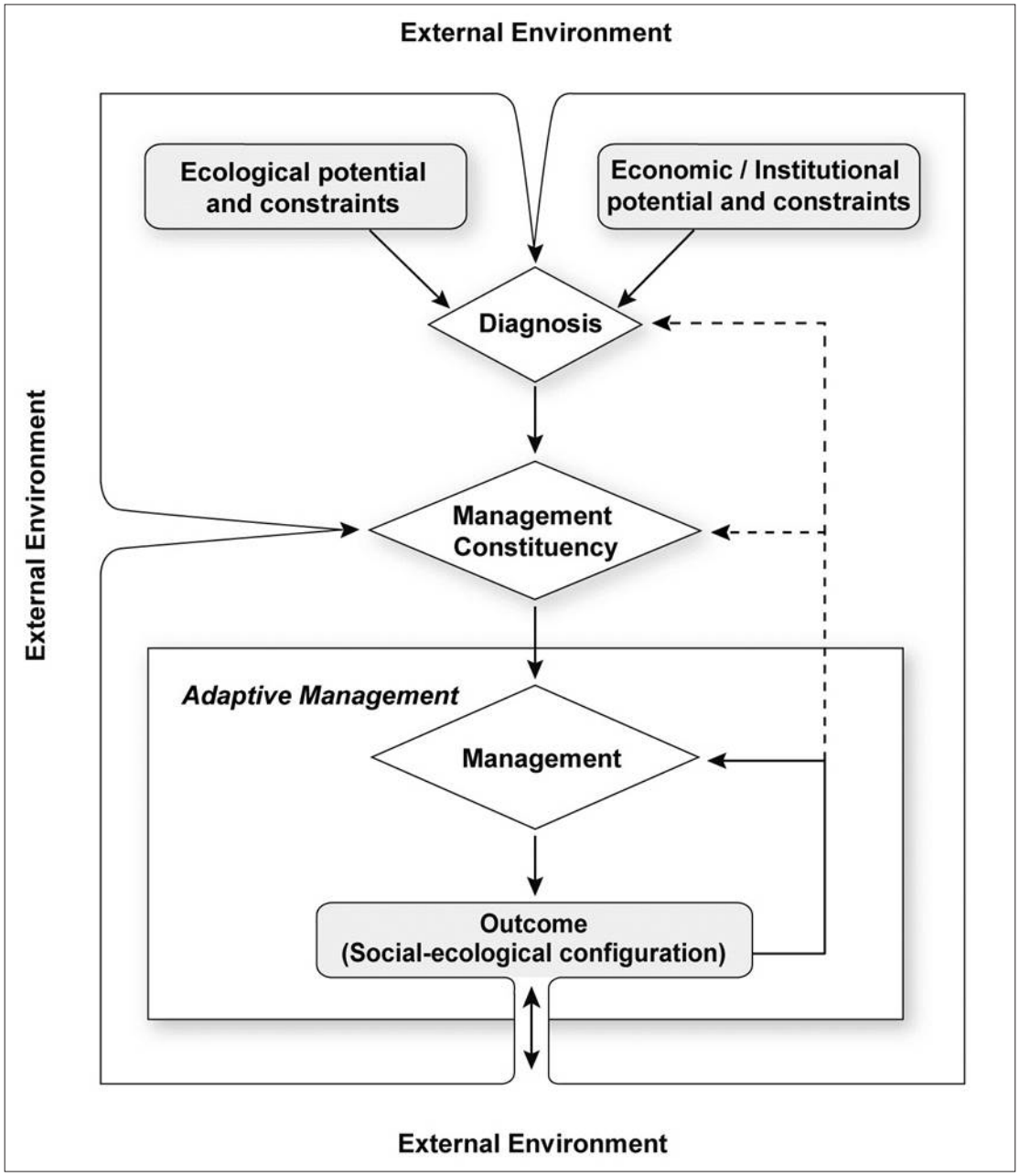
The EAF technical guidelines (FAO 2003) emphasize delineating the scale of the fishery ecosystem, identifying and prioritizing issues, and developing management objectives. Typically, after diagnosis, a management constituency that has the highest potential to address the issues prioritized is mobilized or engaged. The management constituency will then negotiate the rules, norms, and desired outcomes for the fishery.

In contrast with most of the other frameworks, the PDAM framework requires that stakeholders be deliberate in including others in adaptive management (Andrew et al. 2007). To legitimize EAF and ensure its success, it is essential to mobilize a management constituency that is best placed to address the threats and opportunities identified in the diagnosis. Adaptive management, in this case, then involves the negotiated design of integrated EAF and its subsequent implementation and assessment by the IBAMO.

Participatory Diagnosis/Appraisal Process

The Rapid Appraisal of a Fisheries Management System (RAFMS) approach (Pido et al. 1996, 1997; Garces et al. 2010) was adopted to complement the PDAM. Conceptually,

Figure 2. Participatory diagnosis and adaptive management (PDAM) framework



Source: Andrew et al. 2007

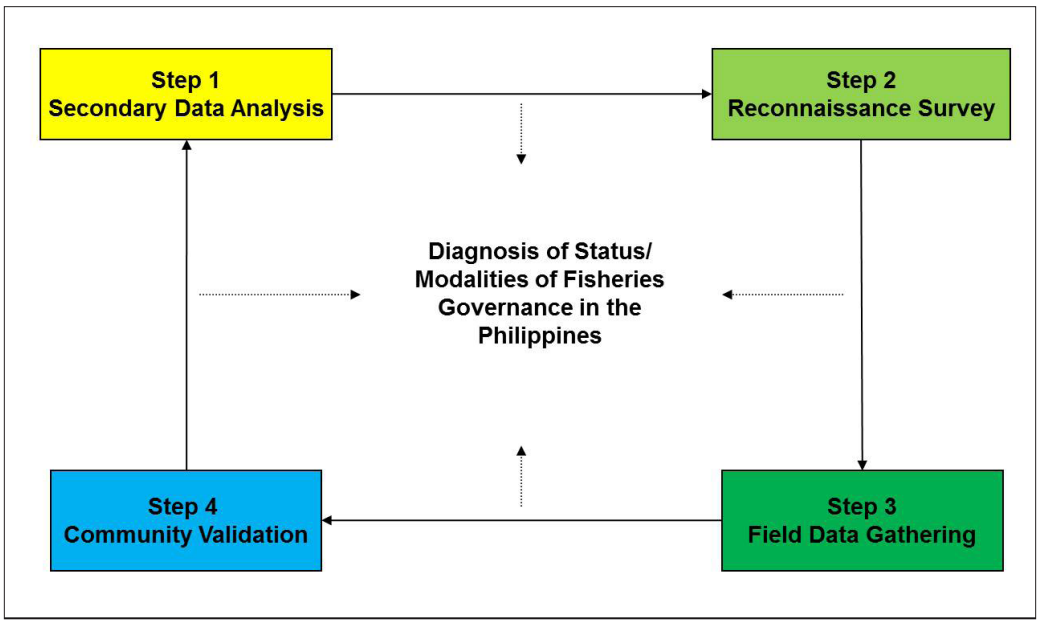
RAFMS is largely based on a methodological framework known as institutional analysis and development (IAD) (Ostrom and Ostrom 1977; Kiser and Ostrom 1982; Ostrom 1986, 1994). Providing an integrated framework, the IAD evaluates the outcomes of resource governance given contextual variables, institutional arrangements, and patterns of interaction. Meanwhile, RAFMS focuses on fisheries management systems and considers the broader context of socio-economic, biophysical, and institutional dimensions. The RAFMS methodology consists of four sequential but overlapping steps (Figure 3): (1) secondary data analyses/literature reviews, (2) reconnaissance surveys, (3) field data gathering, and (4) community validation steps.

Step 1: Secondary Data Analysis

First, relevant secondary literature were compiled and analyzed to understand the current situation and identify any data gaps. Village profiles and statistics, fisheries statistics, municipal development reports, coastal resource management (CRM) plans, and other government documents are examples of literature reviewed. Project reports were also reviewed, particularly those from the following projects: (1) Iligan Bay Coastal Resource Management Project under PACAP (AusAID 2011); (2) Biodiversity Research Program (BRP) for Development in Mindanao (SEARCA 2006); (3) EU-Focused Food Production Assistance to Vulnerable Sectors (FPAVAS) (EU and SEARCA); and (4) "Ridge-to-Reef: an Ecosystem-based Approach to Biodiversity Conservation and Development in the Philippines." (WorldFish/ICRAF/SEARCA 2013)

Prior to the EAF project, a number of LGUs and their respective institutional partners conducted participatory assessments and formulated CRM plans, such as Mindanao State University (MSU)-Naawan's study on the town of Lopez Jaena and Oroquieta City funded by DOST-PCAMRD (De Guzman et al. 2008)

Figure 3. The RAFMS methodology (Pido et al. 1996, 1997; Garces et al. 2010)



and Participatory Coastal Resource Appraisal (PCRA)/CRM Planning under PACAP; Social Action Center of the Archdiocese of Ozamiz City's study on the towns of Panaon, Jimenez, and Sinacaban; and Save Nature Society's study on the towns of Sinacaban and Tudela under PACAP. Reports from various participatory coastal resource assessments of the towns of Jimenez, Panaon, Sinacaban, and Oroquieta City (see PCAMRD Zonal Center for Northern Mindanao 2007a, 2007b, 2007c, 2007d); Lopez Jaena (De Guzman et al. 2009); and Plaridel (MSU-Naawan 2011) were also reviewed.

These projects and initiatives employed the same participatory and consultative processes with relevant stakeholders such as farmers, fishers, LGUs, national government agencies, the private sector, and civil society groups. Aiming to empower poor communities, PACAP pursued as its goals economic growth and better standard of living. One of its components, the Focal Community Assistance Scheme (FOCAS), significantly contributed toward participatory governance structures. Also, it strengthened partnerships between LGUs and civil society organizations, ultimately introducing the paradigm of participatory local governance through the Iligan Bay Coastal Resource Management Program (AusAID 2011).

Meanwhile, the Biodiversity Research Program for Development in Mindanao and the Ridge to Reef project generated useful information for EAF like biodiversity assessments and analyses of laws and regulations and their effects on biodiversity and delivery systems. Very few respondents in the EU-FPAVAS project, however, had moderate knowledge about fish cage culture and fingerling production. In addition, their most common sources of information on farm and fishery technologies were the agricultural extension workers of the LGUs, radio and television programs, and neighboring farms.

The EAF project and the Ridge to Reef project have the same stakeholders, except for the towns of Lopez Jaena and Plaridel. These two LGUs joined IBAMO at the final stages of the project to ensure a more comprehensive coverage of the Iligan Bay municipalities in Misamis Occidental. The project focused on biodiversity conservation, habitat rehabilitation, policy development and advocacy, eco-friendly livelihood technologies and trainings, material transfer reduction, environmental research, institutional capacity-building and partnership development, and information management.

With the wealth of information from the above-mentioned sources, the survey instrument was designed to focus on fisheries governance to complement available biophysical and socio-economic data.

Step 2: Reconnaissance Survey

The reconnaissance survey involved three tasks, beginning with courtesy visits to local government officials to explain the project's goals, objectives, and activities and to seek approval to gather field data. The second step involved identifying key informants or KIs, taking relevant photographs, and estimating the logistical requirements for the actual field survey. Lastly, the schedule of field data gathering was confirmed with identified individual and group respondents.

Step 3: Field Data Gathering

Governance Integrated Survey Instrument

In preparation for the key informant interviews (KII), a governance integrated survey instrument/questionnaire was developed (Table 2). It focused on fisheries management and institutional processes and revolved around the following key subjects related to fisheries: (1) issues/problems, management measures and success indicators; (2) fisheries management bodies and governance processes; and (3) up-scaling of fisheries management.

Table 2. Contextual variables used in the key informant interviews (KII) for eight coastal municipalities of Misamis Occidental

Part I. Issues and problems, management measures, and success indicators related to fisheries
Fisheries management issues/ problems existing in the project area
Violations of fisheries laws and regulations existing in the project area
Management measures to be adopted or implemented in addressing key fisheries problems and issues
Indicators of successful fisheries management regime
Part II. Fisheries management bodies and governance processes related to fisheries
Fisheries management bodies and institutions involved in fisheries governance
Assessment of adequacy of existing fisheries plans, regulations, and budgetary allocations
Awareness and compliance on the Unified Fishery Code of Misamis Occidental
Awareness on the informal fisheries rules and regulations
Part III. Upscaling of Fisheries Management
Need to improve fisheries management to address issues and problems more effectively.
Awareness of the Iligan Bay Alliance of Misamis Occidental (IBAMO).
IBAMO as a useful governance structures for solving problems/issues regarding fisheries management which is beyond the mandate of the municipality or province.
Suggestions to make IBAMO an effective governance arrangement that can handle large-scale fisheries systems and broader marine/coastal ecosystem.
Linkages of local/site level administration with larger scales of fisheries management

Source: SEARCA/WorldFish 2012

Key informants/respondents

A total of 157 key informants (Table 3) from various groups were pre-identified as survey respondents. Most of the key informants from the municipal/city level to the barangay level were recommended and/or identified by the Municipal Agriculture Officer (MAO), Municipal Planning and Development Officer (MPDC) or the Municipal Environmental and Natural Resources Officer (MENRO), since they are more familiar with the individuals/ personalities in their respective areas.

Team formation and training of enumerators

As suggested in the RAFMS methodology (Pido et al. 1996, 1997), the multidisciplinary team must be composed of socioeconomic, institutional, and biophysical experts. Faculty members from the Mindanao University of Science and Technology (MUST) in Panaon, Misamis Occidental, constituted the team of enumerators. Technical expertise was the primary consideration in their selection to ensure their understanding of the intricacies of fisheries and their capability for in-depth conversation with the respondents.

Prior to the KII, enumerators were trained on interview guidelines and protocols to standardize the conduct of the interviews and ensure the quality and consistency of data and information gathered. During the training, the survey instrument was pre-tested and finalized.

Conduct of the interview

Key informants from the towns of Aloran, Jimenez, Panaon, Sinacaban, Tudela, and Oroquieta City were interviewed from August to September 2012. Meanwhile, key informants from the towns of Lopez Jaena and Plaridel were interviewed in October 2012. The KIIs were conducted in the town hall as it was easier to gather the respondents in a central location. Only a few had to be visited in their houses for an interview. Key informants from the regional offices of DA-BFAR and DENR, and officers of the provincial government of Misamis

Table 3. Classification of the respondents interviewed

Respondents (Key Informants)	Regional	Provincial	Aloran	Jimenez	Oroquieta	Panaon	Sinacaban	Tudela	Lopez Jaena	Plaridel	TOTAL
Regional Level											
Bureau of Fisheries and Aquatic Resources (BFAR)	1										1
Department of Environment and Natural Resources (DENR)	2										2
Provincial Level		8									8
Municipal Level											
Mayor			1		1			1	1	1	**5**
Vice Mayor				1		1	1				3
MAO, MPDC,CENRO, CAFO, Fisheries Technologist, MENRO, City Agriculture Technician			3	3	4	2	2	3	5	3	**25**
Bantay Dagat/ Law enforcers (police, maritime, coast guard)				5	5	3	4	3	0	6	26
City Administrator, Planning Officer, CPDC, MPDC Admin Aide			1	2	1	1	1	0	0	2	**8**
City/Municipal Council (i.e., SB Committee on Environment), Barangay Officials, Secretary to the Sangguniang Bayan/Panglunsod)			4	3	4	4	1	3	3	1	**23**
Fisheries and Aquatic Resource Management Council (FARMC)			6	4	8	2	2	2	1	14	**39**
Non-Government Organization (NGO)							3		5	2	10
Academe						4			1		5
Fish trader							1	1			2
Total	3	8	15	18	23	17	15	13	16	29	157

Note: MAO=Municipal Agriculture Officer, MPDC=Municipal Planning and Development Coordinator, CENRO=City Environment and Natural Resources Officer, CAFO=City Agriculture and Fisheries Officer, MENRO=Municipal Environment and Natural Resources Officer, CPDC=City Planning and Development Coordinator

Occidental were interviewed on 15–16 August 2012.

Step 4: Validation of Data

To verify the collected data, the summary and highlights of the results of the KII were presented to relevant provincial/city/town administrators and key officials of Misamis Occidental in a workshop conducted on October 26–28, 2012 in Cebu City. Representatives from the eight coastal LGUs covered by the study were also present during the validation workshop.

RESULTS AND DISCUSSION

Perceptions on Up-scaling

The establishment of the IBAMO offers valuable opportunities to encourage inter-LGU collaboration to address some of the biophysical, socioeconomic, and institutional issues confronting the LGUs along Iligan Bay. According to the 157 key informants, the five most pressing issues that the IBAMO must address are (1) depleted fishery resources and low fish catch; (2) degraded fishery habitats; (3) lack of alternative livelihood; (4) limited institutional capabilities (i.e., Fisheries and Aquatic Resources Management Council [FARMC]), including a lack of effective fisheries monitoring program; and (5) lack of harmonization of fisheries laws and ordinances (SEARCA/WorldFish 2012).

Given current set-up, most (80%) of the key informants perceived the need to improve fisheries management to effectively address issues and problems. Table 4 provides the areas that an improved fisheries management could address. The main issues identified include the providing alternative livelihood for both farmers and fishers (39.8%) and in the implementation of fisheries rules and regulations for the sustainability of marine resources (22.1%).

Role of IBAMO as a Management Instrument

About a third (37%) of the respondents perceived that IBAMO was a useful governance structure for fisheries management (Table 5). As such, it could be an instrument for a unified fishery management, a stronger fishery enforcement, and an integrated approach in addressing various fishery problems, issues and concerns, as well as in protecting biodiversity.

Table 6 lists the functions that the respondents expected of IBAMO. It was perceived that IBAMO will provide a framework in harmonizing ordinances for bay-wide planning and management as well as strengthen CRM in Iligan Bay. The other functions identified in Table 6 could guide IBAMO in drafting its constitution and by-laws, implementing rules and regulations, and the functions of its various technical working groups or program committees.

Apart from the MAOs and the MPDCs, most of those who were aware of the existence of IBAMO were those who attended its meetings. Their knowledge of IBAMO centered on its composition and functions (i.e., to promote a unified structure for fishery management and law implementation and to introduce livelihood programs). Most of the provincial and regional respondents were from IBAMO's interim technical working group, thus very much aware of IBAMO. On the other hand, respondents from the academe and NGOs, and fish traders had the least knowledge on IBAMO's existence and its activities (Figure 4). Findings seem to suggest that IBAMO needs to intensify its information dissemination as part of its information, education and communication (IEC) strategy.

It must be noted that IBAMO has been built on past initiatives and was further strengthened. Aiming to empower poor communities, PACAP pursued as its goals economic growth and better standard of living. One of its components,

Table 4. Potential issues and problems to be addressed to improve fisheries management in Misamis Occidental

Options for Improving Fisheries Management	Frequency (n=157)	Percentage
To have a developed alternative livelihood for both farmers and fishers	45	39.8
To fully and effectively implement fisheries rules and regulations for the sustainability of marine resources (food security) and enforcement	25	22.1
To educate people on the quality of fishery practices especially for sustainability in reducing poverty	15	13.3
To form and improve collaboration of different sectors for better fishery management	14	12.4
To strengthen fishery laws	14	12.4

Note: Frequency refers to the number of respondents that identified the options; multiple responses

Table 5. Perceptions of IBAMO as a useful governance structure for fisheries management

Reasons for Saying IBAMO is a Useful Governance Structure for Fisheries Management	Frequency (n=157)	Percentage
Instrument in implementing unified fishery management for a strong fishery enforcement	23	44.2
Integrate approaches to various fishery problems, issues and concerns, and protection of biodiversity	16	30.8
Facility for introducing projects to fishers (e.g., alternative livelihoods)	11	21.2
Way for resolving illegal fishing	2	3.9

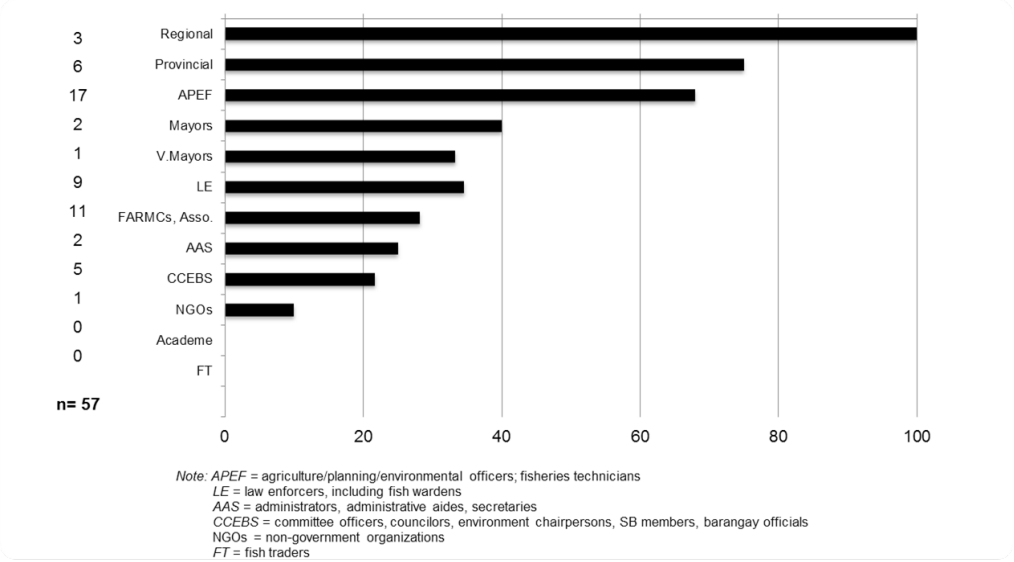
Note: Frequency refers to the number of respondents that identified the options; multiple responses

Table 6. Potential functions of IBAMO as a more effective governance arrangement that can handle large-scale fisheries systems and broader marine/coastal ecosystems

Functions	Frequency	Percentage
Harmonize local ordinances for bay-wide planning and management	59	37.6
Increase visible support to CRM	59	37.6
Adoption of constitution and by-laws (requirement of the SEC)	58	36.9
Create a common front, signifying unity of purpose and organizational strength	58	36.9
Increase resources through resource sharing schemes	58	36.9
Appoint Chairperson of the governing board, Technical Working Group, Alliance Secretariat	56	35.7
Facilitate public information and education and social mobilization	55	35.0
Identify members of the program committees	55	35.0
Serve as a funding source/channel	53	33.8

Note: Frequency refers to the number of respondents that identified the functions; multiple responses

Figure 4. Distribution of respondents in terms of their awareness of IBAMO (%)



FOCAS, significantly contributed towards participatory governance structures. Also, it strengthened partnerships between LGUs and civil society organizations, ultimately introducing the paradigm of participatory local governance through the Iligan Bay Coastal Resource Management Program (AusAID 2011).

IBAMO's Structure and Potential Institutional Linkages

Table 7 lists the respondents' suggestions on which institutions should constitute the IBAMO. The institutions where linkages can be built with IBAMO include national government agencies, local government units, fishers' organizations, and non-governmental organizations, among others (also see Figure 5). The list of institutions would be useful to IBAMO's technical working groups as they design implementation plans. Most of the institutions listed in Table 7 are now members of IBAMO, either as part of the executive committee or the technical working groups.

Figure 5 describes the potential links of IBAMO to various institutions and to systems such as planning and management for agriculture, fisheries, and natural resources; law enforcement; and support services such as research and education. The provincial government of Misamis Occidental has a vital role in coordinating and providing secretariat support to IBAMO though the Provincial Planning and Development Office. In the memorandum of agreement (MOA) signed by IBAMO members, a project management office will be established, which will be responsible for implementing programs and coordinating activities.

The key informants pointed out critical institutional issues and concerns if IBAMO and concerned LGUs were to improve the governance of small-scale fisheries. They expected that a weak organizational structure, financial constraints, and ineffective monitoring system would be resolved or would be effectively addressed within the context of IBAMO. The limited institutional capabilities of the FARMC were also pointed out. Other concerns were lack of clear municipal water delineation, lack of harmony of fisheries plans, poor implementation of the programs and

Table 7. List of local and national institutions that respondents perceive to have potential roles in and contributions to IBAMO (N = 157).

Institutions	Frequency*
National Government Agencies	
Department of Agriculture- Bureau of Fisheries and Aquatic Resources (DA-BFAR)	60
Department of Environment and Natural Resources (DENR)	56
Department of Science and Technology (DOST)	42
Department of Interior and Local Government (DILG)	38
Local Government Units	
Municipal Agricultural Office (MAO)	52
Municipal Planning and Development Office (MPDC)	45
Barangay	39
PENRO/MENRO/CENRO	47
SB/SP	36
Fishers	
Municipal Fishers	34
Commercial Fishers	28
People's Organizations (POs)	43
Non-governmental Organizations (NGO's)	29
Academe/State Universities and Colleges (SUCs)	
Mindanao University of Science and Technology- Panaon Campus (MUST-Panaon)	50
Other SUCs (e.g., = Mindanao State University – Naawan Campus (MSU Naawan)	17
Other Organizational entities	
Fisheries and Aquatic Resources Management Council (FARMC)	42
Protected Area Management Board (PAMB)	30
Regional Development Council/ Provincial Development Council (RDC-PDC)	22

Note: SB/SP=*Sanguniang Bayan/Sangguniang Panlalawigan* (Municipal/City Council); PENRO=Provincial Environment and Natural Resources Office; MENRO=Municipal Environment and Natural Resources Officer; CENRO=City Environment and Natural Resources Office

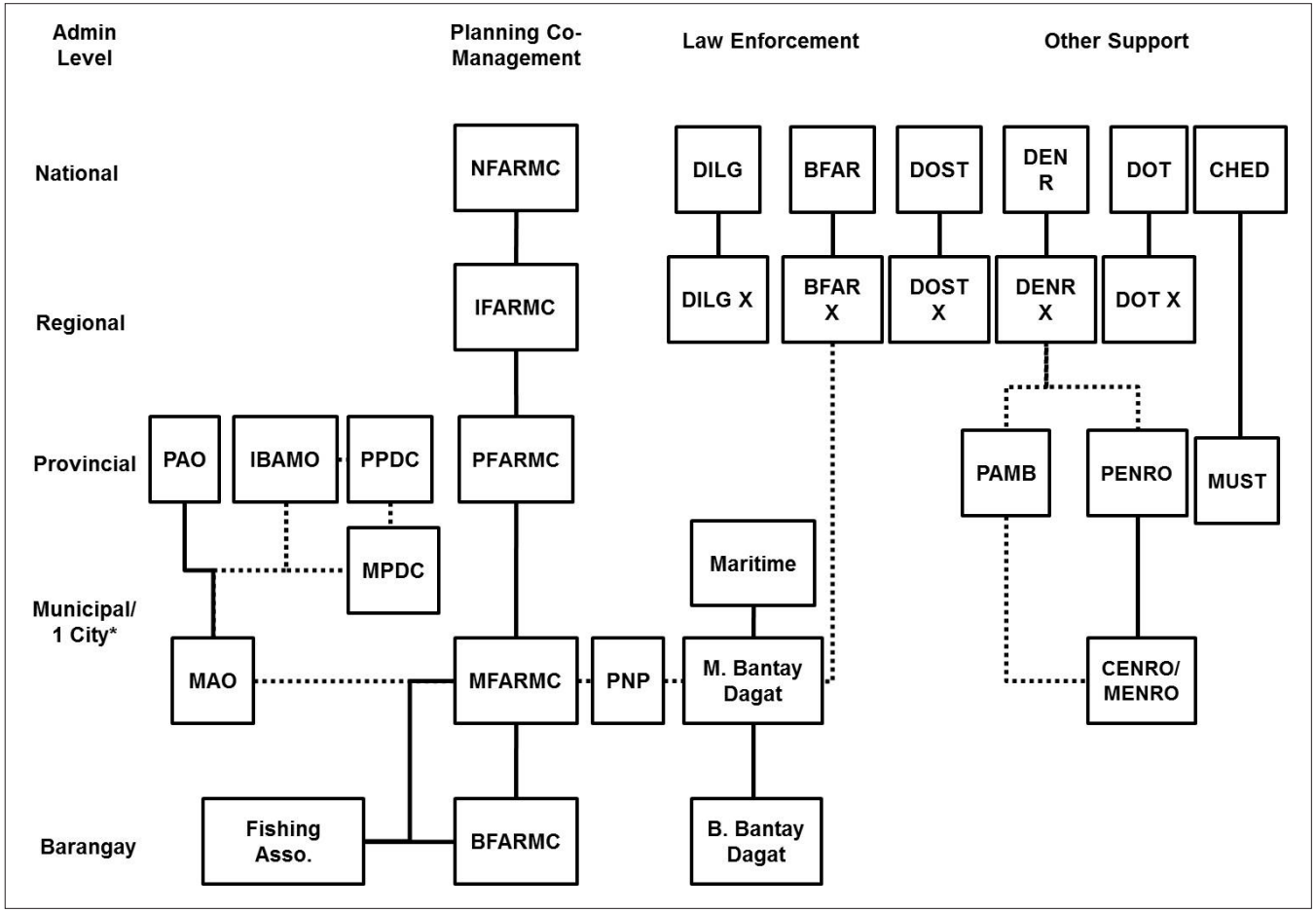
*Frequency refers to the number of respondents that identified the functions; multiple responses

projects within the local planning framework, and weak enforcement of fishery laws. These could be better resolved through a bay-wide agreement and co-management of marine resources among member LGUs. Moreover, many legal instruments (i.e., Fisheries Code, RA 8550) can provide basis for the bay-wide governance of resources to ensure that EAF can be a strategy to reduce poverty and hunger among the artisanal fishers and their families.

Integrated bay-wide planning and management has been duly recognized since the 1990s. However, it has not been widely adopted to a significant extent (ADB 2007). To name a few, towns along San Miguel Bay in the Bicol Region and Cebu Province have established a multi-sectoral integrated body—the San Miguel Bay Management Council—and an inter-municipal collaboration, respectively. Experiences in Cebu Province have shown that local governance systems can be expanded to address the conservation needs of a broader ecosystem and scale (Eisma-Osorio et al. 2009).

By the end of BFAR's Fisheries Resources Management Project, plans to scale up fisheries management entailed the review of bay-wide planning. Specifically, the review would "revisit the institutional relationships between bay

Figure 5. Potential institutional linkages of IBAMO and existing local, regional, and national institutions



Note: BFAR=Bureau of Fisheries and Aquatic Resources, BFARMC=Barangay Fisheries and Aquatic Resource Management Council, CENRO/MENRO=City/Municipality Environment and Natural Resources Officer, CHED=Commission on Higher Education, DENR=Department of Environment and Natural Resources, DILG=Department of the Interior and Local Government, DOST=Department of Science and Technology, DOT=Department of Tourism, IBAMO=Iligan Bay Alliance of Misamis Occidental, IFARMC= Integrated Fisheries and Aquatic Resource Management Council, MAO=Municipal Agriculture Office, MPDC=Municipal Planning and Development Coordinator, MFARMC= Municipal Fisheries and Aquatic Resource Management Council, MUST=Mindanao University of Science and Technology, NFARMC=National Fisheries and Aquatic Resource Management Council, PAMB=Protected Area Management Board, PAO=Provincial Agriculture Office, PENRO= Provincial Environment and Natural Resources Office, PFARMC=Provincial Fisheries and Aquatic Resource Management Council, PPDC=Provincial Planning and Development Coordinator, PNP=Philippine National Police

management councils and FARMCs, leading to strengthening bay-wide planning through proper linkages between FARMCs." (ADB 2007, p. 11) Such cooperative undertakings focus on activities that jointly address major resource threats in each of the municipal jurisdictions, such as degradation of key coastal habitats, overfishing, and dwindling fish stocks.

As noted by Pomeroy et al. (2010) some challenges in improving fisheries management at an ecosystem and multi-jurisdictional scale include (1) LGU executives having the political will to play an important role in coastal resource and fisheries management; (2) improving technical capacity of the LGU staff given their diversity and level of awareness, including training and cross visits; (3) building mechanisms to ensure sustainability and continuity given the three-year tenure of LGU executives; (4) clear delineation of municipal waters; (5) support for enforcement; (6) financial support from local governments for multi-jurisdictional management efforts; and (7) addressing data/information needs to support fisheries management. Most of the institutional issues and concerns in the KII results are reflective of the challenges noted above.

Pomeroy et al. (2010) also identified emerging modalities for scaled-up or integrated fisheries management in the Philippines:

1. Type 1 - clusters and alliances of municipalities to integrate coastal resource management
2. Type 2 - integrated fisheries and aquatic resources management councils
3. Type 3 - gulf management council
4. Type 4 - integrated municipal council

With LGUs allied for integrated coastal resource management, IBAMO falls under Type 1. It is supported by the provincial government as secretariat and by the regional government agencies of DA-BFAR, DENR, DOST, and Department of Tourism (DOT). As a multi-stakeholder body, IBAMO has been mobilized as a "management constituency," which is essential toward legitimizing EAF and increasing the potential for its success (Andrew et al. 2007).

Through its Integrated Fisheries Management Unit, DA-BFAR has supported the scaling up of fisheries management. As part of institutional strengthening, the Fisheries Code of 1998 also advocates the formation of FARMCs. These multi-sectoral bodies assist in formulating local and national policies and support the enforcement of fishery laws, rules, and regulations (Cruz-Trinidad 1998).

Challenges specific to the EAF include: (1) increased information costs of ecosystem-based management (inadequate knowledge of fishing and ecosystem interactions and the response of fisheries ecosystems to management); (2) challenges of participation (expanding pool of stakeholders, elevated costs of stakeholder engagement, difficulty in reconciling multiple interests and expectations, ineffective participation); (3) difficulties in resolving issues related to equity and compensation; (4) bottlenecks in scaling up to the ecosystem scale; (5) inadequate capacity within management agencies and stakeholder groups to deal with the additional demands of EAF (human, institutional, and technical capacity); and (6) means to fund governance reform (FAO 2005).

In conjunction with the data validation workshop described earlier, provincial/city/municipal chief executives and line managers were oriented about IBAMO on 26–28 October 2012 in Cebu City. Local chief executives and heads of participating line agencies signed a MOA. Serving as the highlight of the workshop, the signing ceremony was witnessed by their respective MAOs and/or MPDCs. The MOA was a first step towards the strengthening of the LGU alliance.

Specific development challenges were also identified and classified into three categories: biophysical, socioeconomic, and institutional. These challenges were further validated and prioritized into five to six "key" challenges per sector, which IBAMO could pursue for 2013 and beyond (Table 8). The table provide the key barriers, potential interventions and proposed focal agency to guide IBAMO in terms of implementing program/projects that will address the barriers on biophysical, socio-economic, physical and human capacities, respectively. While all activities cited were considered highly essential, priorities were identified in accordance with the IBAMO TWG project implementation plan in 2013, which included: (1) registration of IBAMO at the Securities and Exchange Commission; (2) preparation/ endorsement of its constitution and by-laws and implementing rules and regulations; (3) election of officers; (4) formation of committees; and (5) presentation of IBAMO to LGUs (local councils). These are essential in formalizing the IBAMO as an organization.

Given the outcomes of the May 2013 local elections, the project organized another workshop with IBAMO members on 17–18 July 2013 to (1) renew LGU commitments to IBAMO; (2) orient and enable the newly-elected LGU executive officers understand IBAMO's goals and objectives; (3) identify and agree on IBAMO's vision, mission, and goals; and (4) elect a new set of IBAMO officers and designate the chairperson and members of the various committees which will push IBAMO activities across the different LGUs.

Finally, the project focused on two key aspects of building LGUs' capacity so that they can effectively carry out and sustain the implementation of their CRM plans, specifically the technical requirements of project implementation, and organizational and operational needs. For example, the project has supported activities toward the strengthening of IBAMO and planned technical trainings on fish catch monitoring and strengthening of FARMCs in Iligan Bay area.

Reviewing several ICM initiatives in the Philippines, Christie (2005) suggested the factors which could impact on ICM process sustainability: decentralization of policy development, community-level characteristics and dynamics, the role of legal consistency, ICM-derived economic and bio-physical benefits (if they exist), ICM project strategies for human and institutional capacity development, financial mechanisms, and the use and management of information. However, he argued that these factors do not provide a ''silver bullet'' that works in all contexts. Rather, their adopting will likely improve the rate of ICM success.

During the workshop in July 2013, the IBAMO adopted and approved its constitution and by-laws and formulated its vision, mission, and goals. It also approved its organizational structure, and created technical working groups and the alliance management office.

Based on its constitution and by-laws, IBAMO shall be a non-stock, non-profit entity principally composed of the LGUs of the City of Oroquieta and the towns of Aloran, Jimenez, Lopez Jaena, Panaon, Plaridel, Sinacaban, and Tudela.

Supporting IBAMO are the Provincial Government of Misamis Occidental, Philippine National Police, Philippine Maritime Police, Maritime Industry Authority, Philippine Coastguard, and the Armed Forces of the Philippines, and the regional offices of the following government line agencies: DA-BFAR, DENR, DOST, DOT, and the Department of Interior and Local Government (DILG).

Sustaining the efforts to ensure IBAMO becomes a functional alliance beyond the lifetime of the project will be a continuing effort by all the members, the secretariat, the various committees, and the technical working groups.

CONCLUSION

Despite localized successes, the governance of small-scale fisheries in Iligan Bay is still beset with critical issues/problems such as depleted fishery resources, degraded fishery habitats, intensified resource use competition and conflict, and post-harvest losses. All of these could be traced to constraints in effective fisheries governance. Simply put, the current fisheries management system in Iligan Bay is neither fully effective nor functional. There is a need for better institutionalization of fisheries management. The 'revitalized' IBAMO is a multi-agency organization that may promote organizational integration including scaling-up of fisheries management. As membership expands to include the private sector, the extent and range of services that could be provided is also expected to increase.

This paper showed that IBAMO offers great potentials to better manage the small-scale fisheries in Iligan Bay. The key informants are nearly unanimous in their endorsement of IBAMO as a governance vehicle to scale-up fisheries management.

There are inherent organizational requirements that need to be addressed more thoroughly such as membership, funding, partnerships, and operations. In short, strengthening IBAMO as an institution is paramount to its effectiveness and its eventual success as a governance mechanism. Capacitation must include strengthening of both in-house personnel and institutional partners. Through time, it is anticipated that IBAMO could address more effectively the issues that confront fisheries rather than the individual LGUs. Hence, IBAMO offers a unique case study for the operationalization of the EAF concept in small-scale fisheries.

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Table 8. List of key barriers related to the biophysical, socioeconomic and institutional, and physical and human capacities, and potential interventions (programs, projects and activities) IBAMO could pursue for 2013 and beyond

Key Barriers	Interventions	Focal Agency/Organization
Biophysical		
Heavy siltation & sedimentation	Development of Mt. Malindang as an eco-tourism area	DENR, PASU/PENRO
	River bank rehabilitation	LGUs/CENRO/MENRO
	Provide alternative livelihood to POs	LGU, NGO,PLGU
Limited knowledge in biophysical assessment & monitoring	Capability building for IBAMO	DENR,PENRO
	Creation of items for CENRO and hire staff	LGU Oroquieta, MPDC, ENRO, MAO, SB
	Building partnership with academe and NGAs	PLGU, MLGU, DENR, BFAR, DOST, MSU, MUST
	Training/workshop for DFWs and LGUs	BFAR, DENR, LGU, DA, MAO, Academe
Pollution	Training for Water Quality (WQ) monitoring	DENR
	Creation of WQ Monitoring task force	PLGU, MLGU
Chemical residues from hatcheries and rice fields	Conduct study of water sampling as part of R & D	DOST, Academe
	Evaluation of hatchery operators permits	MLGU, MPDO
Encroachment in coastal area and municipal waters	IEC	MLGU, DENR, PENRO, CENRO
	Technical forum for validation & adoption of municipal waters	MLGU, SB, NAMRIA, PENRO
	Coastal hazard management	DENR, PAWCZM, EMB, MGM
Low compliance of SWM guidance and ordinance	IEC at Barangay level,	ENRO
	Enforcement and penalty	MLGUs, PLGU
	Partnership with tri-media in IEC	PNPDO, MENRO, SB Chair (Env't and Agri)
	Promote incentive programs for best performing Barangay	
Socioeconomic and Institutional		
Absence /lack of fisheries database/ FARMCs	Harmonization/ development of an Information System (e.g., data gathering, etc.)	DENR, BFAR, LGU -MAO/MENRO
Poor coordination and complementation of projects and programs	Finalization/ updating of CLUP/CDP	MPDC/MAO; MENRO/MTWG
	Establish network and linkages	MPDC/MAO; MENRO/MTWG
	Enhance advocacy program	MPDC/MAO; MENRO/MTWG
Unsustainable programs/ projects/ activities	Revisit policies	MPDC/MAO; MENRO/MSWDO/PESO/MTWG
	Crafting/reformulation of sustainability plan	MPDC/MAO; MENRO/MSWDO/PESO/MTWG
Weak law enforcement	Capability building/capacity development activities	LCE/MAO/MFARMCs
	Provision of logistics and incentives to *Bantay Dagat*	LCE/MAO/MFARMCs
Lack of alternative livelihood	Identify; implement sustainable livelihood projects that are market and demand driven.	MFARMCs/DOST/DTI

Physical and human capacities		
Lack of equipment	Review/ revisit existing CRM plans Tie-up with BFAR, DENR, & other related agencies Acquisition of diving gears/ GPS Setting of standard criteria Accreditation of CRM Plans Gear Distribution, to include gear swapping for illegal gear (*payao*, bottom set gill net, squid jig)	MENRO & MPDC, BFAR/ MLGU, IBAMO/ MLGU, BFAR BFAR
Lukewarm attitude	LCE signifies positive support for IBAMO Benchmarking/ visit of places with best practices of CRM alliance	Mayor PLGU/ WorldFish
Lack of baseline data	Initial data in place; needs tools to solicit data	MPDC, BFAR, DENR, PLGU
Low involvement of stakeholders	Reactivation/restoration of MFARMCs, POs involved	MAO, MPDC, BFAR
	CRM stakeholders' forum	MENRO, Mayor
	Continuous IEC; Tri-media	MLGU, DENR, BFAR
Low/inability to move forward	Raising of enabling ordinances and budget allocation	SB, MPDC, Mayor
Low enforcement of fisheries-related laws	Deputize Bantay Dagat Augment personnel Conduct trainings Acquisition of equipment Networking of CLE Skills training on gear identification and proper boarding Organization and strengthening of FARMCs (municipal and barangay level) Technical Assistance/ trainings on fisheries, law enforcement	BFAR, P/MLGU, IBAMO DENR, BFAR

Source: Stakeholder workshop (October 2012)

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