Chapter 5

Evolution and Lessons from Fisheries and Coastal Management in the Philippines

Alan T. White, Edgardo Gomez, Angel C. Alcala, and Garry Russ

Introduction

Over the last three decades, Philippine institutions and communities have been experimenting with new approaches to coastal management to try to stem the increasing tide of destruction to coastal habitats and the decline of fisheries. Many attempts at coastal and fisheries management have been conducted, ranging from broad-area management planning for whole bays to small community-based marine protected area (MPA) projects (Courtney et al. 2000). The impetus driving coastal and fisheries management projects and MPAs is attributed to the interest of local and national government through devolution of authority under national policies to promote protection and management of coastal resources. Municipal, city, and provincial governments have thus become the key players in the implementation of integrated coastal management (ICM) and MPA projects in association with national government, non-governmental organizations (NGOs), people's organizations, research institutions, and multilateral and bilateral donor organizations, employing different strategies and approaches (White et al. 2002, 2005a). The many useful lessons being learned in the context of ICM programs are summarized in this chapter.

Declining fisheries, mangrove and coral reef destruction, and poverty among coastal communities are issues of primary concern. Fisheries-related food production in the Philippines has been static for the last 10 years despite an increased number and tonnage of commercial vessels, increased number of municipal fishers, and increased coverage of fishponds (Bernacsek 1996; BFAR 1997; Courtney et al. 1999). Municipal fish catch has been on a steady decline, accelerated by the use of illegal fishing practices, such as dynamite and small-mesh fishing nets, as well as overfishing (Fig. 5.1). Philippine fisheries generally reflect world trends of declining catches and fishing down the marine food web, such that top predators

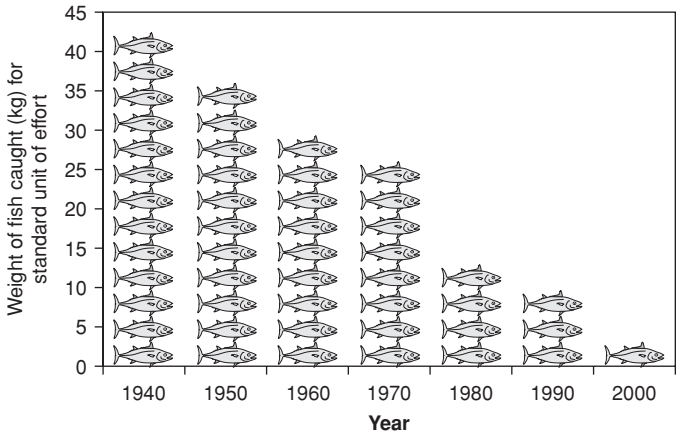

Figure 5.1 Decline in catch per unit effort since the 1940s for fishers using hook and line from six provinces in the Philippines (Green et al. 2003).

such as sharks, groupers and others are increasingly scarce in Philippine catches (Pauly et al. 1998, 2002; Green at al. 2003). It is currently estimated that the 26 000 km^2 of coral reefs (with only about 5% in excellent condition) contribute at least US$1.35 billion annually to the economy (Gomez et al. 1994; White and Cruz-Trinidad 1998; Burke et al. 2002). It is suggested that this estimate could be significantly increased with improved coastal management efforts (White and Cruz-Trinidad 1998).

Factors contributing to this decline are intertwined and not easily isolated for the purposes of management. Nevertheless, the primary issues and conflicts of interest are: various kinds of pollution; illegal and destructive fishing practices; overfishing due to an open-access fishery regime throughout the country; a lack of planning and control of development in the shoreline and beach areas; increasing poverty among coastal dwellers; a rapidly growing population; and variable political will to address the problems (Courtney et al. 2000; NSO 2000; White and De Leon 2004). A force driving many of the issues is a lack of economic alternatives that would reduce the dependency of coastal dwellers on their natural resource base (Green et al. 2003).

Thus, a diversity of human activities are eroding the natural resource base along the 18 000 km[1] coastline of the Phillippines. The intensity of these impacts is threatening the area's potential for future sustainable use. The lack of control of most coastal development and its impacts are indicative of what will occur if stronger and more effective institutions and procedures for coastal and fisheries management are

[1] 18 000 km is used here as the standard coastline of the Philippines based on the coastline of the main islands because this has been commonly cited. New estimates are higher, such as that used by Burke et al. (2002) of 33 900 km based on the perimeters of all islands calculated using digital maps.

not put in place. The challenges are of such magnitude that Philippine institutions are now responding with more concern and integrated approaches than they did in the past. The history of this context and its evolution follows.

Evolution of coastal and fisheries management

The movement towards improved coastal and fisheries management in the Philippines has been influenced through programs and various projects that have tested and refined the practice and implementation (Courtney and White 2000; White et al. 2005b). The evolution of coastal management in the country has approximated a pattern of five stages suggested by Sorensen and colleagues (1990).

(1) Incipient awareness: the need for a coastal program becomes known as signs of coastal resource degradation worsens (1970s and 1980s).
(2) Growing awareness: the need for a program is heightened through national conferences, workshops, or hearings convened by government, academe, or environmental groups (1980s and early 1990s).
(3) National study: heightened awareness resulting from conferences, international assistance, national studies, and policy recommendations (1990s to present).
(4) New program creation: studies on the coastal situation and its management lead to new ICM programs and institutional arrangements (late 1990s to present).
(5) Program development, implementation and evaluation: policies, laws, and programs are implemented and evaluated (starting to occur in 2000 to present).

Important events influencing or affecting the development of coastal and fisheries management is shown in Table 5.1. A legal and jurisdictional transition from central to local government responsibility for coastal management is also reflected in the local government roles (Fig. 5.2).

Two major forces have influenced the development of coastal management in the country since the early 1980s (Courtney and White 2000). The devolution of authority from central to local governments (municipal, city, and provincial) is the first major influence (Fig. 5.2). Second, a series of donor-assisted projects have resulted in a number of experiments in coastal resource management (CRM) (Table 5.1). These projects, working with coastal communities, have focused on nearshore fisheries and coastal habitat management (White and Lopez 1991; Ferrer et al. 1996; Christie and White 1997). In addition, the various efforts made to initiate coastal management have been supported and nurtured by a variety of institutions, including government, non-governmental organizations (NGOs), people's organizations, and research institutions with the support, ideas, and differing strategies of bilateral and multilateral donors.

The decentralization of responsibilities to local governments in the Philippines in the early 1990s, although hailed as a solution to many of the nation's woes, created significant challenges. In the case of coastal management, few coastal municipal

Table 5.1 Important events, laws, and projects in the evolution of coastal and fisheries management. Sources: MCDP (1986), Alcala (1988), White and Lopez (1991), Chua and Scura (1992), Calumpong (1996), Pomeroy and Carlos (1997), Arquiza and White (1999), NIPAP (1999), Courtney and White (2000), DENR et al. (2001), White et al. (2002), and White et al. (2005a, b).

1932	Fisheries Act gives most management responsibility to central government
1940	Hundred Islands, Lingayen Gulf, established as National Park
1930–1960s	Resources considered unlimited in supply not requiring management
1960–1970s	Robust expansion and development in fisheries and aquaculture
1974	First working municipal marine reserve established by Oslob Municipality and Silliman University at Sumilon Island, Cebu
1975	Fisheries decree promoted the optimal exploitation and use of fisheries
1975	Forestry Code established the need to protect mangrove forests
1976	Environmental Impact System established
1976	National Mangrove Committee established
1976	Commercial fishing limited to areas beyond 7 km of the shoreline
1976–1980	Wide-scale survey of coral reefs by University of the Philippines Marine Science Institute and Silliman University Marine Laboratory
1978	Coral gathering is limited to scientific research
1978	Marine Parks Task Force created to recommend sites for marine parks
1978	The Philippine Extended Economic Zone established
1979	Coastal Zone Management Committee with 22 agencies formed
1981	Philippines becomes signatory to CITES
1984–1992	Central Visayas Regional Project begins community-based ICM
1985–1986	Marine Conservation and Development Program of Silliman University supported by USAID establishes Apo, Pamilacan, and Balicasag islands and Carbin Reef as no-take marine reserves
1986	*Muro-ami* and *Kayakas* fishing methods banned in Philippine waters
1986–1992	First bay-wide management program began in Lingayen Gulf
1987	Bureau of Fisheries and Aquatic Resources moves from the Ministry of Natural Resources to the Department of Agriculture
1988	First national marine park established at Tubbataha Reefs, Sulu Sea
1990–1997	Fishery Sector Program of DA–BFAR initiates bay-wide management
1991	Local Government Code devolves responsibilities to local governments
1992	Philippine Council for Sustainable Development created
1992	Philippines becomes a signatory to Agenda 21
1992	National Integrated Protected Areas System (NIPAS) Act passed
1993	Coastal Environment Program of DENR established
1995	Fisheries and Aquatic Resources Management Councils authorized
1995	First International Coral Reef Initiative Meeting held at Silliman University
1996–2004	Coastal Resource Management Project of DENR and USAID implements ICM
1998	Fisheries Code reinforces the roles of local government in management
1998	First national coastal Mayors' conference held to discuss ICM issues
1998–2005	Fisheries Resource Management Project builds on lessons of FSP for bay-wide coastal management
1999	May proclaimed the Month of the Ocean in Philippines
2000	DA and DENR sign Memorandum on implementation of Fisheries Code
2001	More than 100 municipalities and cities allocate budget for ICM
2001	Southern Mindanao Integrated Coastal Zone Project starts
2002	National Coastal Management Policy reviewed at national level
2003	Philippine Sustainable Archipelagic Development Framework drafted
2004	National Coastal Management Policy pending signing as Executive Order
2004	First Coastal Zone Philippines Symposium conducted in Cebu City
2004–2008	Fisheries Improved for Sustainable Harvests Project of BFAR supported by USAID initiates sustainable harvest regimes in four project sites

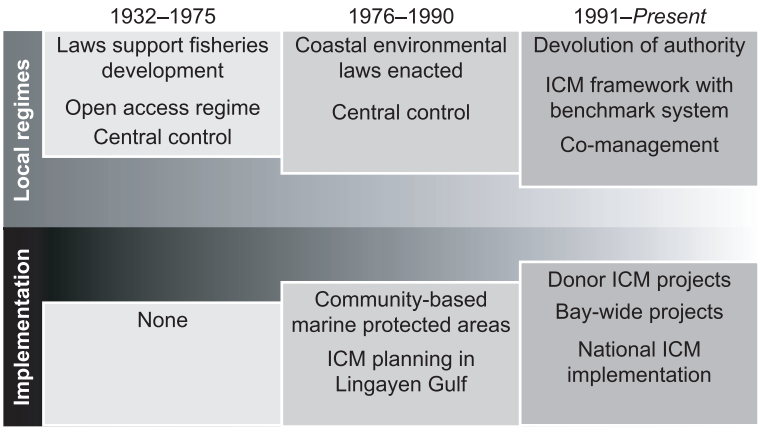

Figure 5.2 Transition of authority for coastal management from central to local government and implementation through time (from DENR et al. 2001 – Vol. 2).

or city governments in the country had the capacity to manage their natural resources. They generally lacked trained personnel, budget, planning capacity, and technical knowledge. In spite of these limitations, the motivation among local governments to manage their resources rapidly increased as they realized the seriousness of the problem and what they would lose if no action was taken (White and Cruz-Trinidad 1998). Thus, the opportunity to improve ICM in the country was seen as tremendous, given the 832 coastal municipalities bordering 18 000 km of coastline.

The current state of coastal and fisheries management in the country depends largely on decentralized authority and various ICM projects of the last 30 years (Table 5.1). These projects, supported by the Asian Development Bank, the United States Agency for International Development (USAID), the World Bank, and others, through the Philippine government, have provided key lessons for improving the state of ICM in the country and providing a sound foundation for the design of future ICM efforts. Such projects, often addressing a broad range of issues, have also included an emphasis on MPAs (White et al. 2005a).

A key lesson generated by the various ICM projects is that it is extremely difficult to plan and implement successful coastal and fisheries management without a multisector approach. Such programs must have sufficient support from the national and local government and its partners, and a strong level of acceptance among the resource-dependent communities. Most successful coastal and fisheries programs in the Philippines are still localized where the geographic scope is small and the number of stakeholders limited. Nevertheless, this is changing as more multi-municipal or city and bay-wide resource management plans are being developed and implemented that address a wide range of issues leading to improved management.

Legal and policy framework supporting decentralization

The legal and policy framework for coastal and fisheries management as well as for the establishment and management of MPAs in the Philippines, is found in the Local Government Code (LGC) of 1991, the Fisheries Code of 1998 and pertaining only to national MPAs, the National Integrated Protected Areas System (NIPAS) Act of 1992. The LGC and the Fisheries Code provide for the policy and institutional framework for carrying out ICM at the local level in the Philippines. This shift to decentralized control over the management of resources encouraged the active participation of local governments and communities.

In the formulation, planning, and implementation of ICM plans, the municipal or city governments are the primary agencies involved. There are many municipal ordinances supporting CRM implementation and MPA establishment within a *barangay* (smallest political unit in Philippines) or multiple *barangay* area. In the case of MPAs, most are established by municipal or city government ordinance. All other government agencies at the national, regional, and provincial level are tasked to provide technical, financial, and resource assistance to these local governments in the implementation of their ICM plans and enforcement of regulations in their municipal waters (Fig. 5.3). The laws and institutions that support implementation of ICM as well as the establishment of MPAs are described in more detail elsewhere (DENR et al. 2001 – Vols 2 and 5; White et al. 2002).

The Fisheries Code likewise provides for inter-local government cooperation for the management of contiguous fisheries and aquatic resources that straddle several municipalities, cities, or provinces. This management strategy is enhanced with the creation of Integrated Fisheries and Aquatic Resource Management Councils (IFARMC) composed of representatives from the local governments, non-governmental organizations, and private and fisher sectors including youth and

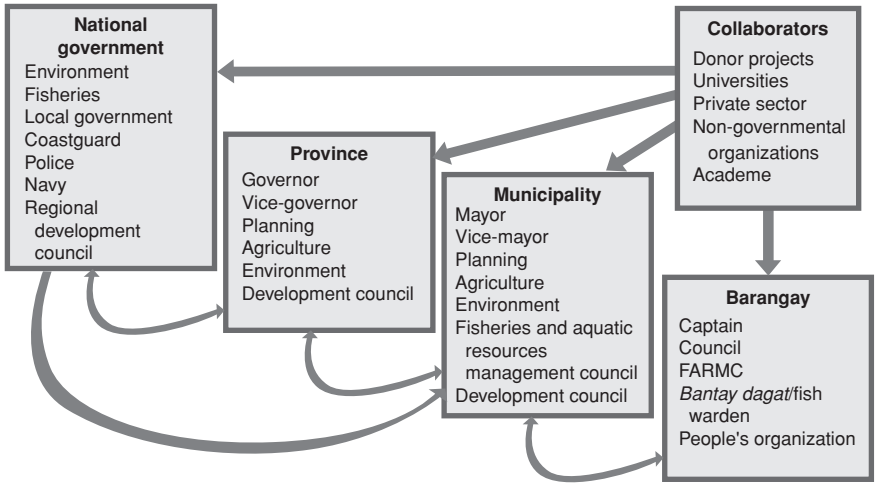

Figure 5.3 Institutions affecting coastal management and their interactions in the Philippines.

women. The IFARMC functions as a recommending body of municipal or city legislative councils for fishery management plans and related regulations. The Bureau of Fisheries and Aquatic Resources (BFAR) of the Department of Agriculture provides guidance for fisheries management within municipal or city jurisdictions. BFAR is also responsible for overall policies for fisheries management in the country and for the direct management of all fisheries that occur outside of the 15 km jurisdictional limit of local governments. The Department of Environment and Natural Resources (DENR) also has jurisdiction over coastal resources through its mandate to protect coastal habitats and to prevent pollution and to set up marine protected areas. The need for DENR and BFAR to coordinate their mandates and management efforts is great and is unfortunately not always attained.

Contribution of community-based marine protected areas

One theme of the three case studies in this chapter is that regardless of how MPAs are established, local support systems need to be in place and functional. Thus, a common thread is the importance of being part of a larger ICM system beyond the immediate community-based MPA. This larger ICM system is the local government planning and implementation framework elaborated below after first exploring community-based MPAs.

The first MPA in the country established as a fish sanctuary was in 1974 on Sumilon Island, Cebu under the guidance of the Silliman University Marine Laboratory (Alcala 1981). Sumilon Island fish sanctuary is often cited as the reason why coral reef fish sanctuaries contribute to improved reef fisheries management (White 1987). This experiment in reef management, that stopped all fishing on a portion of the Sumilon Island reef for about 10 years, allowed researchers to collect substantial data on the effects of such management on the coral reef and its related fisheries (Alcala 1988; Alcala and Russ 1990). The benefits provided compelling evidence for fish biomass spillover from no-take areas. Such evidence has been important for convincing scientists, reef managers, and fishers that fish sanctuaries improve reef fisheries while benefiting fishers in the area (Russ and Alcala 1996; Russ et al. 2003, 2004).

Between 1974 and the present, many similar municipal marine fish sanctuaries or MPAs have been established following the lead of Sumilon and the associated Apo Island (Pajaro et al. 1999; White et al. 2002) (Fig. 5.4). Other well-managed and documented MPAs in terms of their benefits for fisheries and tourism include: Balicasag and Pamilacan Islands, Bohol; Mabini, Batangas; and San Salvador Island, Zambales (Fig. 5.4) (White 1988a, b, 1989, 1996; White et al. 1994; Christie et al. 1999; Kuperan et al. 1999; Green et al. 2002). These examples have followed a general model whereby the portion of a fringing coral reef adjacent to an island or mainland is set aside in a 'no-take' or 'sanctuary' zone and where the area outside of this no-take zone is called a traditional fishing zone or in international terms, a buffer

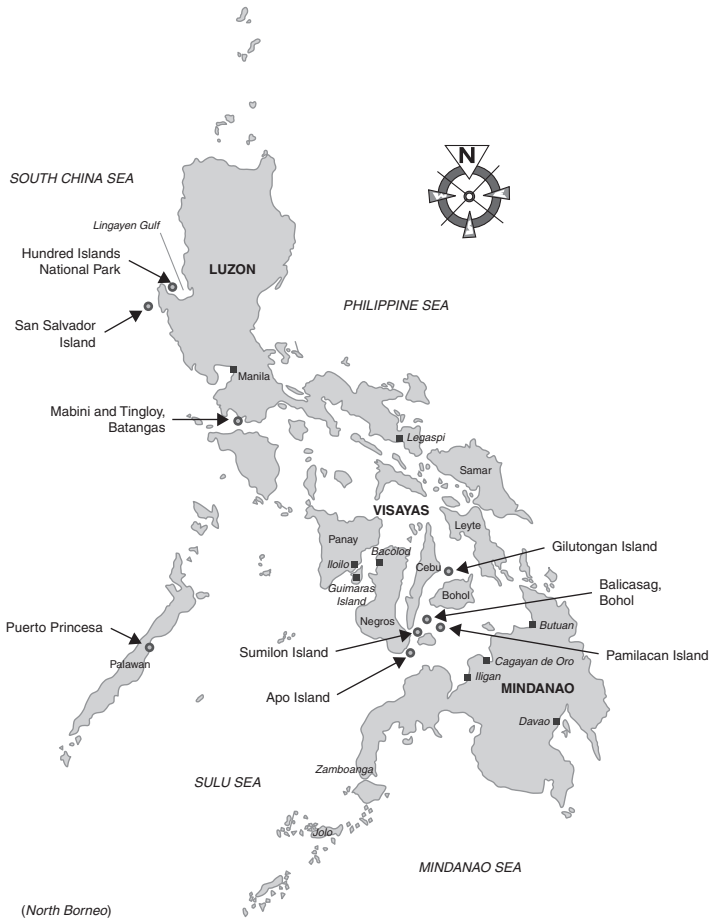

Figure 5.4 Locations of important MPAs and ICM projects in the Philippines.

zone. Activities that do not damage the coral reef in any way such as traditional fishing methods are usually allowed within the buffer zone. Within the no-take sanctuary zone, entry for swimming and diving is normally permitted although some managers prohibit any form of entry (White 1988a, b, 1989; White and Vogt 2000).

Recent studies have not only indicated the beneficial effects of fish sanctuaries on fishery yields and protecting the coral reef, but also that people participating in such management efforts gain in a variety of ways related to food security, cash income from tourism, and pride in their protection role (White et al. 1994; Vogt 1997; Katon et al. 1999). A salient characteristic of all successful MPA projects in the country is the strong involvement of communities and the local government in planning and enforcement (White and Vogt 2000; DENR et al. 2001 – Vol. 5). This involvement builds the confidence of people to manage their own resources and encourages long-lasting outcomes. Thus, the success of Philippine MPAs hinges

on two crucial actors: the (local and national) government and strong stakeholder community involvement.

However, in the context of these apparently successful models, there are problems. In a survey of approximately 439 MPAs, only about 44 MPAs were fully enforced (Pajaro et al. 1999). In a 2003 survey of 54 established and functioning MPAs, about 40% were managed in a sustainable manner (CCEF 2003; White et al. 2004). The area covered by the 54 MPAs reported covers about 810 km^2 of mostly coral reef habitat. Thus, the cumulative effects of the existing MPAs, assuming full implementation, would contribute significantly to the sustainability of the country's coastal ecosystems.

In spite of all the activity to install MPAs, there are only a few that are sustainable in their own right. Contrary to the popular opinion that they are an easy and successful ICM intervention, they are often in need of more assistance. Plus, the benefits from the successful and well-managed MPAs are often being lost to the drain of overfishing, pollution, climate change, and other human pressures in surrounding areas, outside of the controlled MPA or sanctuary (Christie et al. 2002). Nevertheless, they can be the centerpieces of a broader coastal management effort since they are site-specific and display tangible benefits through a locally-controlled mandate. In this context, three case studies follow that highlight a range of benefits and management approaches.

Case 1: Supporting fisheries at Sumilon and Apo islands

Research carried out over the past 28 years at Sumilon Island, and 22 years at Apo Island, both in the Central Visayas (Fig. 5.4), has provided some of the most compelling evidence available worldwide for the utility of no-take marine reserves as fisheries management tools. Abundances of fish targeted by fisheries have been monitored regularly inside and outside no-take reserves at each island since 1983 (Russ and Alcala 2003; Russ et al. 2004; Alcala et al. 2005). In addition, estimates of total annual fishery yields have been made eight times at Sumilon Island between 1976 and 2001 and seven times at Apo Island between 1981 and 2000 (Alcala 1981, 1988; Alcala and Russ 1990; Maypa et al. 2002; Russ et al. 2004). This extensive research addresses four key questions:

(1) Do no-take marine reserves increase the biomass of fish targeted by fisheries?
(2) Do no-take reserves display spillover (net export of adult fish biomass)?
(3) Do no-take reserves reduce, maintain or enhance local fishery yields?
(4) What is the role of local primary stakeholders (fisher communities and local government units) in the establishment and management of no-take marine reserves?

No-take marine reserves were established on the western side of Sumilon Island in 1974 and on the southeast side of Apo Island in 1982 that was legally designated in 1986 by municipal ordinance. Sumilon is a coralline island of 0.23 km^2, surrounded by a fringing coral reef of 0.5 km^2 that has a maximum depth of 40 m. Apo Island

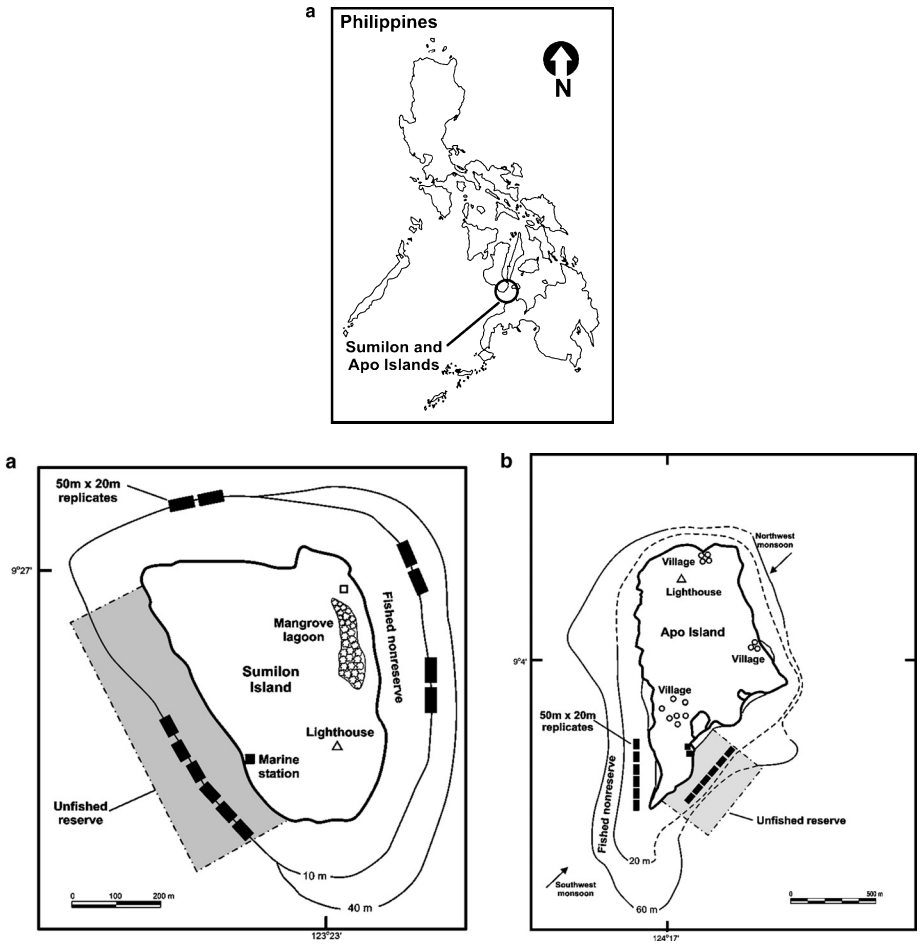

Figure 5.5 Sumilon and Apo Islands showing unfished reserve areas (shaded) and the fished non-reserve areas at each island. The six 50 m $\times$ 20 m replicate underwater visual census plots (black rectangles) monitored from 1983–2003 at each sampling site are shown.

is a mainland island of 0.7 km^2 surrounded by 1.1 km^2 of fringing coral reef to 60 m depth (0.7 km^2 to 20 m depth). The fisheries around each island use hook and line, traps, gill nets, and spears. Sumilon has no permanent residents, but is fished regularly by about 100 municipal fishers from the nearby Cebu Island. Apo Island has about 700 permanent residents, with about 100 municipal fishers. The Sumilon reserve is a 0.75 km section (25% of the coral reef area) (Fig. 5.5). The area of the reserve to 500 m offshore is 37.5 ha. The Apo reserve is a 0.45 km section (about 10% of the coral reef area) (Fig. 5.5). The area of the reserve to 500 m from shore is 22.5 ha.

The management histories of Sumilon and Apo reserves are given in Russ and Alcala (1999) and White and colleagues (2002). Both reserves were initially established under municipal ordinance. Day-to-day management was the responsibility

of the local communities. However, Sumilon reserve has had a complex history of management from 1974 to 2005. Full no-take (1974–1984, 1987–1991) and partial no-take (all fishing except hook and line banned – 1995–2004) status was applied at Sumilon reserve in the hope of maintaining local fisheries and enhancing tourism at the island. No-take status at Sumilon was maintained in 1974–1983 under an agreement between the local municipal government led by a conservation-minded mayor and Silliman University. It was removed when a newly-elected mayor did not support the reserve concept (1984–1985), and due to poor communication of objectives from local mayors to fishers (1992–1994) (Russ and Alcala 1999). Full no-take status has again been re-established at Sumilon in 2005 by the local government. In contrast, the no-take status of the Apo reserve has been maintained from 1982–2005 due to strong support from the organized and empowered community.

Effects on fish biomass

The biomass of target fish (five fish families accounting for 92.3% of the fisheries yield at Sumilon; four families accounting for 75.6% of the fisheries yield at Apo) increased inside the no-take reserves by 3.1 times over nine years of no-take protection at Sumilon and by 4.6 times over 18 years of no-take protection at Apo (Alcala et al. 2005). The biomass of these fish did not increase outside each reserve. The biomass of large predatory fish, highly-favored targets of reef fisheries, increased by almost 12 times over nine years of no-take protection at Sumilon, and by 17.3 times over 18 years of no-take protection at Apo (Russ and Alcala 2003).

Spillover of fish

Both large predatory fish, also surgeonfish and jacks (accounting for 40–75% of the yield at Apo) increased substantially (by factors of 17 and 3 respectively) inside the Apo reserve over 18 years of protection. Outside the reserve, the biomass of these fish increased significantly closer to (200–250 m) than further away from (250–500 m) the reserve boundary over time (Russ and Alcala 1996; Russ et al. 2004). In addition, hook and line catch rates of surgeonfish were significantly higher closer to (within 200 m) than further away from the reserve (Russ et al 2004). In fact, 63% of the hook and line catch records of the surgeonfish *Naso vlamingii* in 2000–2001 were recorded within 200 m either side of the reserve, in just 11% of the reef fishing area (Russ et al. 2003). Combined, this is some of the best evidence that reserves can display spillover, and benefit local fisheries.

Effects on fisheries yields

The studies of the effects of no-take reserves on local fish yields at Sumilon and Apo islands are long-term manipulative experiments. Because data on reserve biomass and fish yields were collected over almost two decades, it was possible to

investigate the relationships between the duration of reserve protection and both the fish biomass inside the reserves and local fish yields outside the reserves. At Sumilon, there were positive correlations between years of reserve protection and both targeted fish biomass in the reserve and catch outside the reserve, although the latter relationship was not statistically significant (Alcala et al. 2005). At Apo, there was a strong positive relationship between years of reserve protection and targeted fish biomass in the reserve, but not between years of reserve protection and catch outside the reserve (Alcala et al. 2005). These results, plus spillover evidence, suggest that marine reserves may help maintain, or even enhance, local fishery yields, in the long term.

Russ and colleagues (2004) reported on the potential fishery effects of the no-take reserve and a 1986 Marine Management Plan at Apo Island. They showed that the benefits over the 20 year period were: a slightly higher catch of surgeonfish and jacks; increased hook and line catch rate; and a reduction in hook and line fishing effort. The fishery and tourism benefits generated by the reserve enhanced the living standard of the island community.

The role of the local community and local government

Through social and community processes, the local fisher community was educated and empowered while the local government (village and town) learned to protect and manage their marine resources. Apo marine reserve, an early community-based MPA established in the country, is now a classic example of a highly successful community-based coral reef fishery and marine biodiversity conservation project operating under the policy and legal framework of the Local Government Code of 1991 and the Fisheries Code of 1998. This success is due to the collaborative partnership among an organized fisher community, a local government, and an NGO academic institution, serving primarily as technical and social facilitator-adviser (Alcala and Russ 2000, 2001).

Important lessons learned from the experiences at Sumilon and Apo Islands are:

- Strong local community support can protect no-take marine reserves over time.
- No-take marine reserves can increase the biomass of fish targeted by fisheries.
- No-take reserves can display some spillover, even though the effect may be small, and for coral reef fish, occur over a spatial scale of hundreds of meters, not kilometers. Such an effect, although small, can play a very direct role in developing strong local support for no-take reserves.
- No-take reserves can help maintain or even enhance local fishery yields. A result from these studies is that the removal of 25% (Sumilon) and 10% (Apo) of the available fishing area did not reduce total fish yield at either island over time.
- No-take reserves can generate substantial alternative incomes for local communities, particularly through tourism.

Case 2: Supporting fisher livelihood through tourism at Gilutongan Island, Cebu

The 15 ha Gilutongan Marine Sanctuary, just 5 km off the southern coast of Cordova Municipality, Cebu, in central Philippines, is fast becoming another favorite dive destination in the country. In 2004, the sanctuary realized earnings of over two million pesos (US$36 000) in users' fees from snorkelers and divers visiting the area.

The results of a reef monitoring effort conducted at the Gilutongan sanctuary in mid-2003 showed stable and improving living coral cover and a significant two-fold increase in the density of reef fish over the baseline monitoring data of 1998 (Nanola et al. 2004). In 1998, there were very few target reef species observed within the sanctuary and in the immediate vicinity, and the abundance of fish was very low. A steady increase in the number of species and total abundance has been recorded since. With the coral reef inside the sanctuary showing marked increases in fish population and improvements in live coral cover, it continues to attract an increasing number of divers and swimmers.

The local government of Cordova and resident fishers conduct a biannual reef monitoring activity in coordination with the Department of Environment and Natural Resources (DENR), the Bureau of Fisheries and Aquatic Resources, University of San Carlos – Marine Biology Section, and non-governmental organizations. This reef monitoring is now initiated and coordinated by the local government while data analyses are assisted by participating academic and NGO partners.

In the 1970s, Gilutongan was part of the hotbed of illegal fishers in the area around Mactan Island, Cebu. Blast and cyanide fishing, identified as highly destructive means of extracting from the sea, were killing not only the fish, but also the vulnerable reefs. The vicious cycle of poverty was grinding: a growing number of fishermen, saddled with obligations to their growing families, were trying to get more and more fish out of the sea through destructive methods. The resulting habitat degradation, however, caused the dwindling of fish stocks and pushed the Gilutongan Island residents even deeper into poverty (Sotto et al. 2001).

The reef sanctuary was established in 1991, but was not properly managed until 1999, with the creation of the Gilutongan Marine Sanctuary Board. Technical assistance was provided by the Coastal Resource Management Project (CRMP) of the DENR with funding assistance from USAID in the re-establishment of the Gilutongan Marine Sanctuary. At that time the *barangay* community, the municipal government and CRMP worked together to formulate a three year marine sanctuary management plan. The management plan, transformed into a municipal ordinance, specified management procedures, rules, and established the user fee system for visitors to the sanctuary.

Because Gilutongan Island is only about 20 minutes from Mactan, the resort center of Cebu and one of the prime Philippine diving destinations, a high volume of divers and tourists for Gilutongan's development as a destination was assured.

However, the Marine Sanctuary Board had to devise a scheme whereby utilization of the sanctuary would contribute to its conservation and management. The fee system was established in 2000. By the end of 2001, the sanctuary had 'earned' a million pesos.

Users' fees of 50 pesos (US$1) per diver are collected by the municipal government and are shared with the community in the island *barangay*. In addition, divers pay a premium for taking photographs or video footage underwater. With its 70% share, the Municipality of Cordova has constructed an US$8000 guardhouse at the sanctuary site and funds the reef monitoring activities. The municipal government also appropriates funds for more information, education, and communication activities, the salary of a project director, supplies and the maintenance of the guardhouse, anchor buoys, and two coastal law enforcement patrol boats stationed at the site. The *barangay* appropriates from it a 30% share of the revenue, which funds medicines and alternative livelihood for the immediate community. It also provides information, education and communication, and honoraria for law enforcers and monitoring personnel.

Local-level initiatives like Gilutongan Island are paving the way to help address the problem of degraded coastal habitats, declining fish catch, and the economic over-dependence of human communities on fishing. In addition, Gilutongan has provided benefits and lessons beyond the value of marine sanctuaries enhancing marine habitats. These include: (1) generating a significant revenue for sanctuary maintenance and to benefit poor resident fishers through a user fee and revenue sharing scheme; (2) assisting members in managing a marine sanctuary with technical assistance from NGOs, national agency, or university; and (3) an example that local municipal governments can achieve effective marine conservation in an affordable and sustainable manner. Although Gilutongan Marine Sanctuary is working well and providing numerous benefits, it is small, crowded, and already threatened with overuse. Thus, more such areas under protection are needed in the vicinity of Cebu to absorb the volume of divers and address the magnitude of area-wide problems.

Case 3: Supporting reef restoration, Hundred Islands National Park, Luzon

The Hundred Islands National Park (HINP) was established in 1940, long before the concept of marine protected areas became common in the Philippines. Hence, the focus of concern at that time was the islands and adjacent mainland shore, not the submerged coral reefs (NEDA 1992). The park, in the City of Alaminos, northern Luzon on the Lingayen Gulf, derives its name from the 107 islands, islets, and rocks of uplifted Karst topography within its boundaries (Fig. 5.4). Most islands have vegetation cover and in years past supported healthy fringing coral reefs.

The national Philippine Tourism Authority (PTA) managed Hundred Islands until the passage of the NIPAS Act in 1992. After that law came into effect, a Protected

Area Management Board (PAMB) was created, chaired by the Regional Director of the DENR, with representatives from various national and local government agencies, as well as people's organizations. For practical reasons, however, it is still the PTA that exercises day-to-day management of the park. This situation is not working well, in part because the local government wants to have a more direct say on revenue usage.

The park is highly accessible since the town of Alaminos is serviced by many buses traveling on good highways from Metro Manila and other parts of Luzon. This attribute is good and bad. The park could have a tremendous cultural, scientific, and educational value. However, the volume of visitors also makes the park subject to insults such as pollution, sedimentation and destructive fishing, among others.

Recognizing the stressed condition of the park's coral reefs, the PTA agreed in 2000 to a multi-year initiative of the Marine Science Institute of the University of the Philippines (UPMSI) to initiate restoration and restocking efforts. The objective was to enhance the attractiveness of the marine component of the park by reintroducing giant clams to various reefs and also to transplant corals at experimental sites in the northern, central, and southern sectors of the park. The islands are strung out from north to south on an average of five to six abreast, along a sedimentation gradient. The north is open to the clean waters of the gulf while the south is heavily silted from shore-based activities including fishponds. There is also an east–west gradient, with the east further from the mainland's influence but more wind and wave affected. Given this situation, two experimental sites for coral transplantation were established in each of the three sectors, on different islands, and giant clam restocking was undertaken in the northern sector.

The initial efforts in giant clam restocking actually commenced in the mid-1980s, necessitated, in part, by the overflow of giant clam stocks at the primary ocean nursery of the UPMSI in Bolinao town, 40 km north. Small numbers of the smooth clam *Tridacna derasa* and the horse hoof clam *Hippopus hippopus* were brought into the HINP together with large numbers of the true giant clam *Tridacna gigas.* Some of the aggregations of the latter species developed into 'coral reef communities', with the grown clams providing substrate, shelter, and rugosity on an otherwise rubble and rock reef flat. This area has been dynamited more than once by illegal fishers.

Corals and other invertebrates colonized many clamshells, as did various species of algae. These observations led to the expansion of the effort to include coral transplantation activities to enhance the environment of the park. As previously mentioned, six sites were identified in different sectors of the park and coral fragments were transplanted at a density of three fist-sized branches per m^2. In total, 10 000 coral fragments were transplanted using several methods. The most common was to cement the branches to the substrate and the least common way was to tie the branches to dead coral colonies. A third method was to tie coral fragments to marble tiles that served as substratum. In summary, after two years of observations,

the survival of monitored transplants ranged from 50–89%. Of the corals used, the genera *Pavona* and *Porites* fared best followed by *Montipora* and *Acropora.*

One issue often raised regarding restoration or rehabilitation is the alleged negative effects of gathering coral fragments. To reduce these effects, the first option was to make use of naturally-occurring fragments, such as those broken by wave action. Second, small to fist-sized branches were carefully detached from donor colonies, usually in the order of 10–15% of the parent stock. The donor colonies were monitored throughout the experimental period and did not show any negative trends or death. In many cases, the donor colonies actually showed healthy recovery.

The next issue is whether this type of intervention is useful. A priori, yes, just as reforestation accelerates the recovery of a forest. Empirically, however, the jury is still out. In the two year observation period of the experiments, the fish life did not show consistently or statistically higher recruitment. Fishers have, however, used dynamite to catch fish where the clams have been deployed, and this might be seen as positive proof that the interventions were working, but also indicates that the local community and government enforcement of the laws is still lacking.

The management system for the HINP is still weak. The PTA, a national agency, gets little cooperation from the local government. Hence, security from illegal fishers continues to be an issue. This highlights a basic lesson about coastal management in the Philippines, which is that local governments with jurisdiction over municipal waters, that sometimes include national parks such as HINP, must be included in the management system. In this case, it behooves the PTA to engage the town in management through sharing of benefits from the Park. Until this issue is resolved, under the existing arrangement, the value of experimental intervention for reef restoration cannot be fully appreciated.

Local governments and integrated coastal and fisheries management

The many MPA projects have increasingly revealed the need for more integrated forms of coastal management. Although the MPAs are seen as important interventions to protect coral reefs and to enhance nearshore fisheries, they only address a small portion of the coastal management issues in the country and sometimes inadvertently detract from the support required for broader management for fisheries, including pollution prevention, shoreline development, mangrove conservation, and others. In addition, the integration of reproductive health programs within ICM projects is beginning to slow population growth, a critical need given the dependence of people on limited resources.

This larger ICM system referred to earlier is the local government planning and implementation framework (Fig. 5.6). The MPA case studies above are developed within this framework through local municipal government and community support. An evolving ICM framework is highlighted below.

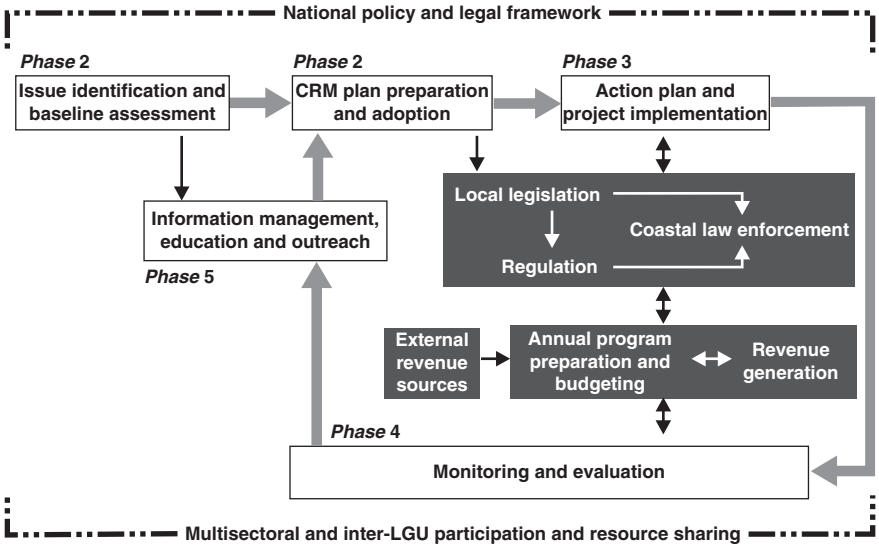

Figure 5.6 Five phase ICM planning process adapted for Philippine local government (DENR et al. 2001).

A benchmark system for local governments

A system of ICM benchmarks is being adopted as the national ICM strategy and policy framework through the DENR and the League of Municipalities of the Philippines. This benchmark system is now being utilized in more than 100 coastal municipalities (covering about 1/6 of the coastline) and cities through the assistance of the Coastal Resource Management Project of DENR since 1996 (DENR–CMMO 2003). Its purpose is to standardize the approaches and results of each local government in their coastal and fisheries management efforts so that they can follow a common monitoring and evaluation framework. It is a simple system whereby each local government adopts a planning framework and process for addressing their CRM needs, so that together with the national government they can assess the extent and effectiveness of their management interventions.

The basic ICM benchmarks required to achieve the first level are: (1) conduct a coastal resource assessment; (2) adopt a multi-year CRM plan; (3) establish coastal resources management organizations; (4) allocate a CRM annual budget; and (5) implement at least two best practices as appropriate. Common best practices include: (a) delineating and enforcing municipal water boundaries; (b) planning and implementing coastal zoning; (c) implementing specific fisheries management interventions; (d) having functioning marine protected areas; (e) implementing mangrove management; (f) implementing solid waste management; (g) developing coastal environment friendly enterprises; (h) passing legislation as required; (i) enforcing coastal laws; and (j) addressing other needs in the area.

Municipalities and cities are thus the primary units of government for ICM in the Philippines. Indeed, the size of a typical municipality or city that covers 20 km or more of shoreline and has marine jurisdiction to 15 km offshore, is large enough to effectively address most of the area's resource management problems. Local governments are confronted with multifaceted problems in their coastal areas and, therefore, the ICM undertaken by this scale of government can respond to local conditions. Development of ICM is at least beginning to follow a process and to adhere to consistent set of benchmarks and criteria for evaluation (DENR–CMMO 2003).

The process of establishing MPAs is usually part of a broad community-based resource management program within the local government. A local or national NGO or a local university, as in the case of Silliman University and the formation of the Sumilon, Apo, and Gilutongan reserves, may facilitate this process. Being part of a larger ICM program raises awareness about the need for an MPA and also emphasizes the need for broad area plans where fisheries management and MPAs are integrated. The broad planning phases also provide guidance for MPA establishment by encouraging a planning process that leads to implementation through a participatory process (Fig. 5.6). In addition, a MPA management rating system and database is being adopted by most of the assisting organizations where the national government provides guidance for effective management and sharing information in a standard format. This system is helping to standardize the measurement of management performance among a diverse range of MPAs (White et al. 2004).

Boundary delineation for fisheries

A major issue triggered by the Fisheries Code of 1998, was the delineation of municipal boundaries for fisheries so that that local governments knew exactly the areas for which they had responsibility. The delineation of the 15 km boundaries has implications for where commercial fishers (boats of more than 3 tons) are allowed to fish. Because of the increasing documentation of overfishing in nearshore waters and beyond, it became of paramount importance to formally establish the municipal boundaries so that these waters are reserved for small-scale fishers. The problem arose regarding how the boundaries are determined. For example, what landmass, the islands or mainland shore, was to be used as a baseline for determining the boundary. This question was initially settled in 2001 and then unsettled in 2002 by a Department of Justice letter stating that the order making the delineation was illegal. Nevertheless, local governments started and continued to delineate their municipal waters. As delineation has proceeded, more municipal and city governments have begun to enforce the 15 km limit and to ensure that these waters are reserved for the municipal small-scale fishers. This trend is continuing and promises to spread nationwide as part of local government ICM efforts. The weak link is that few municipalities have the capacity to patrol all their waters. In spite of this weakness, it is a healthy sign that open access is being restricted.

Local government law enforcement

In response to the need for improved capacity for coastal law enforcement by local governments, several experiments in collaborative law enforcement efforts have prospered. In the Central Visayas Region 7, for example, the Coastal Law Enforcement Alliance for Region 7 was formed in 2000. This alliance was comprised of all national agencies with some mandate over coastal law enforcement together with the four provincial governments. The alliance operates at both the regional or sub-regional scales to address increasing problems with illegal commercial fishing within municipal waters. It also provides logistical and technical support for single or clusters of municipal governments that want to improve their fisheries law enforcement. The real financing for most enforcement comes from the municipal and city governments themselves, but they need technical guidance and mentoring to encourage their work.

Presently, several clusters of municipal governments in Cebu and Bohol Provinces have created a joint patrol of their waters working together with the Region 7 support group. One group used a boat provided by the DENR with fuel purchased by the municipalities, and personnel from both local government, the Philippine National Police and the Philippine Coast Guard. Such operations have arrested and fined commercial fishing boats that operated illegally and these incidences serve as an important warning. Although this is only a beginning in a country with more than 800 coastal municipalities, it is setting a precedent for effective fisheries patrolling and management through local government initiatives jointly with key national agencies. Support for improved MPA surveillance is also being provided through these patrolling operations.

Co-management of MPAs with local governments and NGOs

Collaboration is an important factor in the success of the MPAs described in the case studies. Although legally ordained by the municipal or city government, the actual implementation brings together a number of actors that make them effective and sustainable entities over time (White et al. 2002). The *barangay* community of Apo Island, under the municipality of Dauin, has benefited greatly from its long-term association and mentoring of Silliman University. Key individuals at Silliman have maintained research and conservation interests in Apo Island. This involvement has aided the conservation of the island tremendously. However, day-to-day management is really done by the community leaders and the Protected Area Management Board, some of whom reside on the island. Gilutongan Island Marine Sanctuary is another example of collaboration where the key actors are the municipal government, diving tourism operators, an NGO – the Coastal Conservation and Education Foundation – and originally the USAID-supported Coastal Resource Management Project. Several very active community members have also been critical in providing vigilant enforcement in an area prone to illegal fishing at any time of day.

The private sector in the Philippines is playing an increasingly important role in the success of MPAs and ICM in general. As the examples illustrate, academic institutions such as Silliman University, NGOs such as the Coastal Conservation and Education Foundation, World Wide Fund for Nature, and others, including the tourism business community are contributing in appropriate ways. They provide technical guidance, mentoring to the communities, funding, and often bring tourists that are willing to pay entrance fees or purchase local products. These sectors also sit on management committees, thus collaborative management is indeed becoming the norm in the country.

Key lessons

A major message emerging from the experience of coastal management in the Philippines is that generalization cannot easily describe what is being learned. This is because the successes all have their own identity and to a limited degree, each community and local government must navigate their own course before their program becomes sustainable. This observation is borne out from the highly participatory process that each management body engages in before field implementation begins. This also reflects the relatively decentralized legal and institutional setting of the Philippines where local municipal and city governments have full authority over their coastal areas and resources. The only exception is when an area is within a national protected area and even here, there is a high level of local control because the management council is mostly comprised of local stakeholders. Thus, despite or, more likely, because of the highly participatory process of planning and implementation, many areas are coming under sustainable use regimes. These managed areas, such as Gilutongan, Sumilon, and Apo islands and many others, see improvements in the condition of their coral reefs and fisheries while socio-economic benefits to local stakeholders have improved.

An important common ingredient in the successfully managed areas in the Philippines is that multisector collaboration is always present. Such collaboration ranges from the fishing community to the national government while key players are more often local, rather than national. Catalytic academic organizations, NGOs and members of the business sector often make the difference between success and failure in localized management. The research efforts of several universities have, on the one hand, documented the real results of MPAs while at the same time serving as mentors for concerned communities and local governments. NGOs often bring technical assistance and funding to start projects that would never be initiated or pushed in the proper direction without their support. Thus, although each project may have a different mix of partners, there are always partners that have learned how to work together effectively without usurping local authority.

The final and perhaps most important conclusion is that ICM regimes are showing higher levels of success than those that simply focus on one issue or management

approach. The local governments that plan for their entire area and then prioritize issues and interventions are doing better and moving toward sustainable management. The planning process helps them allocate budgets and to integrate conservation and even human reproductive health into their normal service. Integration across sectors, within and outside of coastal communities, and with a variety of field-tested interventions is a key to building management regimes that will endure over time, at least in the Philippines.

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