RESOURCE MANAGEMENT STRATEGIES FOR CARIGARA BAY, PHILIPPINES

by

Jessica C. Muñoz[1]

ABSTRACT

Carigara Bay is one of the bays covered by the Coastal Resource Management Component of the Fisheries Sector Programme (FSP), an ADB-assisted resource management programme. The bay is characterized by a multispecies and multigear fishery. Over the years, fish production has decreased while water quality has deteriorated through heavy sedimentation from upland erosion and forest denudation. Red tide bloom is now a perennial occurrence.

Through the Coastal Resource Management Component of FSP, management strategies have been developed which include community organization and education and the setting up of the Carigara Bay Management Council CBMC), limitation of fishing effort, marine habitat protection and rehabilitation, development of land zonation plans, shoreline habitat protection, monitoring of water quality and promotion of alternative/supplementary livelihood.

Resource management strategies are implemented through the concerted efforts of various agencies and organizations at local, regional and national levels. However, the responsibility for managing resources still belongs to the six local governments and the local communities in Carigara Bay. After almost six years of coastal resource management (CRM) implementation in the bay, several recommendations were formulated and presented in the paper.

1. INTRODUCTION

Almost all coastal areas in the country are in a critical condition. However, the Fisheries Sector Program (FSP) of the Department of Agriculture was implemented in only 12 prioritized bays for more efficient and effective programme implementation. Carigara Bay was selected as one of the twelve bays because of the following selection criteria: resource regeneration requirement; environmental degradation problems; poverty levels of communities in the area; and initiatives in self-regulation by local government units (LGUs) and fishermen's associations (FAs).

1.1 Status of the Bay's Resources

Carigara Bay is one the most important fishing grounds in the country. Its approximate location is at 11 degrees 28' North latitude and 124 degrees 30' East longitude. The bay has an area of about 512 square kilometers with an average depth of 54 meters. The bay's substratum is soft mud, however, some areas are sandy with coralline rock.

[1] Supervising Aquaculturist, Coastal Resources Management Section, Bureau of Fisheries and Aquatic Resources (BFAR), Quezon City, Metro Manila, Philippines.

As early as 1944, the potential of the bay as a rich fishing ground was discovered by some Japanese fishermen. And in 1949, an exploratory mission of the United States Rehabilitation Program made trawl operations by converting a U.S. Navy mine sweeper. The mission concluded that the bay was a good trawling ground which could support 3 to 4 commercial-sized boats. When the bay was identified as an area for expansion, trawlers from other neighboring areas as far as Manila began to fish in the bay. Since then, trawling operations never stopped. Fishing and other related activities led to the depletion of the bay's resources. The catch of municipal fishermen were reduced thereby decreasing the earnings of the fishermen from their fishing activity

The bay is now being exploited by more than 20 kinds of fishing gears. There are about 255 species of finfish found in the area. However, destructive fishing methods such as dynamite and cyanide fishing greatly reduced fish recruitment and species diversity.

Most coastal habitats have been damaged. Only 22% of the coral reefs are healthy. Major mangrove stands have been converted into fishponds and beach resorts. Seagrass beds have been damaged by trawling and blasting activities. Only patches are left of what was a luxurious growth of different species of seagrasses.

Red tide blooms periodically occur in Carigara Bay, resulting in economic loss and dislocation of fishermen. The occurrence has been attributed to heavy sedimentation, siltation and pollution. Furthermore, poor water quality has contributed to lower coral reef productivity owing to poor light penetration.

There are about 210 hectares of fishponds in nearshore areas of the bay: about 156 hectares acquired through the 25-year fishpond lease agreement (FLA); 144 hectares privately owned; and 10 hectares acquired by a school of fisheries for extension and research. Species cultured are prawn and milkfish. Conventional and semi-intensive methods are used.

1.2 Socioeconomics, demography and social services

The total population of the five municipalities along Carigara Bay is about 125 789. There are 39 coastal barangays inhabited by about 24% (31,307). There are about 2 432 fishermen along the bay's coastline of about 60 kilometers, a density of 41 fishermen per kilometer of coastline.

About 67% of the coastal population completed their elementary education (6 years) and 11% have finished college education average of 4 years).

Health facilities are present in most towns. There are two hospitals servicing the 5 municipalities. A midwife and a sanitary inspector is present in all municipalities. However, poor sanitation prevails in the area, affecting the health of local people and coastal waters. Only 58% of the population have effective solid waste facilities.

Domestic water sources are from commercial water districts, deep wells and spring. Most barangays have access to electric services. Most towns are accessible by feeder and dirt roads. Only Carigara, the major town, has concrete roads. A municipal port is also located in this town.

Each municipality has a market but most fish and fishery products are marketed in Carigara. About 40% of the fish caught in the bay are consumed locally, 50% are sold to the neighboring areas and 10% is shipped out of the province.

Small scale farming is the traditional alternative livelihood for most fishermen. However, these fishermen are only tenants. Others are engaged in part-time trading and home-based industries, such as mat weaving and nipa shingle making.

There are 48 fish processing establishments. Drying and salting are the most common methods used.

2. RESOURCE MANAGEMENT ISSUES IN CARIGARA BAY

Issues affecting Carigara Bay are categorized into resource and environmental degradation, socioeconomics, legal and institutional and information, education and communication.

2.1 Resource and environmental degradation

Overfishing in the bay is caused by excessive fishing effort. Although the Local Government Code of 1991 delineates boundary between municipal (0 - 15 kilometers) and commercial (>15 kilometers) waters, there are reports of commercial fishermen encroaching on municipal waters. Furthermore, fishing boats have not been properly registered and boats of more than 3 GT are registered as municipal boats. Damage to bottom habitats by trawler and modified Danish seine operations has become increasingly common. The catch composition of these gears shows a large portion of juveniles. Most baby trawlers are based at Capoocan, Leyte.

The use of destructive fishing methods affects both resources and the environment. The use of dynamite to catch high-priced fish and cyanide in aquarium fish collection has impacts not only on fish but also on the various marine habitats. There is continuous access to ammonium nitrate as a material for dynamite making. Using fine-meshed nets also affects recruitment of fish stocks.

Improper waste disposal along the coastal waters of the bay causes water quality degradation. Besides unsightly dumping areas, there is an increase in the amount of coliform bacteria which affect the health of the entire coastal community.

There are about 43 tributaries around Carigara Bay. The river systems bring large amount of silt from nearby denuded forests. High siltation and sedimentation reduce water productivity. Poor agriculture and aquaculture practices contribute to water pollution. The farmlands and fishponds use different kinds of pesticides,

herbicides, mullocides and fertilizers, which, when dumped in large quantities, harm water quality. Red tide blooms occur annually in Carigara Bay, and the most serious outbreak in 1992 lasted for about four months.

2.2 Socio-economics

Declining production from capture fisheries due to overfished fishing grounds and a degraded environment has resulted in a vicious cycle of poverty among coastal communities in Carigara Bay. This poverty is aggravated by overpopulation, especially in the barangays of Carigara. The lack of viable livelihood options in the area makes it difficult for fishermen to augment their income from other sources.

Fishermen are described as non-bankable group in the coastal community. Most of them have low educational attainment. They lack skills to undertake alternative or supplemental livelihood options. Most of them possess neither land or valuable properties. Therefore, they could not comply with the bank requirements in availing credit offered by the government through conduit banks.

2.3 Legal and institutional

Legal and institutional issues are the results of uncoordinated implementation by agencies tasked to enforce fishery and environmental laws. Moreover, law enforcement has been devolved to the LGUs (municipal and provincial). The national government's jurisdiction is limited to waters beyond 15 kilometers from the shoreline. However, technical assistance will have to be provided by the national government whenever necessary.

The devolution of resource management to the local government under the Local Government Code of 1991 did not foresee the need to build LGU capability to ensure that adequate and qualified manpower implement the resource management programme. On the national scene, Executive Order 116 streamlined the bureaucracy, diffusing the fisheries extension service of the Department of Agriculture and affecting programme implementation at the grassroots level. While some staff of the LGUs have a technical background in fisheries, implementing CRM programmes and projects goes beyond technical knowledge. There should be a knowledge of the concepts and principles of CRM.

There is a weak judicial support especially on prosecution. There are very few cases against illegal fishing which have been successfully prosecuted. Furthermore, local politics overrides the proper functioning of the judicial system. This makes apprehension of violators with political connections extremely difficult for law enforcers.

One of the most important functions of the LGUs is the enactment of a unified basic municipal ordinance for fishery management. Each of the five municipalities along Carigara Bay have enacted basic fishery municipal ordinance. However, only that of Capoocan did not include provision for banning trawlers within the municipal waters.

2.4 Information, education and communication

Most coastal communities lack knowledge on marine ecology and environmental conservation and management. The open access nature of Philippine fisheries makes it possible for fishermen go from one place to another when his traditional fishing ground runs out of its valuable fish species. Barangay Daraopay in Carigara is being inhabited by transient fishermen who have chosen to stay for good. Fishermen also think that marine resources are inexhaustible even if they have observed negative biological changes on the fisheries.

Corollary to this, formal education is inadequate to impart resource management concepts. Occasionally, lectures on management and conservation of marine resources are conducted in elementary school. However, this is not enough and the effort is not sustainable. Poor information dissemination and education on marine resource management result to poor participation of the community in resource management.

3. MANAGEMENT STRATEGIES AND ACTIONS FOR CARIGARA BAY

Issues related to environmental degradation and resources depletion are resolved using the concept of an integrated coastal resources management (ICRM).

Management strategies are implemented baywide by the coastal community. The interactions between and among the various sectors of the community are always considered. Activities conducted in the bay are anchored on the concept of community-based resource management (CBRM). Management strategies aim to provide solutions to management issues and problems within the bay. There are seven strategies formulated for Carigara Bay and are contained in the bay's CRM plan. These strategies contain solutions to one or more problems that beset the coastal community.

Strategy 1. Community Organizing and Development

Realizing the need for an intensive community organizing and development, two nongovernmental organizations (NGOs), the MPYA and Labrador, Inc., were contracted for Carigara Bay. These NGOs complement the inadequate manpower of the DA regional office.

There are three phases of community organizing and development: (1) **Phase I (Preparation)** which includes community entry and legitimization, community integration/immersion, information campaign, participatory action research for CRM plan formulation, public education on CRM, training and institutionalization, organizing training; (2) **Phase II (Operationalization)** which includes presentation/discussion of workplan to stakeholders, continuing community integration/immersion, assistance to barangay and municipal CRM committee, continuing CRM public education, formation of fisherfolk cooperatives, and continuing advocacy work; and (3) **Phase III (Expansion and Institutionalization)** which includes continuing activities of Phase II to strengthen the community.

Community organizing and development involves specific activities that harness the coastal community's capability to plan and implement CRM activities to rehabilitate coastal fisheries; ensure equitable access to resources; control illegal fishing; reduce fishing effort to sustainable harvest level; and alleviate poverty thru income diversification.

Fishing communities and the local government are involved in identifying and analyzing resource management problems as well as planning, implementing, monitoring and evaluating strategies and actions to solve the problems in their respective areas. Educating the public, disseminating information, raising the awareness of the coastal community on coastal resource management, instituting management council to coordinate bay management and preparing the coastal community to undertake alternative or supplemental livelihood projects are some of the activities.

Prior to community organization in coastal barangays of Carigara Bay, a series of workshops, seminars and trainings at the community were undertaken.

Law enforcement is one of the activities of the resource management councils. A composite team was formed to enforce fishery laws in the bay. The team is composed of representatives from the fishermen, Bantay-Dagat organizations, NGO, Philippine National Police-Maritime Command and DA. It was observed that violations have decreased and that cases against these violators have been pursued.

Information dissemination, public education and trainings are being done regularly. For CRM to be sustainable, institutionalization at all levels is necessary. In this regard, the barangay and the municipal management councils have been formed. At the baywide level, the Carigara Bay Management Council (CBMC) was established to provide direction in the implementation of CRM activities in the whole bay. The CBMC is composed of LGUs of the municipalities of Babatngon, San Miguel, Barugo, Carigara and Capoocan.

To implement the strategy, community organization, education, public awareness campaign and the formation of CBMC are being undertaken by NGOs. LGUs also take active participation especially in the formation of the bay management council. National agencies such as the Bureau of Fisheries and Aquatic Resources, the Department of Agriculture and the Department of Environment and Natural Resources have extended technical and to some extent, financial assistance to the community.

Strategy 2. Limitation of Fishing Effort

Overfishing of the bay's marine resources is attributed to the open access nature of Philippine fishing grounds. Limitation of fishing effort as a strategy aims to lessen the stress in the bay through selective fishing. All municipalities have enacted municipal fishery ordinance as basis for appropriate management. There is a total ban of baby trawlers in all municipalities except for Capoocan which allows baby trawlers 6 months in a year.

Some measures implemented to effect limitation of fishing effort are banning of fine-meshed nets and read measurement of all fishing boats. Furthermore, training courses for all law enforcement officers are conducted on a regular basis.

This strategy needs legal basis for implementation. In this connection, LGUs have enacted resolutions to effect limitation of fishing effort. The Philippine National Police, the Philippine Coastal Guard, the National Prosecution Service of the Department of Justice and BFAR are tasked to implement fishery laws related to this strategy. The community members who have been deputized as fish wardens are also tasked to implement fishery laws.

Strategy 3. Marine Habitat Protection and Rehabilitation

This strategy establishes fish sanctuaries, artificial reef projects and conducts mangrove reforestation which are being implemented through community-based organizations (CBOs). The CBOs which are based in barangays take charge in demarcating zones, enforcing fishery rules and regulations and conducting training and education of the fisherfolks. The CBOs also work in coordination with concerned government agencies and NGOs. Furthermore, research institutions are also involved in the resource and ecological assessment of the bay to come up with updated status of the bay.

One of the most important projects the coastal community of Carigara Bay to rehabilitate the depleted fishery resources of the bay was the establishment of fish sanctuaries (FS) in 4 sites. With the assistance of DA regional staff, the local government staff and NGOs, resource management committees were formed in each site to oversee the fish sanctuaries. The RMCs have formulated management plans for the sanctuaries and are responsible in protecting the area against violators. While no activity (fishing or passage) is allowed inside the sanctuary, traditional fishing (hook and line and gill net) is allowed at about 200 metros away.

Strategy 4. Shoreline habitat rehabilitation and management

There is a need to address the issues related to coastal forest degradation. The implementation of reforestation of denuded mangrove forests is one of the strategies to resolve these issues. DENR is mandated to protect and manage the mangrove resources of the country. Through the awarding of stewardship scheme and the integrated social mangrove reforestation program, coastal communities are involved in the reforestation projects to ensure a long-term management and protection of the area.

This strategy also involves the conduct of land-use mapping that would support the zonation scheme which designates the zones, boundaries, uses and means of implementing mangrove reforestation and protection.

Aside from DENR, NGOs, LGUs and the bay management council are also involved in this strategy.

Strategy 5. Zonation plan for shoreline areas

In conjunction with shoreline habitat and management, a land use zonation plan which designates areas for intensive use, ecotourism and recreation, mangrove reserve/reforestation and agricultural use were prepared by the municipal governments along Carigara Bay. Abandoned fishponds, degraded mangrove habitats, dumping sites, fish ports, beaches and other coastal uses were identified to resolve conflicts. Criteria for land-use schemes were also acceptable to the majority of the coastal community.

The land-use zonation is under the jurisdiction of the HLRB. the National Mapping Resources and Information Authority of DENR is also involved in terms of mapping the coastal area.

Strategy 6. Water quality monitoring

The problem of water quality degradation is addressed by this strategy. Water pollution usually comes from shoreline, inland, agricultural and upland activities. Sources of pollution's in the bay were identified and measures were formulated to minimize the effects of pollution. This strategy is coordinated with reforestation program of DENR.

The conduct of water quality monitoring has been delegated to DA regional office. Initially, a research institution conducted hydrobiological assessment of Carigara Bay. BFAR also assisted the regional office in water quality monitoring especially during red tide occurrences.

Strategy 7. Promote attractive and economically viable alternative livelihood project

There is a need to assist the coastal community in exploring other avenues for alternative livelihood projects. Recognizing the problems of overfishing of marine resources and poverty among coastal communities. The strategy to identify and promote economically viable livelihood projects was launched. These projects are compatible with the CRM approach.

Existing livelihood projects were be evaluated by conducting cost-benefit studies on their impact to the socioeconomic situation in the area. Fishermen cooperatives and organizations need to be strengthened to effectively initiate credit arrangements.

NGOs play important role in assisting fishermen avail of credit facilities to start alternative livelihood projects. Under FSP, credit is available to fishermen through the Land Bank of the Philippines and the Development Bank of the Philippines

4. SOME LESSONS LEARNED IN THE IMPLEMENTATION OF ICRM IN CARIGARA BAY

The issue of sustainability is very important when planning for the long-term management of coastal resources. This issue needs to be addressed by a strong organization that is capable of implementing coastal resource management.

1. Coastal resource management should be anchored on ***community-based resource management***. Success is ensured when the community participate in the planning, implementation and monitoring of pilot projects and/or activities. It has been observed that fishermen are now more active and more vocal on what they want done in their fishing communities.

2. ***Institutional strengthening*** is an integral part of management. There is a need to determine and assign responsibility to all agencies, institutions and offices tasked to implement programmes. There must be qualified and able personnel, both from the national and local levels, to implement programme activities and perform extension services. Logistical support, infrastructure and human resources development should be made available. Moreover, legal mandates should be vested in agencies entrusted with management implementation.

3. There is a need for continuous ***education and information dissemination*** for government officials, local government officials, nongovernmental organization members and fisherfolks. Education and information dissemination play a vital role in introducing CRM to all sectors.

4. Considering the holistic approach in management, a ***baywide management*** of the area is deemed appropriate. All factors affecting the environment and its people should be viewed as one affecting the others (i.e. deforestation effect on coastal area). Even if problems are site-specific, management should consider the bay as one ecological unit.

5. Recognizing the limitation of the government sector in terms of time and personnel involvement, ***NGO/PO participation*** in management had been effective. The NGOs, being area-based, have better perception of community wishes and aspirations.

6. In the planning process, ***research as support to management goals*** is necessary to have scientifically-based management options. Research results should be made available and these results should be translated to language that coastal managers understand.

7. The Philippine Local Government Code states that local government units shall share with the national government the responsibility in the management and maintenance of their municipal waters. In effect, the

national government has limited jurisdiction over municipalities. Municipal governments can legislate management measures for the purpose of enhancing the right of its people to a balanced ecology. ***Political will and commitment*** are the necessary tool for implementing management at the local government level.

8. ***Linkages and networking*** provide the local fisherfolks access to logistics and other assistance in the implementation of the various CRM activities.

9. For better and efficient implementation of management options, ***social and political acceptability*** lessens potential conflicts between and among the fisherfolks and the local government units.

10. Law enforcement is a very important component of ICRM. Often, an ***effective and efficient enforcement*** of fishery laws, rules and regulations, resolves most issues and problems of ICRM implementation.

5. CONCLUSION

Implementation of ICRM in Carigara Bay showed that management of coastal resources involving the active participation of all major stakeholders produces positive results. Despite its multisectoral dimension, it is easier to implement integrated coastal resources management through institutional coordination and linkages. Its complexity did not diminish the desire of the different sectors to establish a functional CRM in the bay. NGOs, LGUs, fishermen and the government have decided to use the negotiating table to push for reforms in Carigara Bay.

Programme implementation had successes as well as failures. Accomplishments tell of success stories that could serve as inspiration to promote the strategic spread of ICRM to other coastal areas.

REFERENCES

Alapan, A.A. 1991. Training course for provincial team on FSP and CRM planning workshop (Module I). Final Report, Volume XIII.

Alix, J.C. 1989. Community-based resources management: the experience of the Central Visayas Regional Project I. Coastal area management in Southeast Asia: policies, management strategies and case studies. *ICLARM Conference Proceedings*, pp. 185-190.

Integrated Coastal Resources Management Plan of Carigara Bay, Leyte. 1991. Coastal Resources Management Component. Fisheries Sector Program. Department of Agriculture, pp. 1-59.

White, A.T. 1989. Two community-based marine reserves: lessons for coastal management. Coastal area management in Southeast Asia: policies, management strategies and case studies. *ICLARM Conference Proceedings*, pp. 85-96.