Integrated Coastal Zone Management Case Analysis: Barangay Cayucyucan, Mercedes, Camarines Norte, Philippines

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Introduction to the San Miguel Bay 'Problem' and Barangay Cayucyucan

The San Miguel Bay

Situated in the outer northwestern portion of the San Miguel Bay lies Barangay Cayucyucan. Developmental and institutional integrated coastal resource management initiatives in the surrounding island areas recently incorporated Brgy. Cayucyucan as a 'mainland link' for an expanding new paradigm in community-based integrated coastal resource management (CBICRM) processes being implemented by the Institute of Social Order (ISO). This new paradigm is believed to centralize equitable community participation in decision-making and program implementation processes – the benefits derived from such, and a movement towards implementing a modified closed access ecosystem-based management regime. Many perceive these efforts as a 'new beginning' for the San Miguel Bay, and for Brgy. Cayucyucan, as past and current broad-based coastal management efforts had failed to meet the socio-ecological management needs of the bay, and of those residents along its coastline.

Geographically, San Miguel Bay's coastline measures 280 km, from Grove Point in the Municipality of Mercedes (Camarines Norte) to Quinabuscan Point in the municipality of Siruma (Camarines Sur) (CEPSMB, 1993). The bay has a freshwater catchment area of 220,300 hectares draining into 12 river systems throughout. With its shallow nature – averaging 7.4 meters in depth and substrates (Figure 1) – a mixture of sand and mud covering approximately

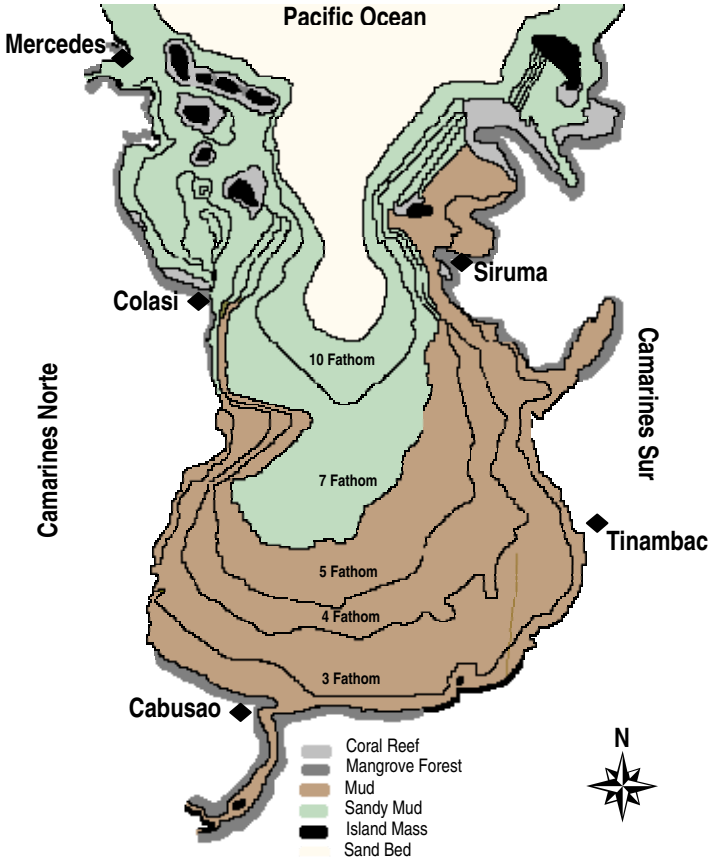


Figure 1. Situational map of San Miguel Bay, Philippines – showing bathymetry, sediment profile, and significant ecosystem components.

95% of the area, San Miguel Bay has been classified as an estuary possessing a high potential for biological production. Near the mouth of the bay, freshwater influences on the bay's ecological composition give way to higher salinities favorable for coral growth.

Reef areas within San Miguel Bay total 3,744 hectares composed of 648 has. of corals, 2,885 has. of sand and rubble, and 240 has. of rocks. Seagrasses and seaweeds are found in the shallow subtidal zones of these reef areas; and, there are 1,402 hectares of mangrove forest remaining throughout the bay. The reef areas provide the marginalized coastal fishers of the Camarines islands and coastal mainlanders with subsistence and a primary source of income. Notably, the reefs are still in place; however, most are dead due to the onslaught of illegal fishing practices and the effects of heavy siltation deposits. This has resulted in a bay-wide catch reduction of 81.5% since the 1940's (CEPSMB, 1993). In 1992, the coral reefs within the municipality of Mercedes were said to be in fair to good condition contributing 674 tons (approx. 4%) of marketable fish to the 'bay-wide' municipal fish catch amounting to 16,850 tons. Today, the reefs are considered to be in poor condition; thus yielding substantially lower fish catches (CEPSMB, 1993).

Since the 1970s, there has been a consistent decline in the bay's municipal fish catch, reportedly due in part to sectoral overfishing and habitat exploitation. As an example, in the 1980s, 3% of all fishing units active in the bay (75 small trawls) earned more collectively than all other fishing units in the bay combined (2,300 other units) (Sunderlin and Gorospe, 1998). Socio-ecological research conducted throughout the San Miguel Bay area indicated that the bay's continual decline in fishery-related productivity could be attributed to excessive fishing pressures, destructive and illegal fishing methods, and habitat destruction through inappropriate socioeconomic development activities. From a socioeconomic stance, identified 'bay' issues range from the lack of alternative livelihood sources, low returns from fishing, and inefficient marketing systems to inequities that often lead to conflict between commercial and municipal fishers. Identified institutional and policy issues afflicting the bay stem from the lack of sectoral participation, a resistance towards community regulations/management, limited financial

resources for resource management, and the lack of institutional capability to meet coastal management needs (FSP/SMBMC/ICLARM, 1994).

To answer some of the problems besetting the bay and others like it, the San Miguel Bay Integrated Coastal Fisheries Management Plan – Philippine Fisheries Sector Program (FSP) was launched under the Department of Agriculture (DA) in 1989 with three central aims. First, to decentralize coastal management forms for the nearshore fisheries resources to a municipal/community co-management regime. Second, to promote community-based initiatives resulting in the rehabilitation, conservation, and protection of the coastal resource base. And third, to diversify income sources available to the small-scale fisher (Sunderlin and Gorospe, 1998).

In response to 'decentralizing' coastal management, the San Miguel Bay Management Council (SMBMC) was established under the FSP to serve as an administrative body tasked to manage the bay as a single entity. Central to the SMBMC mandate were directives, such as formulate policies and strategies; act as a coordinating unit between stakeholders; and arrange external funding to carry out demands, among others. Project targets included organizational development programs aimed at streamlining and enhancing the bay's management capabilities through public participation and institutional development. The SMBMC–FSP agenda also highlighted the Fisheries Resource Management Program (FRMP) aimed at reducing fishing efforts to sustainable yields; instituting infrastructure programs to maximize rates of return from fishing activities; forming alternative livelihood programs to provide income generating options; and developing environmental protection programs intended to rehabilitate coral reefs, mangrove forests, and to reduce lowland and upland development impacts.

By 1994, the FSP was completed, and the SMBMC was to sustain and responsibly co-manage the socio-environmental development and use of the San Miguel Bay in conjunction with representative Local Government Units (LGU). With little support offered to the SMBMC, and the emergence of 'interest' conflicts between principal groups, i.e. the SMBMC fisher membership and the LGU, and other prominently backed

stakeholders (e.g. trawl owners), the council stopped functioning within two years, and objectives were never met. It has been postulated that the 'failure' of the SMBMC and any of its subsequent project targets was a result of the council's institutional arrangements relative to community involvement and support sustainability. Currently, a second phase of the FRMP is being implemented throughout the bay focusing on alternative livelihoods. Again, implementation for the various livelihood-based projects is 'top down' with short-term and politically oriented support. Seemingly, the past problems of the FSP phase one are set to repeat themselves (Pers com, 2005).

Overview: Municipality of Mercedes and Barangay Cayucyucan

As previously mentioned, Brgy. Cayucyucan has recently become a central 'mainland link' in an expanding community-based integrated coastal resource management processes being implemented by ISO. Like many of the coastal barangays in the region, Cayucyucan shares many of their social, institutional, economic and environmental parameters, problems and issues.

Mercedes, originally called 'Barra,' has always functioned as a trading port for both native and foreign vessels. The name 'Barra' comes from the local Bicol word 'nabara,' meaning grounding, which is akin to the frequent grounding of ships during bad weather conditions, or as a result of ignorance when ships were piloted through its narrow and shallow channels. During the Spanish colonization, a Spanish vessel bearing the captain and his wife, named Doña Mercedes, ran aground in Barra. They settled in the area and the captain's wife endeared herself to the local people as a result of her virtue and kind heart. Subsequently, upon her death the locals decided to refer to Barra as Mercedes in gratitude and memory of 'Doña Mercedes' (MJE and DRIM, 2000).

Formerly a barrio of the provincial capital, Daet, Mercedes became a municipality in 1948, comprised of 19 barrios spread over 9,214 hectares of land – including five islands (Figure 2). Originally a seventh class municipality, Mercedes is now a third-class municipality – based on municipal revenue, labor force and land area – via Ministry Order # 32-86. Mercedes is often considered as the fish bowl of the Bicol region, and is the third largest fishing ground in the Philippines (MJE and DRIM, 2000).

As of 2000, the municipality is said to have produced no less than 100 tons of marine products everyday (MJE and DRIM, 2000). At present, the municipality's dependence on fishery-related activities has become precarious for the mainland coastal barangays, even more so for the nearby island barangays of Apuao, Caringo, and Quinapaguian where fishery resource extraction activities no longer sustain the people's level of living, some even beyond subsistence (ISO, 2000).

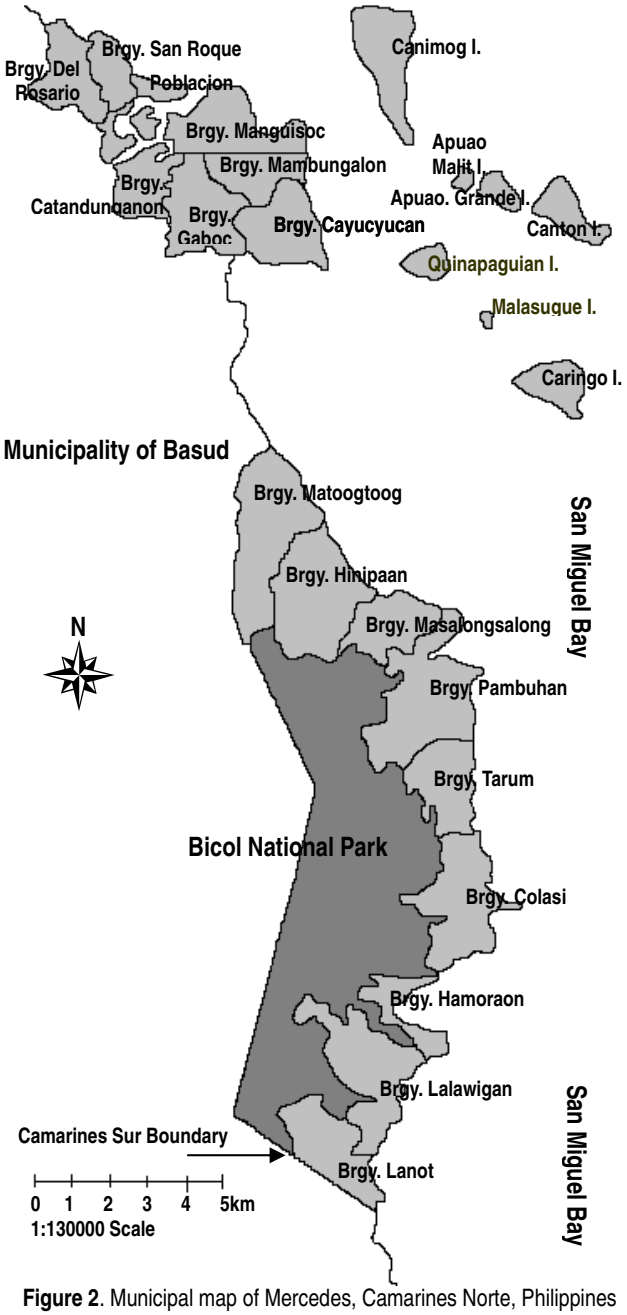


Figure 2. Municipal map of Mercedes, Camarines Norte, Philippines indicating barangay boundaries and municipal divisions.

Barangay Cayucyucan, covering an area of 281.3753 hectares, is located along the northwest coastline of the municipality, and is comprised of six *puroks*/zones with a population of just over 900. Although the municipality on a whole is classified as 'third class', Cayucyucan, and many of the coastal barangays, have not progressed equitably (Mercedes Gov., 2003). Fishery resource extraction, marine agriculture, agro-forestry, and agriculture are the dominant livelihood activities in the area. Cayucyucan is a 'classic' Filipino mainland fisher-farmer community, one that is seemingly more prosperous and developed than the nearby island barangays. Although poor, the people's prosperity, in relative terms, is primarily due to its mainland geographical position, where farming activities are capable of supplementing daily subsistence needs, as well as providing for alternative sources of income. Additionally, its ease of access to and from the municipal port – a central fish trading port for the

provinces of Quezon, Camarines Norte, and Camarines Sur, and the town proper via road and waterway – greatly improves its 'marketing' position, and eases the flow of goods and services between the barangay and the municipal town proper. However, incomes are still endemically low, ranging between PhP500-1000 per week; hence, meeting subsistence needs is still highly dependent on the extraction of natural resources (ISO-PCRA, 2005).

All the same, low income in the barangay should not be viewed as a central problem or issue relative to resolving Cayucyucan's socioeconomic and environmental problems; but rather as a symptom to such. The following is a synopsis of the identified social, institutional, economic and environmental problems and issues that currently exist:

Synopsis of Identified Issues and Problems

Social: Positive broad-based socialization plays an important role in the equitable development of any community. However, magnitudes of 'self-interest' in development contexts present a significant 'problematic' stumbling block towards equitable development and prosperity in Brgy. Cayucyucan, especially for the highly marginalized (e.g. subsistence fishers and landless farmers). Access to education is limited and is clearly an issue within the barangay as it has impeded, and will continue to do so, the development of diverse altruistic community leaders. Additionally, long-term external support for organizations and organizational development is highly dependent on internal and external political group interests, seemingly in a continual flux; thus limiting participation in development and natural resource conservation activities.

Institutional: Although several institutional/organizational bodies exist in Brgy. Cayucyucan, all but the Samahan ng mga Kababaihan – the women's group of the Barangay Cayucyucan Development Organization (BCDO) remains active. Other organizations are not accredited and not formally recognized; thus, rendering such un-supported and inactive. Additionally, external support networks for institutional and organizational development remain either weak, short term, non-developed, or highly dependent on internal and external political interests. From an environment-institutional

perspective, there is currently no active and persistent environmental management system in place to formally educate or actively mobilize users for environmental protection and conservation initiatives (Mercedes Gov., 2003).

Economic: Current low income is prevalent rendering needed economic diversification stagnant and the use/adoption of technical advancements in agricultural and aquacultural production unattainable. The barangay is persistently short of local subsistence needs (respective of rice, corn, vegetable, fruit, meat, and legume consumptions) and below that of regional production levels (all aquacultural productions, and copra production). Local agricultural yields have been consistently dropping since 1995. As well, significant drops have been noted in marine products and agro-forestry yields since 1990 – all equating to economic opportunity losses (MJE and DRIM, 2000) (Mercedes Gov., 2003).

Environmental: The current status of the natural marine resource base is mildly degraded (coral reefs and seagrass beds). However, this is being used in an exploitative manner relative to extraction pressures (coral reefs, seagrass beds, mud-flats, and mangrove forests). Lowland forests and shrub lands are not used at a sustainable rate, and being are inundated by domestic waste products.

In an effort to resolve these central problems and issues hampering the well-being of Brgy. Cayucyucan and the surrounding ecosystems, the following information has been compiled through a series of in-situ surveys. This constitutes a situational and functional case analysis of Brgy. Cayucyucan's socio-environmental situation. Accordingly, an action plan identifying appropriate alternative community socio-environmental actions relative to current problems and issues is also included in this case analysis, and will be used to guide the socio-ecological development efforts of the barangay, in cooperation with the neighboring Inter-Island Natural Resource Management Council (IINRMC) and ISO as they expand and fully incorporate Brgy. Cayucyucan into a unified community-based integrated coastal resource management process.

Barangay Cayucyucan Community Profile

Name of community: Barangay Cayucyucan, Municipality of Mercedes, Camarines Norte, Philippines

Population: 942 residents, 207 households, growth rate – 2.83%, fisher-farmer orientation (Mercedes Gov., 2003).

Community Setting:
Situated in the outer northwestern portion of the San Miguel Bay, Brgy. Cayucyucan (123° 02' North – 14° 05' East) is connected to the provincial capital Daet via road links through the municipality of Basud (PhP10 jeepney fare – approximately 40 minutes); to the town proper of Mercedes via tricycle to the Manguisoc wharf and sea link (PhP11 – 20-minute ride, plus five-minute boat/ferry ride); and approximately nine hours south of Manila by land.

Barangay land area composition is comprised of remnants of lowland evergreen forest, and molave, beach, and mangrove forests. Of the 29 original hectares of mangrove forest, three hectares have been converted into aquacultural ponds; only remnants of the primary forest remain, second growth is approximately 35 years old. Water resources consist of seagrass and seaweed beds within sand to sandy-mud substrates.

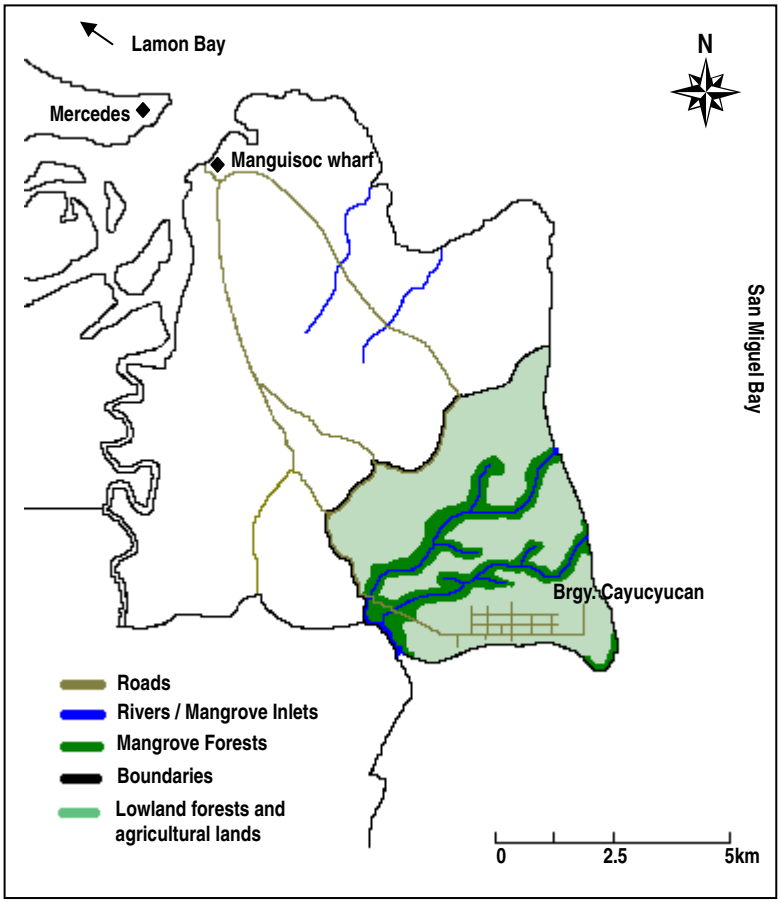


Figure 3. Barangay map of Cayucyucan, Mercedes, Camarines Norte, Philippines indicating significant barangay habitats, river systems, and boundaries.

Historical Profile:

In 1887, two families from Imus, Cavite discovered a shoreline facing inwards to the southeastern side of San Miguel Bay. The area was said to be rich in marine life including fish, crabs, shrimps, and other types of natural resources. These two families, who were looking for areas to fish, decided to settle there. During that time, the place was uninhabited and unnamed, and according to stories, the *Caviteños* found a huge tree with lush leaves known to be *Ipil*. This tree sat on the shore facing the bay, and because its dense leaf cover created a refuge from the heat of day, the *Caviteños* called this their *yucyucan* or place of rest (Mercedes Gov., 2003).

From that time onwards, the place became known as Cayucyucan throughout the neighboring communities, towns and provinces. The place was not only legendary for the rich marine resources, but also for the use of fishing technique called *kinavite*, a type of fish corral, which is still currently used in the area (Mercedes Gov., 2003).

Selected Socio-Demographic Profile:

Table 1. Population profile for Brgy. Cayucyucan respective of the number of individuals within each age group according to sex.

Sex	Age Group (years old)													
	< 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	≥ 60
Male	7	26	49	41	53	35	53	30	43	30	37	12	17	19
Female	9	42	48	55	28	33	43	41	48	33	36	13	20	35

Source: Mercedes Gov., 2003.

Table 2. Educational attainment for Brgy. Cayucyucan adult residents (18 years of age or older)

Attainment Level (% of adult population)					
Some Elementary	Elementary Graduate	Some High school	High school Graduate	Some College	College Graduate
4.0	64.0	28.0	4.0	4.0	4.0

Source: ISO-PCRA, 2005

Table 3. Male/female school enrolment profile for Brgy. Cayucyucan.

Jack and Jill Daycare	Nursery		Preparatory		Kinder 1		Kinder 2					
	M	F	M	F	M	F	M	F				
							11	16				
Cayucyucan Elementary School	Grade 1		Grade 2		Grade 3		Grade 4		Grade 5		Grade 6	
	M	F	M	F	M	F	M	F	M	F	M	F
	12	9	10	9	10	11	7	14	10	11	6	16

Manguisoc National High School	Year 1		Year 2		Year 3		Year 4	
	M	F	M	F	M	F	M	F
	1	2	2	4		1		2

Camarines Norte State College	Year 1		Year 2		Year 3		Year 4		Year 5	
	M	F	M	F	M	F	M	F	M	F
			1	1						

Source: Mercedes Gov., 2003

Table 4. Male/female malnutrition rate (%) profile by purok/zone, for Brgy. Cayucyucan.

Purok 1		Purok 2		Purok 3		Purok 4		Purok 5		Purok 6	
M	F	M	F	M	F	M	F	M	F	M	F
20	8.3	26.9	20	6.4	5.2	22.5	24.1	18.5	11.5	35.5	11.1
Average male malnutrition rate: 21.63 %						Average female malnutrition rate: 13.36 %					

Source: Mercedes Gov., 2003

Developmental Socialization and Adaptation Profile:

Reverence is a strong social connection within Brgy. Cayucyucan. Perhaps this has been concretized through their religious beliefs and family value systems. The community is predominantly Roman Catholic (RC), although there are minor affiliations to Born Again Christians and Iglesia ni Cristo (INC) factions. The barangay festival celebrates religious and family orientations and commences on every third Saturday of August. It is also believed to bring about prosperity in fishing related activities. Attesting to their family values is 'Family Week,' celebrated yearly beginning on September 27; and again, family and religious beliefs are affirmed on May 14-15 annually. Beliefs in alternate spirits that inhabit the land and sea are said to be distant memories; hence, land and sea are looked upon only as a place of productivity – no fear of fabled entities and spirits, no ritual actions or manifestation, just benign reverence out of safety.

Historically, the community of Cayucyucan was built around family units, and families employed a community help system referred to as *'bayanihan'*. To date, socialization within the community is revolves around the family unit (extended family included); however, the *bayanihan* system is no longer practiced. As an example, small credit lending systems have been established; however, to avail of the service one must be part of the founding family through relations. Hence, economic endeavors are constructed within, as well as the benefits of such held within. Various community

members and organization officials have said that if a family has a member in any form of governmental or organizational position, such is considered to be a logistical advantage to the family's prosperity.

Clearly extended family interests are a contentious point of discussion in the barangay. Issues of land ownership between barangay officials and the community often arise as officials position themselves to prosper from external tourism interests relative to 'barangay land use' and ownership (i.e. vacant land within the barangay is considered as communally owned land for communal development, whereas political and prominent community leaders vision such a 'public land' for private development). As stated, this can be a contentious issue, but one that goes unchallenged, giving credence to a secondary – hierarchical – form of socialization within the community, manifested through reverence.

Notably, socialization forms and issues related to kinship and ownership respective of organizational development have restricted past environmental oriented participatory development actions. Currently, only a Barangay Fisheries and Aquatic Resource Management Council (BFARMC) works in conjunction with the Bicol Upland Development Foundation Inc. (BUDFI), the implementation arm of the FRMP livelihood endeavors being primarily aquacultural and its associated capability building components. Within this relationship, financial and technical support is seen as its strengths with evident weaknesses. Organization efforts utilized constitute 'sweeping' community organizational processes, and 'top-down' – 'short-term' management frameworks. Currently, BFARMC's activities within the Municipal Fisheries and Aquatic Resource Management Council (MFARMC) (and the MFARMC itself) remain virtually inactive as a result of conflicting political interest. Community and BFARMC participation in IINRMC initiatives in the area is still in its infant stages.

Inevitably, local forms of socialization lend to a community's ability to adapt to changing socio-political, economic and environmental conditions. As examples, a group of marginalized fisher/farmers have established a form of capital sharing within the

community, the Community Grameen Bank (CGB), to compensate for inability to obtain financial loans through formal channels. Several residents have obtained 'educational sponsors' for their children nationally and from abroad, thus lessening family financial burdens that prevent children from obtaining a higher level of education. Unfortunately, current levels of 'adaptation' have not carried over to positive environmental-conservational oriented strategies, and limited to those geared towards production.

Economic Adaptation and Livelihood Profile:

Historically, fishing practices focused around various forms of 'fishpens' (*kinavite*), throw nets (laya), and a form of 'lamp' fishing utilizing the natural glow of a particular branch from a white *lawan* tree to attract fish at night, but is no longer in use (*white lawan*). Technical fishing adaptations in the community did not significantly advance until approximately 1945 when the beach seine, purse seine, fish coral, and fish traps were introduced by fishers migrating from Cavite. In the early 1960s, the *bukatot* was introduced copying its use in Camarines Sur, along with varying degrees of mangrove forest base aquacultural production in the mid 1980s.

With the onset of these 'new' gears, fishers were then able to use reliable environmental clues to maximize their production levels. For example, fishers have stated that typhoons resulted in a 'darkening' of the water, which made the use of nets more productive – "fish cannot see them". Hook and line fishing was best carried out in clear waters or when the moon is bright; consequently, bright nights were less productive for net fishing. With the ability to catch different species and becoming mobile, fishers learned of 'seasonality.' For example, the fly fish was easily and abundantly caught during the months of June and July; fishing was better in San Miguel Bay during the northwest monsoon; poor during the southeast monsoon, thus venturing to offshore reefs to fish.

In due course, seasonal clues have been replaced by the calendar, as with noted environmental clues respective of farming activities. Hot weather equated to the planting of corn and cassava, rice was seasonal and timed according to the amount of rainfall; however, farming has become continuous for much of the barangay due to

irrigation efforts. Naturally, farming activities adapted the use of herbicides and fungicides to improve crop productivity, as well as the use of Thiodan, a banned insecticide (the use of Thiodan stopped in 2001 as required by government regulators).

Many of the aforementioned modes of 'production' and others not highlighted, combined to 'competition' between the municipal and commercial fishing sectors have lead to a highly exploitative environmental state within Brgy. Cayucyucan's coastal environment. However, conservational techniques have been formed/adapted within the marine sector. For example, some fishers abide by fishery regulations and do not employ the use of the beach seine during the month of May (this is a general spawning time for the marine fish in the area). With respect to the community's environmental reproductive activities, large portions of the barangay's mangrove forest that were cut in the 1960s for charcoal, dye, and wood products (used as house building and fencing materials) were replanted in 1970. Currently the barangay has plans to reforest recently denuded mangrove forest areas with 120,000 seedlings. Presented below is a livelihood and economic synopsis of the community's activities and monetary values received from such.

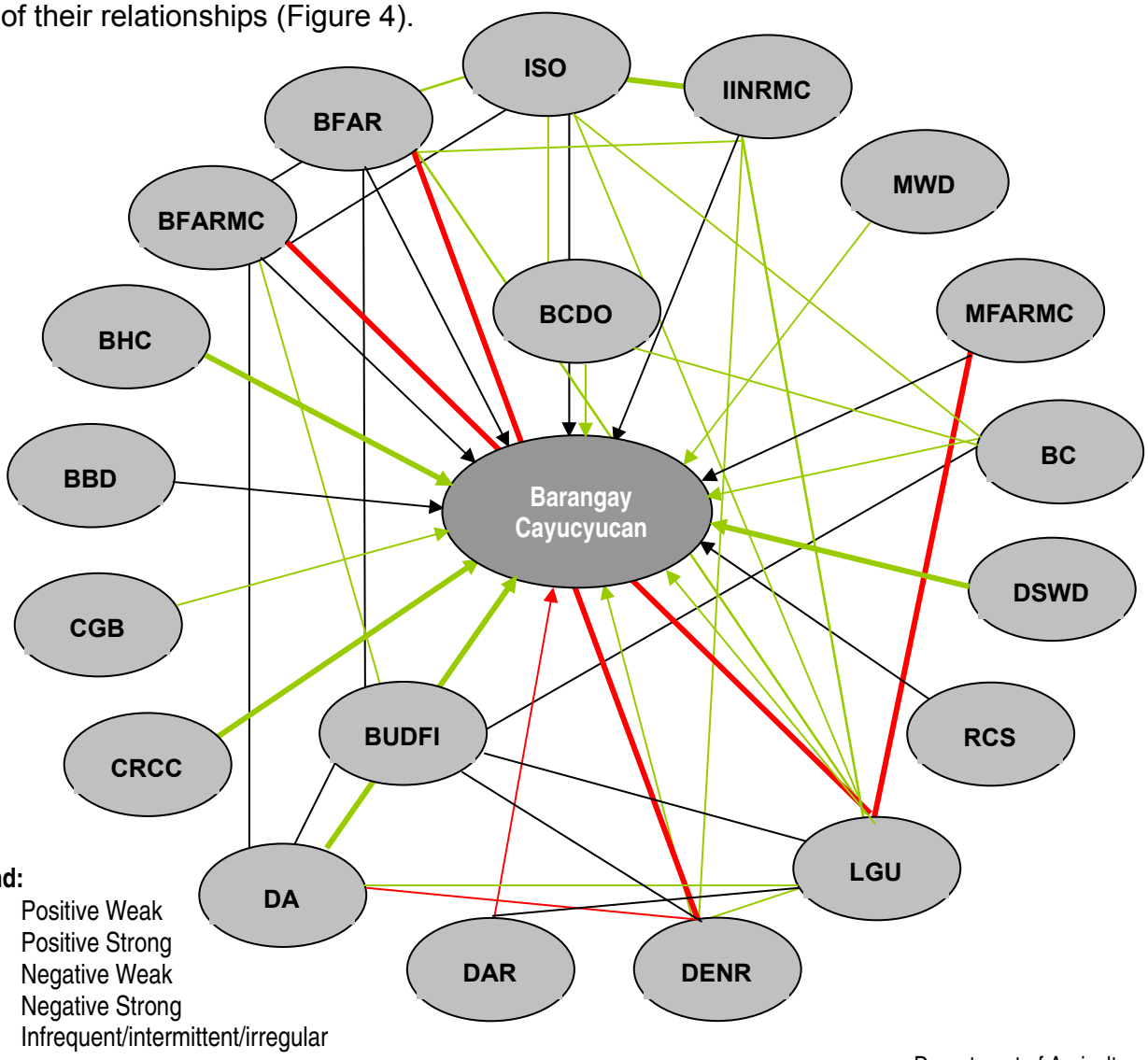
Table 5. Brgy. Cayucyucan area resource use, resource production, and employment profile.

Sector	Form of Production/Harvest	Monetary Value (PhP)	Sector Employment 'Relative Reliance'
Agriculture	Irrigated Rice Farming	Value unknown - subsistence use only.	32.0%
	Rain-fed rice farming		
	Vegetable and root crops		
Agro-forestry	Copra	Unknown	28.0%
Marine extraction/fishing	Marine fishes	1,971,600	30.0 %
	Crabs	89,000	
	Shrimps	18,000	
	Shells	1,170	
Mariculture	Seaweeds	200,000	Approx. 2.0%
	Grouper and mud crab	Unknown	Less than 1.0%
Professional			2.0%
Official Unemployed			Approx. 5.0%
Under-employed			Approx. 23.0%

Source: Mercedes Gov., 2003.

Information obtained in focus group discussions (FGDs) indicate the earnings from livelihood activities averaged PhP1113.63 per week (ISO-PCRA, 2005). Relative to 2003 barangay fisher data, gross fishing income are equated to PhP413.60 per fisher/per week (i.e., before expenses). This comparative computation indicates a strong dependence on agriculture and home-based livestock raising for cash income and subsistence (i.e. the harvesting of marine natural resources just meets barangay needs). Notably, 40 % of those interviewed in 2005 for this study indicated that they rely on financial help from family members working outside of the barangay to meet their current needs.

Institutional Profile:
Institutionally, the barangay provides administrative services such as 'barangay clearance' for outside employment requirements, provisions for a localized 'format' for internal conflict resolutions, and health services through the Barangay Health Center. Below is an institutional map outlining community and external affiliations and the extent of their relationships (Figure 4).



BC – Barangay Council
BCDO – Barangay Cayucyucan Development Organization
BFAR – Bureau of Fisheries and Aquatic Resources
BFARMC – Barangay Fisheries and Aquatic Resource Management Council
BHC - Barangay Health Center
BBD – Barangay Bantay Dagat
BUDFI – Bicol Upland Development Foundation Inc.
CGB – Community Grameen Bank
CRCC – Community Roman Catholic Church

Department of Agriculture – **DA**
Department of Agrarian Reform – **DAR**
Department of Social Welfare – **DSWD**
Inter-Island Natural Resource Management Council – **IINRMC**
Institute of Social Order – **ISO**
Local Government Unit – **LGU**
Municipal Fisheries and Aquatic Resource Management Council – **MFARMC**
Municipal Water District – **MWD**
Red Cross Society – **RCS**

Figure 4. Barangay Cayucyucan institutional map outlining community and external affiliations and the extent of their relationships.

From Figure 4, it is evident that many relationships are cordial; however, relationships need to enhance coastal environmental management participation with the community and its political entities need improvement. Accordingly, it is also evident that inter-governmental relationships and coordination need to be greatly improved. The following table highlights some of the more important institutional and agency relationships, and their capability strengths and weaknesses in relation to coastal resource management (CRM) processes within Brgy. Cayucyucan.

Table 6. Most relevant institutions and agencies capable of working in association with Brgy. Cayucyucan in relation to socio-environmental conservation and protection.

Government Departments and Line Agencies	Central Capability Strengths	Central Weaknesses
Department of Environment and Natural Resources	Logistical, technical, and financial support mechanisms.	Poor integration with affiliated CRM government agencies.
Department of Agriculture	Logistical, technical, and financial support mechanisms.	Poor integration with affiliated CRM government agencies.
Bureau of Fisheries and Aquatic Resources	Logistical, technical, and financial support mechanisms.	Poor integration with affiliated CRM government agencies.
Department of Agrarian Reform	Ability to equitably delegate and implement land reform.	Relatively non-active in the area.
Local Government Unit	Logistical, technical, and financial support mechanisms for CRM endeavors.	Political and self-interest orientations
Barangay Council	Logistical and organization support mechanisms for community CRM and development initiatives. Ability to mitigate localized conflicts.	Political and self interest orientations
Non-Government Institutions and Organizations		
Barangay Fisheries and Aquatic Resource Management Council, and	Regulatory legal mandates, and institutional CRM and development affiliations.	Limited and non-equitable CRM activity.
Municipal Fisheries and Aquatic Resource Management	Regulatory legal mandates, and institutional CRM and development affiliations if activated and fostered.	Non-recognized by LGU, non-functional in SMB CRM mechanisms.
Institute of Social Order	Full CRM capabilities associated with long-term commitment policies.	Perceptions associated with being Manila-Ateneo relative to financial capabilities and political influences.
Inter-Island Natural Resource Management Council	Capable localized CRM capacity, equitable CRM and community development orientations, recognized as LGU CRM partner.	Limited financial capital.
Barangay Bantay Dagat	Regulatory legal mandates, and institutional CRM and development affiliations.	Low participation rates, non-accredited by barangay council, low organizational and technical capacity.

Barangay Environmental Profile:

Barangay land distribution: Existing data indicates that the total land area of Brgy. Cayucyucan is 281.3753 hectares (2.75% of total municipal land area); however, land area estimates are set at 417.82 hectares. Within the barangay boundaries, 29 hectares of secondary mangrove forest remain, of which 3 hectares has been converted into fishponds. Few primary mangrove forest remnants exist, approximately one hectare only. Eighty-three hectares of land is devoted to rice production, divided evenly between irrigated and non-irrigated fields. The barangay itself covers approximately 10 to 15 hectares (Figure 5). The remaining portions of land are divided between residual terrace land mainly for corn, root crop, and copra production (Figure 5)(MJU and DRIM, 2000)(Mercedes Gov., 2003).

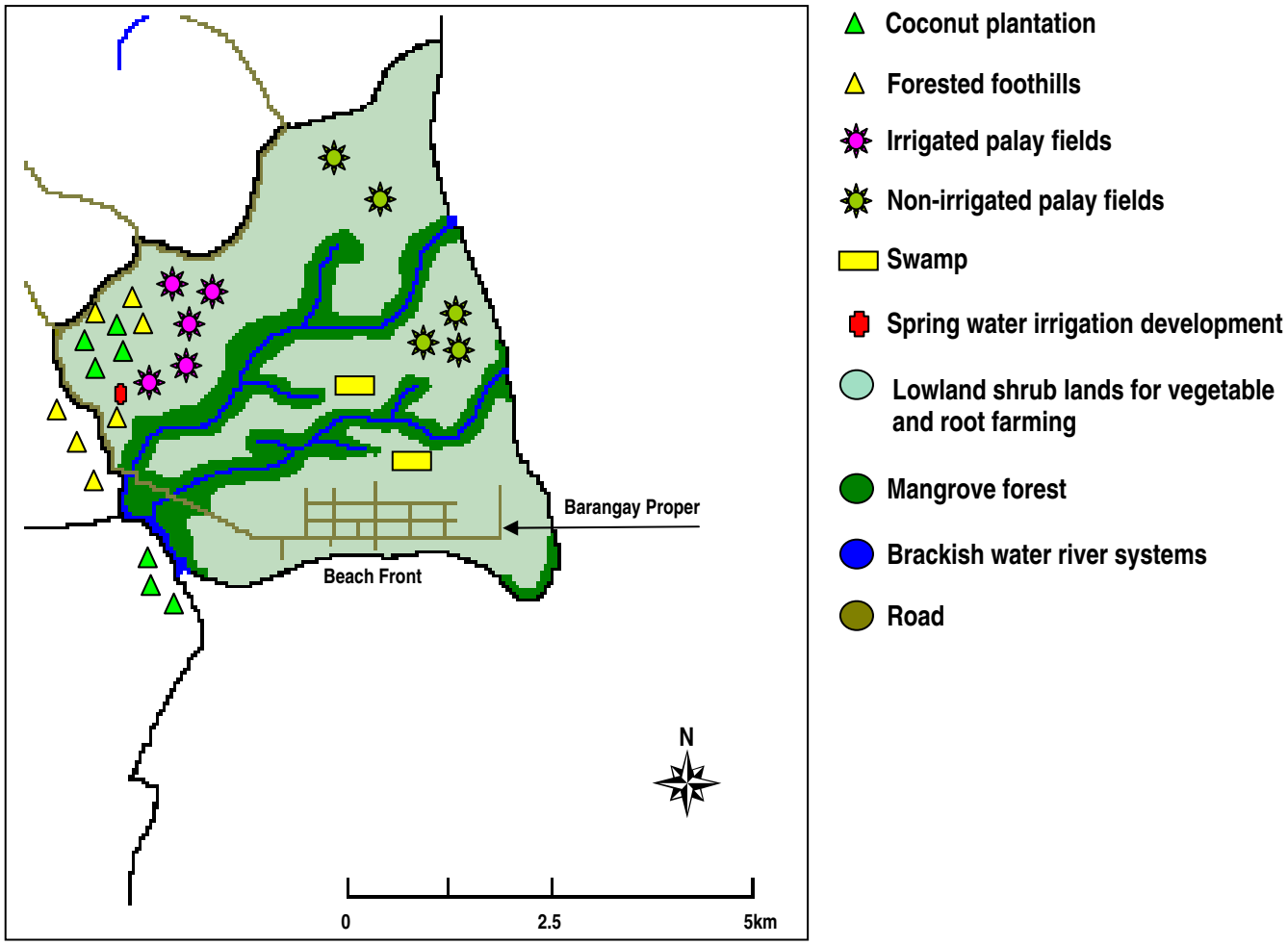


Figure 5. Barangay map of Cayucyucan, Mercedes, Camarines Norte, Philippines indicating significant barangay land habitats and habitat use, river systems, and boundaries.

Barangay Land Characteristics (see Figure 5 for orientation):

1. Geologic Formation: recent alluvium.
2. Land Slope: 0 – 3.0%, gentle slope, no significant erosion threats.
3. Land Classification: beach front, minor alluvial plain, foot slope, and hilly landscapes consisting of the following:
    a. Tidal Flats: These areas are moderately deep-to-deep fine loam. Soil acidity is mildly alkaline (pH 8.0), moderately available P and Ca/Mg, adequate OM, extractable K, BSP and CEC, resulting in high fertility. Primary use - fishpond purposes.
    b. Mangrove and Nipa forests: Composed of fine loam to moderately deep coarse loam. Soil acidity is mildly alkaline reactive (pH 8.0 – 8.5), low available P and Ca/Mg, adequate OM content, with extractable K, BSP and CEC, resulting in a moderate fertility level. Primary use – habitat for marine production, domestic building materials.
    c. Estuarine Plain: A deep to very deep clay layering, underlain by a fine clay substratum, characterizes these areas. The soil is of medium acidic to neutral (pH 4.5 - 7.0), with high OM content, available P, BSP and CEC, resulting in a high fertility rating. Primary use - coconut, rice, and shrub growth for fuel wood.
    d. Beach Ridges and Swales: Soil layering is shallow to moderately deep, coarse, loamy, and underlain by sandy skeletal substratum. This soil is slightly acidic to neutral (pH range 6.0 - 7.0), has moderate Ca/Mg, CEC and available P, has high extractable P, acid BSP, and is moderately fertile. Primary use – domestic.
    e. Residual Terrace: Soils within are layered. The top layer is a dark brown fine loam over a more yellowish brown fine loam to clayey underlain. This soil is acidic, has low available P, moderate extractable K and Ca/Mg, has a high OM, BSP, and CEC content, and is moderately fertile. Primary use: root crop and corn production.
4. Regulatory Status: All lands fall under the public domain land status, classified as either alienable and/or disposable. No public forests, permanent forest or forest

reserves, timberlands, game refuge and/or bird sanctuaries have been officially declared; however, unofficial shrub and grazing lands have been set aside and classified as intermittent swamp lands. Additionally, Barangay Ordinance (BO) 127 – S92 has declared the 29 hectares of mangrove forest as Barangay Communal Lands (BCL). This ordinance bans the cutting of mangroves for charcoal production; however, permits can be secured to allow cutting for house and fencing construction uses. Fishponds that are not for commercial use do not need operating permits from the barangay council.

5. Mineral Resources and Reserves: None.
6. Natural Disaster: Typhoon prone area, two non-active volcanic cones, and one thrust fault-line just south of the barangay cutting through Canimog Island.

Barangay Water Characteristics (see Figure 6 for orientation):

1. Freshwater Resources: Freshwater spring development for irrigation purposes.
2. Marine Water Resources: Brackish water conditions (33.0 –35.0 ppm salinity balanced with tidal flows) within the mangrove forest system are clear, and relatively clean; flows are impeded via infrastructure developments. Mud and sand flat benthos inundated with sparse seagrasses and minor coral formations – mostly dead. Coastal waters are heavily silted during rainy periods (October to February). No formal resource ecological assessment information has been established.
3. Groundwater Formation: Ground water supplies are replenished via rainwater with little salt-water intrusion. Low-lying areas accumulate rainwater resulting in flooding.
4. Water Use and Regulation: Unspecified.
5. Surface Water and Stream Conditions: None.
6. Prevailing Tidal Functions: Tides are diurnal and provide irrigation/water changes to approximately 3.0 hectares of brackish water fishponds.

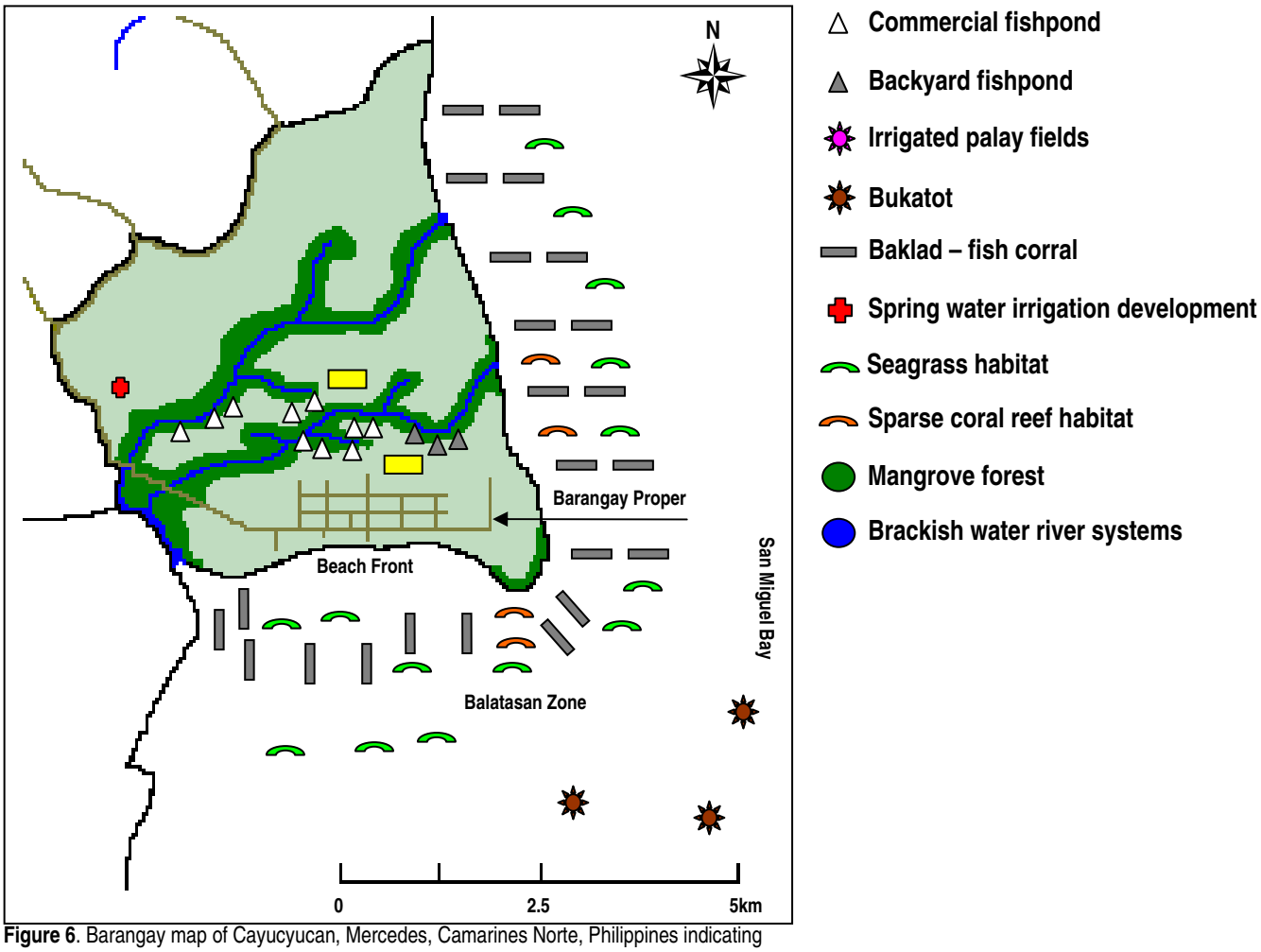


Figure 6. Barangay map of Cayucyucan, Mercedes, Camarines Norte, Philippines indicating significant barangay water habitats and habitat use, river systems, and boundaries.

Barangay Atmospheric Characteristics:

1. Temperature: The average temperature recorded for the period 1985-1993 was 23.5oC, lower than the national average of 26.9oC. Warm months are from April to September, while the coolest are from December to February.
2. Humidity: The average annual relative humidity was 83% between 1985 and 1995; humidity peaks from October to January, all other months measured humidity averages 80%.

Barangay Biological Environment Characteristics:

1. Vegetation and Flora:
    a. Mangrove Forest: dominated by *Rhizophora mucronata*, *R. apiculata*, and *Nypa fruticans*,

b. Beach Forest: dominated by *Casuarina equisetifolia*, *Barringtonia racemosa*, *Erythrina variegata*, *Acacia farnesiana* and *Prosopis vidalianus*,
c. Molave Forest: dominated by *Euphorbia trigona*, *Aglaia argentea*, and *Antidesma*, *Drypetes*, *Gomphandra*, *Sterculia*, *Pleomele*, *Vitex parviflora*, *Veitchia merrillii*, and *Begonia spp*.,
d. Remnants of a Lowland Evergreen Forest: dominated by dipterocarp tree species: *Agalai spp*., *Dipterocarpus gracilis*, *D*. *grandiflorus*, *Ficus spp*., *Tristania spp*., *Exocarpus latifolius*, and *Swintonia foxworthyi*. *Sygium spp*., *Dracontomelon dao*, and *Pongamia pinnata*.

2. Fauna: No formal documentation available.
3. Bacterial and Fungi: No formal documentation available.

Barangay Cayucyucan – Situational Analysis

The following situational analysis for Brgy. Cayucyucan has been broken down into four distinct dynamics: social, economic, institutional, and environmental. Within each, problems and issues were identified through in-situ field surveys, FGDs with barangay residents and officials (see Appendix 1 and 2 for survey formats and forms), Inter-Island Natural Resource Management Council (IINRMC) members, and program development staff from ISO. Each dynamic was scrutinized relative to the development of an integrated coastal resource management action process. This data is taken into consideration in the following Functional Analysis.

Social Situation Analysis: Societal related problems and issues within Brgy. Cayucyucan in terms of equitable sustainable development throughout the community are rooted in perceptions and practice of 'self-preservation.' This is manifested through modes and/or forms of present organizational development that limit broad-based participation in needed 'positive' socio-environmental development actions. Within the community, a self-preservation mindset has excluded and/or limited diverse external interactions with coastal regulatory bodies and environmental orientated development agents (e.g. BBD, BCDO, BFARMC, BUDFI, BFAR, ISO, IINRMC, and the MFARMC) (see Figure 4 for reference). Social interactions within the community are also deeply rooted in self-preservation and political interest, and may also be a central 'internal'

factor hindering collective participation levels in coastal management initiatives. This is not to say that such forms of relationships will continue to exist, only that the social predisposition within the community toward 'family-unit and 'self-preservation interests' relative to development actions may hinder needed broad-based equitable community participation in environmental conservation and preservation efforts. Listed below are key problems and issues in relation to the community's social orientation as against development and coastal resource management initiatives – such will be the focal point of a functional analysis following.

- MFARMC is not functionally recognized by the LGU.
- FRMP-BUDFI-BFARMC activities are not part of a broader-based coastal management process working in conjunction with the community as a whole.
- Community social orientations are not conducive to broad-based community participation through common goal action processes (i.e. sectoral participation is family or political oriented).
- Educational attainments are low; thus, impacting cognitive participation in local development roles.
- Land tenure issues are internally contentious and further exacerbated by poor or absent external institutional relationships, and the community's innate disposition/reverence to local and external 'self-interest' power structures.
- Social and technical adaptive strategies are 'production' oriented, not conservational or preservational.

Notably, socially oriented problems and issues within Brgy. Cayucyucan are a result of being highly marginalized within the Philippine society. Yet, strengths can be found within this orientation relative to coastal management needs. Mass mobilization efforts can be reduced by targeting specific family-unit groups or sectoral leaders for information dissemination, regulatory, and participatory processes, while giving credence through the degree in which social reverence is displayed in the community. However, this may also be a weakness in the same process since family-unit or sectoral leaders have the ability to filter information; thus, restricting an individual's choice, and reactive/proactive behavior towards a particular problem or issue base.

Institutional Situation Analysis: Naturally the social dimensions in Cayucyucan strongly affect how they relate to and work with external and internal institutions, and how they themselves form internal institutions. As most internal organizations are non-

acceded, they are at a disadvantage of gaining outside institutional 'capability' support that can help consolidate and expand their efforts equitably throughout the barangay, as well as improve their suitability. Accordingly, community forms of socialization also restrict access to many sectors of the community, and the benefits to be gained from actively participating within.

External and internal political interests have also sidelined barangay participation in MFARMC functions relative to broader bay-wide environmental management problems and issues. The encroachment of commercial fishers, and the use of active gears (baby trawl and a form of muro-ami fishing technique – *boli-boli*) by residents of the adjacent municipality of Basud have been identified by the community and external CRM consultants as threats, and the non-participation or sidelining of the MFARMC not only puts the barangay, but the municipality as a whole, at a disadvantage in using institutional processes to resolve this current issue. The MFARMC and BFARMC involvement in coastal regulatory and policing processes (e.g. the Bantay Dagat) does not receive neither mandated functional support nor community recognition in the CRM process, again limiting participation within and the effectiveness of expressed endeavors.

External institutional relationships surrounding Brgy. Cayucyucan (refer to Figure 4) also hamper community environmental management efforts and land tenure resolutions. Poor functional relationships between the Community Environment and Natural Resource Office (CENRO) and BFAR agencies respective of their mandates create conflict with local efforts to bring the use of the mangrove forests under control. For example, BFAR mandates still support the development of livelihood activities within the barangay's mangrove forest; on the other hand, DENR's efforts are in direct contrast and recently focused on reforestation and preservation efforts. Then again, the barangay council, through BO 127 – S92, declared the 29 hectares of mangrove forest as barangay communal lands banning the cutting of mangroves for charcoal production. This ordinance, however, permits mangrove cutting for domestic building needs, as well as the development of the mangrove for backyard fishpond establishments. Chiefly, the

three hectares of mangrove forest that have been converted to pond use constitutes 'commercial' use.

Clearly there are many legal and institutional issues to be resolved, and without positive and continual working relations among all the coastal stakeholders, the problem/issue bases will continue to be unresolved, and further hinder coastal socio-environmental management efforts. To illustrate this point further, even through land tenure is a nationally mandated priority, long standing land tenure issues within the barangay still remain, like the poor relationship between the community and DAR, and contact between the DAR and the LGU is only intermittent. As a result, only 10% of the barangay farmers own the land they farm, and approximately 70% of residents do not own the land their homes are built on (ISO-PCRA, 2005). This limits their access to local and external loan-related institutions – loans that are needed to advance alternative livelihood endeavors – as well as severely impacting the formation of positive community perceptions towards caring for, contributing towards, and participating in the sustainable management of their surrounding environment. Notably, the community does have a good, productive, and responsive working relationship with the DA; so does the LGU with individual government line agencies operating within the municipality. Since community–LGU relations are cordial, this may be a channel of influence to resolve the current problematic level of institutional conflicts impacting Brgy. Cayucyucan in terms of institutionally related coastal resource management issues and community development obstacles. Listed below are key problems and issues in relation to the community's institutional orientation as opposed to development and coastal resource management initiatives – such will be the focal point of a functional analysis following.

- Poor internal and external functional relationships between the community relative to cross-boundary CRM initiatives, responsibilities, and mandates (e.g. MFARMC and FRMP sectoral representation).
- Poor internal and external functional relationships, and compatible mandates between the community, the DA-BFAR, and the DENR.
- Irregular contact between the community and BFARMC, and Bantay Dagat initiatives, responsibilities, and mandates.

- LGU support for deputized community Bantay Dagat fish wardens is currently dependent on external political interest.
- Unresolved land tenure issues between the community and DAR.
- Poor and conflicting external inter-agency relationships and mandates relative to community CRM needs.
- Institutional and organizational political interests that interfere with equitable community socio-environmental development and ecological management needs.
- Erratic contact between the community and external development agencies.
- Non-recognition and/or non-accreditation of community organizations resulting in a hindrance of 'access' to external development and support mechanisms.
- Poor or sweeping organizational processes employed by external institutions implementing 'top-down' – 'short-term' management frameworks relative to local economic development projects.

Economic Situation Analysis: Malnutrition averaging 17.5% and exceptionally low educational attainment (Mercedes Gov., 2003) are just mere results of Cayucyucan's endemically low incomes, an average of PhP4,500 per month. Notably, transportation costs alone to send one child to the nearest secondary school located in Brgy. Manguisoc (Manguisoc National High School) amounts to PhP440 (ISO-PCRA, 2005). Dry goods costs within the barangay average 10 to 20% higher than the municipal town proper due to transportation costs as well. On the whole, there is a strong reliance on fuel wood for cooking needs.

A collapsing coastal fishery, once the mainstay of the community, continually produces fewer and fewer returns. In 1991, the barangay harvested a surplus of marine fish products amounting to 187,103.48 kilograms (MJE and DRIM, 2000). By 2003, considering the incomes derived from fishing, conservative estimates indicate that the community's yearly harvest produced a surplus of only 40,000 kilograms (Mercedes Gov., 2003). With competition and encroachment by the commercial fishing sector into municipal waters, monetary fishing returns began to drop, causing a shift in income and subsistence dependencies towards agricultural related endeavors. Moreover, barangay residents have noted diminishing yields in this sector as well, despite advancements in farm irrigation and pesticide applications (two problems indicated within this sector). Rice, corn, vegetable, fruit, and legume crops consistently fall short of subsistence needs.

Without 'property', access to credit needed to diversify their production/income base is not readily available from the more capable external financial institutions. Internally, small-scale loan schemes created within the community (the CGB) are limited in access as well (extended family groups involved in the scheme only). Livestock raising is again problematic due to the lack of capital required. Approximately 25 cows, and 25 pigs are currently being raised among 907 residents – far short of subsistence needs. Hence, subsistence reliance remains focused on the extraction of natural resources. Past economic diversifications have come through the introduction of newly developed and 'exploitative' natural resource extractive methods (cyanide and dynamite use, boli-boli and *bukatot* methods). Natural resource reproduction efforts geared towards coastal habitats have been limited to mangrove reforestation in the '70s. Currently these efforts are about to be repeated; however, economic benefits to be derived from such are naturally based in the distant future – perhaps 10 to 15 years after planting.

Listed below is a synopsis of key problems and issues in relation to the community's economic orientation as against development and coastal resource management initiatives – such will be the focal point of a functional analysis following.

- Endemically low incomes.
- Lack of capital for income diversification.
- Insufficient access to loan institutions.
- High dependency on natural resource extraction for subsistence needs.
- Low capacity for natural resource reproduction and conservation efforts.
- High competition for natural resources internally and externally.

Environmental Situation Analysis: The near marine habitat of Brgy. Cayucyucan is only mildly degraded in terms of a few minor coral reef formations present (mostly dead but in a recovering state), and the seagrass and seaweed beds. The seagrasses run the length of the barangay's exposed shoreline, and are impacted by seasonal siltation flows, as well as the physical forces of wave actions. Hence, these grassbeds, although encompassing a wide area, are neither very dense nor prolific. Further from the shoreline the seabed shifts from a sandy composition to muddy soft-bottom sediment prolific in s*aragassum* seaweeds, *siganids*, and invertebrate life forms. Exploitation by

habitat destruction in these habitats is not significant, aside from infrequent encroachments of commercial fishers from the adjacent municipality of Basud who use baby trawls, *kayakas* gears (a method that uses a fine net mesh and a lighting system to capture its prey at night) and *boli-boli* wherein active gears are used to drive fish into a net system. Significantly, current exploitations of the habitat come in two forms: first, the use of non-selective gears (spear, *kayakas*, *bukatot*, and *boli-boli*); and second, the blanket use of various forms of fish corrals, mechanisms used for the gathering of grouper fry, and traps primarily used for gathering crabs and shrimps on the physical and functional links between the seagrass beds and the mangrove forests. Hence, exploitation is in the form of indiscriminate catch selectivity and the degree of fishing pressure present is very high.

Although the 26 remaining hectares of mangrove forest in the barangay is very dense and healthy, growth is primarily secondary, and structured like a tree farm. At present, exploitative habitat pressures within include deforestation and sand mining activities for domestic building use. These activities, as well as erosion and siltation problems along water flow exit and entry points, are exacerbating production values within the forest. An infrastructure development to protect rice fields from flooding during typhoons has eliminated a point of water access to the mangrove forest from the sea, significantly reducing water flows and exchange rates within the forest as a whole. Consequently, with restricted water flows within the forest, waste materials emanating from the current three hectares of fishponds within the forest may adversely be affecting biological and chemical oxygen demand levels (BOD and COD).

Shorelines around the barangay are relatively broad and well protected by old-growth vegetation; thus, beach erosion is not a significant factor of concern. Freshwater wells are hardly inundated by sea/saltwater making them suitable for domestic uses other than drinking – an adequate supply of fresh drinking water comes from the municipality every Sunday and distributed accordingly. Sanitation within the barangay is adequate; but an inspection of adjacent fields and vacant areas (where community garbage and

refuse are commonly dumped) reveal that solid waste disposal is a significant problem in the community.

Generally, groundwater through deep well access is not suitable for agricultural irrigation. There is one deep natural fresh water spring that has been tapped and used for such purposes; even so, flow is inadequate to meet all of the barangay's irrigation needs. As noted, agricultural and agro-forestry production has been consistently dropping over the last 15 years. This phenomenon has been attributed to loss of land fertility, although no significant studies have been conducted to verify the fertility status of the barangay's agricultural and agro-forestry lands. Notably, levels of applied herbicides, pesticides, and fungicides have remained constant despite noted production drops.

Although there are no significant 'forestlands' within the barangay's boundaries, remnants of beach, molave, and lowland evergreen forest, plus shrub lands, are at constant threat because the community relies heavily on these resources for domestic fuel and charcoal needs.

The overall condition of ecosystems mentioned appears to be determined by the degree of active management within and the degree of community reliance upon the ecosystem. Below is a table showing community perspective of current levels of environmental management in terms of key ecological components within the barangay boundaries.

Table 7. Community perspective of current levels of applied environmental management forms in terms of key ecological components within the barangay boundaries (5 being excellent, 1 being very poor, 0 if absent).

Resource Base	Ranking	Resource Base	Ranking	Resource Base	Ranking
Coral reefs	1	Agriculture lands	1	Freshwater streams	0
Mangrove forests	4	Forest lands	0	Freshwater wells	4
Seagrass beds	0	Agro-forest lands	1	Barangay sanitation	4
Shoreline	5	Shrub lands	2	Freshwater springs	4

Source: ISO-PCRA, 2005

Listed below is a synopsis of key problems and issues in relation to the community's environmental orientation as opposed to development and coastal resource management initiatives – such will be the focal point of a functional analysis following.

- Exploitation of marine habitat through habitat destruction using active gears.
- Exploitation of marine and mangrove inhabitants with the use of non-selective gears.
- Exploitation of the coastal ecosystem's physical and functional links between the seagrass beds and the mangrove forests.
- Exploitative levels of natural resource extractions relative to all coastal ecosystems.
- Domestic use of mangrove forest products for building materials.
- Alterations made to natural water flows within the mangrove system.
- Potential BOD and COD overloading from waste products emanating from mangrove based fishponds.
- Mangrove forest replanting agreements (Memorandum of Agreement [MOA] with the LGU), and planting regime (tree plantation) in conflict with community intentions and needed ecological requirements.
- Domestic use of forest resources for fuel wood.
- Perceived losses in land fertility.
- Domestic waste management.
- Inactive ecosystem management.

Socio-Environmental Situation Photo Index

P1. Secondary growth mangrove forest habitat within Brgy. Cayucyucan.

P2. Constructed seawall blocking former ocean access to the mangrove forest, Brgy. Cayucyucan.

P3. Mangrove forest deforestation and sand mining resulting to shoreline erosion, Brgy. Cayucyucan.

P4. Use of mangrove forest trees for the construction of fencing throughout the entire barangay, Brgy. Cayucyucan.

P5. Solid organic and inorganic waste disposal on idle public lands, Brgy. Cayucyucan.

P6. Use of mangrove forest trees for the construction of fencing, house construction, and nipa roofing – common throughout the barangay, Brgy. Cayucyucan.

P7. Idle mangrove forest aquaculture pond – September 27, 2004, Brgy. Cayucyucan.

P8. Idle mangrove forest aquaculture pond (P7) February 10, 2005, indicating over-development of idle aquacultural ponds, and the use of non-mangrove friendly aquacultural techniques, Brgy. Cayucyucan.

P9. Beachfront, indicating the common class of fishing boat and crab trap gears utilized, Brgy. Cayucyucan.

P10. Beachfront indicating the difference between the common class of fishing boats utilized, and that of the highly marginalized fisher, Brgy. Cayucyucan.

P11. Inside clearing within the mangrove forest. Gear shown is non selective, but primarily used for the capture of grouper fry to supply 3 hectares of grouper aquaculture ponds, Brgy. Cayucyucan.

P12. Extensive grouper aquacultural pond within the mangrove forest backing on to scrublands – non-mangrove friendly techniques – trash fish feeds obtained from illegal fishers, Brgy. Cayucyucan.

P13. Focus group discussion with community residents encompassing the use of the natural coastal resource base, aquaculture initiatives, and CRM management problems and issues, Brgy. Cayucyucan.

P14. The barangay's central reason, and source of strength to undertake CRM initiatives, Brgy. Cayucyucan.

Barangay Cayucyucan – Functional Analysis

In the following functional analysis, problems and issues identified in the **Situational Analysis** have been either filtered (to highlight their importance) or grouped together according to their commonalities and positions relative to needed internal CRM functional needs and external requisite support mechanisms to sustain community CRM endeavors. Each highlighted or grouped problem/issue base has been then scrutinized for strengths, weaknesses, opportunities, and threats (SWOT) relative to Brgy. Cayucyucan's current and future ability to undertake CRM initiatives in conjunction with available internal and external support mechanisms.

Table 8. SWOT functional analysis of filtered and grouped societal/socialization related problems and issues currently experienced in Brgy. Cayucyucan relative to CRM needs and possible initiatives.

Problem/Issue Identified: MFARMC is not functionally recognized by the LGU.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
There is a recognized presence of self-realization and self- mobilization. Opportunities, e.g. LGU-IINRMC Bantay Dagat system, and capabilities are present within assisting institutional arrangements to broaden local forms of functional socialization to resolve the issue. There is a highly adaptable community.	Community is not readily disposed to the technical, financial, and managerial provisions of FRMP-CRM initiatives. The SMB itself loses a strategic ecological management link. The situation further marginalizes residents of Brgy. Cayucyucan.	The situation may help promote sectoral self-mobilization, which is a strong form of sustainable CRM participation. The situation may promote the strengthening of community mobilization. An opportunity is present to develop alternative access regimes within the SMB, i.e. closed access.	Pushing for resolutions on contentious issue bases may marginalize residents from each other, or from LGU development programs. MFARMC inputs respective of Bantay Dagat efforts without prior LGU acceptance may lessen current LGU support, which processes, in turn, may be deemed 'hopeless' by the community; and compliance with in-situ CRM regulatory measures could drop.

Problem/Issue Identified: External and internal community social orientations are not conducive to broad-based community participation through common goal action processes, e.g. FRMP-BUDFI-BFARMC activities are not part of a broader-based coastal management process working in conjunction with the community as a whole.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
The current CRM change agent (ISO) commencing work within the community uses solid community organization processes, which is necessary in this form of problem/issue base.	Social orientation patterns hamper the building of broad-based participatory levels. Building community consensus in relation to CRM regulatory needs will take a considerable amount of effort and time considering current social orientation patterns.	Working relationships between the three-island BFARMC has been very productive. This level of social contact may encourage the Cayucyucan BFARMC members to join their 'group representation', i.e. the IINRMC, and jointly share their strengths and experiences.	Because socialization between differing groups is based on 'extended family,' conflicts, even sabotage of BUDFI efforts, may occur due to inequalities and/or varying levels of marginalization being experienced within the community as a whole.
	Community members have indicated that their level of participation would depend on implementing a 'close access' regime relative to their municipal natural resource base.		Current legislation stipulates that access to the natural resource base is 'open' between municipalities for municipal fishers. Without a plausible shift, participation rates in CRM regulatory endeavors may be severely hampered.
Allocated livelihood funds are concentrated on a few endeavors, helping to ensure project success – thus, a 'proven' process could be clearly adapted/copied by others who, due to cultural socialization patterns, have chosen not to partake in the process as part of the group.	Alternative organizational processes with conflicting mandates may develop. Socialization problems are amplified in terms of CRM needs. Duplication of efforts occurs between CRM oriented groups.		Duplication of CRM efforts, particularly organizational could waste available/limited CRM resources on administration needs, rather than on CRM active initiatives.

Problem/Issue Identified: Educational attainments are low, which hamper cognitive participation in local development roles.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
The lack of educational venues in the community has heightened the community's desire to partake in organizationally delivered education. Opportunities and capabilities are present within assisting institutional arrangements (LGU, ISO, IINRMC, DA-BFAR, DENR, and BUDFI are willing to assist with educational and leadership building processes). Currently, ISO has a youth leadership building program that community members can avail of.	Needed education to sustain and ensure CRM activities throughout the community – from the youth upwards – will take extended periods of time, effort, and external resources.	The community has a high degree of 'willingness' to undertake CRM educational processes. ISO interests in the community are founded on education and capability building processes – youth and adult active forms. Current community religious beliefs and values are compatible with ISO and IINRMC beliefs and values, thus educational teachings would be aligned accordingly.	The low educational foundation in the community may hinder the capacity of the youth for future development as leaders.

Problem/Issue Identified: Land tenure issues remain internally contentious.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
CARP delineation surveys are completed.	Privately owned lands have not been equitably distributed in the barangay, and further plans for implementation are not functionally on the LGU agenda. Land tenure often equates to capital for social investment; without such, CRM improvements related to participation remain weak. Expertise relative to the issue base is not readily available.	No significant CRM related opportunities exist relative to this issue. Land tenure issues may mobilize marine tenure perspective relative to stipulated community desires.	Issues such as land and sea tenure often consume or divert a community's attention and energy away from maters that could be resolved. Land tenure is a broad issue to address, and even so on a broader scale of initiative; thus addressing such at the barangay level, without probable gains, may weaken CRM initiatives. If this issue needs to be addressed, scarce and valuable resources earmarked for CRM activities may be lost without significant gains obtained.

Problem and/or Issue Identified: Social and technical adaptive strategies are 'production' oriented.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
The opportunities and capabilities are present within assisting institutional arrangements. ISO, primarily, is capable of community re-orientations through cognitive educational and capability building processes. The Barangay Council has actively recognized the importance of reproduction and conservation respective of the mangrove forest resource base, i.e. current reforestation efforts and Brgy. Ordinance 002-S92.	Social and technical adaptation of assisting and mandated institutional arrangements – such as the LGU, DA-BFAR, DENR, BUDFI and somewhat the IINRMC – are also production oriented.	New ISO program policies stipulate balanced efforts between production – reproduction – and conservation efforts respective of all community development and CRM initiatives. Efforts sustained by the barangay relative to mangrove forest conservation and reforestation can be used to promote additional CRM initiatives geared towards compatible value systems.	Production benefits are easily seen in the short term, while those benefits derived from reproduction and conservation efforts, in terms of the natural resource base, only become evident in the long term if appropriate monitoring systems are employed and community participation is sustained.

Table 9. SWOT functional analysis of filtered and grouped institutionally related problems and issues currently experienced in Brgy. Cayucyucan relative to CRM needs and possible initiatives.

Problem/Issue Identified: Poor and erratic internal and external functional relationships between the community relative to cross-boundary CRM, and in-situ CRM needs.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
Community working relationship with the Barangay Council is strong. Abilities within, and the desire to work inter-institutionally are present particularly with ISO, DENR, IINRMC, DA-BFAR, and FRMP-BUDFI-BFARCM affiliations.	Needed CRM institutional and organizational relations are hampered through social orientations. Socio-political interests seemingly prevail over general interests and needs. Personal and institutional relations are poor and 'silently heated' among CRM 'actors,' or the interests clash between the Municipalities of Mercedes and Basud over illegal fishing activities and the lack of subsequent support during apprehensions.	Prominent barangay and community leaders seem keen to enhance and inter-connect needed CRM relationships.	Due to political and social orientation, development assistance may become skewed, and non-responsive to the needs of more marginalized community members. Apprehension of illegal fishers from the municipality of Basud may lead to physical harm or heighten tension between the municipalities of Mercedes and Basud.

Problem/Issue Identified: Poor and conflicting external inter-agency relationships and mandates relative to community CRM needs.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
Institutions are intent on fulfilling mandates.	DENR and DA-BFAR functional mandates and modes of implementation are contradictory relative to in-situ practices particularly on mangrove forestry conservation and development.	ISO has the ability and experience to facilitate the alignments of functional mandates and modes of implementation among the relevant CRM actors and institutions in-situ.	Relative to barangay mangrove forest policies, needed policy corrections may confuse community CRM implementors as well as lessening the community's confidence in CRM 'experts' and CRM guidelines and processes.

Problem/Issue Identified: LGU and, to some extent, Barangay Council support is currently dependent upon political and personal interests.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
Political interests within the barangay have often led to some form of action, rather than inaction, benefiting CRM processes. LGUs are slowly becoming more supportive of Bantay Dagat efforts, and coursing initiatives through a local organization dedicated to the process, i.e. the IINRMC. IINRMC membership is not sectoral, but rather based on individual membership.	CRM endeavors in the past tended not to benefit the community equitably.	As Bantay Dagat efforts further strengthen, the benefits gained from these efforts may entice residents of Basud to join a widening CRM initiative.	Yielding to 'special interests' to gain needed support ensuring community participation could effectively derail the implementation of comprehensive CRM initiatives, and/or decrease widespread CRM participation.

Problem/Issue Identified: Non-recognition and/or non-accreditation of community organizations.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
ISO has considerable expertise in gaining formal recognition/accreditation and support for community organizations. The Barangay Council has recognized ISO and the IINRMC as a potential and formative partner in community development and CRM initiatives.	Without recognition/ accreditation of community organizations, these quasi-developed organizations have difficulty gaining external resources that aid in the sustainability of the endeavors.	Ensuing institutional help (ISO) aimed at the formalization of community organization, and assistance relative to capacity building, could effectively gain strength for ISO and IINRMC CRM intentions relative to community acceptance and participation levels.	Some organizations requesting help in 'formalization' may not be in line with LGU or Barangay Council socio-political orientations, thus intervention or assistance granted to these entities could hamper ISO and IINRMC (the leading external and internal CRM entities) relationships and endeavors within the community and/or Barangay Council.

Problem/Issue Identified: Poor organizational processes employed by external institutions ('top-down'/'short-term'), e.g. FRMP-BUDFI-BFARMC affiliation.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
FRMP-BUDFI-BFARMC have the financial resources and technical backing to implement alternative livelihood projects. Projects can be adapted or copied for the benefit of others (i.e. looked upon as demonstration projects).	Non-equitable distribution of benefits may arise. Sustainability is weak due to short-term support.	Projects can serve as demonstration projects that may be a testing ground for the different aspects of CRM program implementation. Other projects may be adapted to suit community conditions.	If these projects do not gain sustainable support, failures could disillusion further community involvements towards the technology, or investments in such, by the general community**.**

Table 10. SWOT functional analysis of filtered and grouped economic related problems and issues currently experienced in Brgy. Cayucyucan relative to CRM needs and possible initiatives.

Problem/Issue Identified: Endemically low incomes resulting in the lack of capital for income diversification potentials.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
The community exhibits a willingness to increase environmental production levels. If community members are to avail of ISO and IINRMC loan and livelihood assistance packages, institutional and organizational mechanisms in place ensure equitable participation rates and equitable benefit distributions.	Lack of investment capital needed to diversify income bases and reduce natural resource dependencies may inhibit community. Past alternative livelihood endeavors had a tendency to inadvertently focus on the least marginalized members of the community.	Ensuing ISO and IINRMC CRM endeavors are tied to alternative livelihood arrangements.	Communities often tend to focus on institutionally introduced alternative livelihood projects, not CRM conservation efforts. Low capital investments by community members (i.e. project counterpart investments), coupled to current socio-political interest may hinder broad-based participation levels in these projects, as well as their sustainability during difficult times. A willingness to increase environmental production levels may result in further natural resource exploitations, not CRM conservation or preservation initiatives. Community socio-cultural processes may be challenged – as a result of perceived equitability discrepancies; thus, creating internal socio-political conflicts, low participation rates and low investment rates for similar projects and/or CRM initiatives. Poor participation in CRM activities may ensue if equitable access to assistance packages is not ensured.

Problem/Issue Identified: High dependency on, and competition for natural resources to meet current subsistence levels.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
The situation retains community cultural identities. Some community members are interested in increasing environmental production through 'green' alternatives.	Population growth, and the lack of economic alternatives increase natural resource dependency to exploitative levels. Few alternatives are available to the community to translocate or shift their natural resource dependencies. There is poor community understanding of environmental production limits and processes needed to increase/maintain sustainable environmental production rates. Natural land-based resource production rates to meet all subsistence needs would be exceedingly difficult to reach given physical spatial limitations. Local marine systems may take 3 to 5 years of extensive CRM efforts to raise incomes significantly above subsistence levels.	The community has the ability to locate livelihood endeavors in other barangay land and water areas with confidence; thus, the sharing of geographic areas for livelihood initiatives integrates different community CRM efforts, strengths and weaknesses; inadvertently increasing broad-based participation and regulatory compliance needs.	Appropriate CRM conservation/preservation actions needed to increase natural resource production rates will economically affect the poorer of the poor in the community. Most CRM measures do not decrease natural resource dependencies in very poor coastal communities, but rather re-locate them. Addressing population growth to mitigate resource dependence/competition would be culturally contentious considering local values and beliefs. Over-expectations as to what can be done/achieved strongly affect participation rates.

Problem/Issue Identified: Low capacity for natural resource reproduction and conservation efforts leading towards economic advancements.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
Capacity for change. ISO, the central change agent undertaking CRM initiatives, is noted for not placing timeframes on its undertakings and its internal policy of not leaving a community until actions are sustainable. Barangay Council has taken resource mangrove reforestation initiatives.	Socio-economic and political orientations are not compatible with short-term CRM orientations. Considerable re-orientation and educational processes will be needed and may take 2-3 years to achieve significant results. The mangrove reforestation agreement about to be implemented is not a CBFMA, but rather a MOA.	Ensuing in-situ institutional and organizational endeavors (ISO, IINRMC, and the Brgy. Council) have the capacity to re-orient environmental resource production alignments.	Those more capable of, or attuned to 're-orientation' may disproportionately benefit from income generating institutional assistance packages relative to ensuing ISO and IINRMC undertakings. Basic MOA reforestation efforts are not always compatible with communities centered on 'natural' resource production (these projects are for rehabilitation purposes, and not for production use); thus, communities may easily confuse reforestation efforts with forest stewardship agreements where production based socio-orientation are compatible.

Problem/Issue Identified: Access to loan institutions.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
Community shows initiative and support in implementing in-situ adaptable forms of loan acquisitions.	Current capital structures within the community are not conducive/acceptable to external loan institutions. There is weak sectoral participation in external and quasi-internal income generating projects (i.e. FRMP-BRARMC-BUDFI projects). There is weak and functionally non-recognized MFARMC participation. Social attributes in the community are not conducive to formal organization structures like cooperatives, where loans can be accessed at affordable rates.	Institutional presence for income generation endeavors/loan acquisition if active participation levels increase, e.g. through FRMP-BRARMC-BUDFI, CGB, ISO and IINRMC.	A continual lack of broad-based participation in internal and external institutional processes may further exacerbate marginalization issues relative to loan granting institutions. Access to mainstream high interest loans in endemically poor areas may further impoverish the community and restrict access to more affordable loan schemes available under cooperative agreements.

Table 11. SWOT functional analysis of filtered and grouped environmental related problems and issues currently experienced in Brgy. Cayucyucan relative to CRM needs, possible initiatives, and external assistance.

Problem/Issue Identified: Marine habitat destruction and exploitation through the use of active and non-selective gears.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
Immediate surrounding marine resource base is not in any significant 'physical' threat. The use of active gears is not widespread within the barangay and isolated to a few family units. In terms of non-selective gears, alterations to net-mesh and trap-opening sizes are relatively easy to facilitate and promote. Community seems susceptible to change if given alternatives. Respect for barangay officials may enhance gear regulatory compliances, providing such is acceptable to these officials.	Dominant use of active gears is confined to residents of adjacent municipality (Basud), but Cayucyucan community's jurisdictional influence against encroachment is highly limited. Few alternatives exist. The resources needed to enforce change in the use of active or non-selective gears with non-exploitative ones are currently limited, both within the community and externally through institutional change agencies. Community generated capital needed to alter or obtain new 'legal' gears is limited, and harvests vs. efforts vs. needs may not be enough to persuade certain individuals to give up exploitative methods of fishing. Socialization forms in-situ and ex-situ are not entirely conducive to external forms of pressure to create change. Many non-selective gears (particularly fish and crab traps) are used by the most marginalized, and least capable of change in the community.	The need to work with Basud municipal residents to achieve bay-wide CRM regulatory compliance may influence in-situ CRM change agents to expand their CRM initiatives. Corrective needs may encourage community, institutional and organizational entities to enhance and diversify their internal and external support networks.	Replacement of active gears may further promote this highly adaptable, production oriented community, to utilize or create additional, perhaps more exploitative, gears to compensate for losses incurred if regulatory compliance is forced, or appropriate supplements are not provided. Forced compliance may only move 'exploitation' of one ecosystem to another, perhaps a more flexibly regulated and more susceptible habitat, such as the mangrove forests. Forced and/or non-compensated regulatory compliance may cause divisions within the community; thus, hampering CRM efforts, or further marginalizing those in need of equitable development assistance.

Problem/Issue Identified: Exploitative levels of natural resource extractions relative to all coastal ecosystems.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
In-situ and ex-situ organizations, institutions, and some local residents are keen to improve the management of their ecosystems, and reduce exploitative resource extraction levels – particularly promoting sustainable management perspectives within their mangrove forests.	Two active CRM development organizations (ISO and IINRMC) operating within the area have not been able to significantly change the level of effort placed on fisheries extraction rates in-situ. Even if alternative livelihoods could be provided, there is no guarantee that natural extraction rates would drop due to endemically low incomes. Currently, there is generally a low interest in, and understanding of natural resource conservation processes within the community. Past and current CRM participation in the area has been focused/based on mere membership (non-active), and/or out of 'productive' interests (alternative livelihood supplements). Community members have indicated that their levels of participation and regulatory compliance would depend on implementing a 'closed access' regime relative to their natural resource, i.e. restricting access by municipality.	With the appropriate CRM interventions (temporary or long-term), the natural resource base has the potential for short-term recovery; thus, increasing its production base to sustainable levels relative to community needs. External (ISO, IINRMC) institutions and organizations with vested interests in the community have the necessary CRM capabilities in terms of CRM planning, and needed community support mechanisms to enhance the productivity of the resource base.	Vested personal and political interests may interfere with regulatory efforts to bring extraction rates in line with sustainable capacity levels. Community 'productive' orientation may hamper needed interventions in CRM conservation and preservation.

Problem/Issue Identified: Disruption of seagrass and mangrove forest physical and functional links (i.e. bio-life cycles) and the natural flow of tidal water within the mangrove forest itself.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
Through adult forms of education, the general community could easily understand the concept of how and what is happening as a result of these disruptions and alterations. Expertise to resolve the problem/issue is readily available. There are no identifiable political interests that would significantly figure into correctional measures.	Mangrove biological needs may be impacted by reduced water flow levels; thus, internal production levels may be hindered and further impacted if livelihood developments within the ecosystem increase, i.e. both socio-economic and ecological production levels will not meet community expectations. Both the seagrass and mangrove ecosystems are not functioning at optimum production levels to benefit community needs. Community consensus in relocating fish corrals (effectively creating a buffer zone around the river-mouth), and/or reducing the extensive use of trapping systems within the mangrove forest would be exceedingly difficult.	Although the benefits to be gained by moving fish corrals and/or reducing/altering harvest modes may take two to three years to show significant increases in seagrass and mangrove production rates. Monitoring efforts to do so are relatively easy and could boost community CRM participation.	Reducing harvest levels, or the relocation of fish corrals could create tensions between those introducing the CRM measure and those that will be affected by the decision. *[Note – education and understanding problem-based issues do not always lead to corrective actions.]*
Blocked ocean access at the northern end of the mangrove forest has allowed for a needed increase in rice production.	Correction to mangrove water flow sources would be costly, and most likely not gain the support of the community.	Corrective action would signal strong support towards sustainable CRM, resulting in further movements towards broader-based community participation.	Significant efforts were involved in the establishment of a seawall to block ocean access. A reversal of the effort, or even the introduction of the concept by CRM agents may effectively cause a political and social rift between barangay and LGU representatives with CRM agents; thus, severely impacting barangay council and LGU support for other CRM efforts.

Problem/Issue Identified: Domestic use of mangrove forest products for building materials.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
Relative to the community's past and current use of their mangrove 'tree' resources and reforestation patterns, current 'tree' management schemes seem to be adequate, but could be improved upon. The use of mangrove products, particularly trees for building materials, is a renewable resource or material – if maintained.	Community mangrove uses are not in line with national legislation, thus lowering respect for, and compliance with needed environmental regulatory mechanisms, as seen throughout the adjacent ecosystems.	Current sustainable uses and forms of community management within the mangrove forest – if improved – could be used to bolster the use of balanced sustainable environmental development doctrines in other areas in need of socio-environmental management efforts (i.e. demonstrating that human-environmental interactions and needs can be sustainable). There exists an opportunity to enter into a CBMFA; thus, enhancing institutional supportive links with the community for other CRM endeavors.	Although the community has an ordinance covering the use of the mangrove forest within the barangay boundaries, its implementation is not in line with national legislation, relative to RA 8550; hence, conflicting regulatory mechanisms may lower respect for, and compliance with, other environmental regulatory mechanisms introduced.

Problem/Issue Identified: Domestic waste management.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
Current LGU and barangay plans include the establishment of an appropriate solid waste disposal site. Current levels of community awareness relative to solid waste management are sufficient.	Currently, not all wastes are being buried as a community norm; thus, solid wastes not buried have worked their way into the coastal ecosystems.	The promotion of appropriate waste disposal systems enhances broad-based environmental awareness, and can aid CRM educational endeavors.	Potential for concentrated buried waste by-products to leak into the community's ground water sources is high. Waste disposal sites do not promote recycling, reducing, nor reusing waste products.

Problem/Issue Identified: On all accounts, inappropriate and lax ecosystem management.			
Strengths	**Weaknesses**	**Opportunities**	**Threats**
Community leaders and prominent members are receptive to furthering environmental efforts. Institutional and organization change agents interested in implementing CRM in the area have the appropriate capabilities. ISO–IINRMC CRM management focus on Cayucyucan's mangrove forests would strengthen and complete the 'broader' area's ecosystem oriented management goals.	Community orientation towards ecosystem management is perceived to be restricted to economics. Community orientation towards ecosystem management is 'production' based, not conservation, or preservation as needed. Current ISO concerns are centered on mangrove management perspectives within Cayucyucan, and not ecosystem oriented CRM within the community boundaries itself.	There is an opportunity for the community to become part of a broader-based locally implemented CRM initiative, and one that may promote their 'closed/limited access' regime wishes.	Social orientation is not geared towards collective action, which is needed to meet CRM processes. The focus of ISO and the IINRMC being centered on mangrove management puts the linked ecosystems <u>within the community boundaries</u> at a disadvantage; perhaps creating or promoting apathy for remaining corals, and seagrass and seaweed beds. Hence, full CRM potentials or production expectations within the mangrove forest itself may not be reached (i.e. serious efforts must be placed upon bio-geographical processes).

Situational Diagnosis Process

Clearly past efforts to decentralize coastal management in the San Miguel Bay were successful since such did not need the help of the communities to any great extent; in essence, this was merely an administrative task. Problems began to occur when the active arm of the desired CRM process – the communities themselves – were tasked with the rehabilitation, conservation, and protection of the bay's coastal resource base. Ostensibly, the administrative planners did not consider the socio-political-environmental orientations within the communities, nor within the administrative body itself. Hence, trying to manage the bay as a single entity – as a single VMG - and ensure that participation was supportive and broad-based seemed futile.

Up to this time, a barangay-wide vision-mission-goal (VMG) relative to coastal resource management has not been established; however, as of February 14, 2005, over a hundred fishers and community residents have formally joined the IINRMC, and thereby adopting the IINRMC VMG framework as stated below.

IINRMC VMG Statement:

> **Vision:** For the IINRMC to aid in the building of prosperous communities that have a heightened sense of awareness and values for the environment, with democratic and efficient leaders in the local government who respond to equality, environmental protection and conservation, and who are firm believers in the Lord Almighty.
>
> **Mission:** For the IINRMC to become an organization of small fisherfolks who advocate for programs on environmental protection and conservation, and foster cooperation with the local government and the different sectors of society in working for genuine development.
>
> **Goal:** To be recognized by the local government as a partner organization in coastal and marine resource management – one that creates positive impacts on the consciousness, livelihood and environment in the areas the Council represents.

Note: The IINRMC has been recognized by the LGU since 2000, and is considered to be a central partner in the municipalities' CRM endeavors. Throughout the island barangays of Apuao, Quinapaguian, and Caringo, the IINRMC has achieved the following in relation to their VMG:

- Raised the income levels of the fisherfolks by 25%;

- Increased the longevity of fish habitats by 10% through the establishment of three marine coral reef sanctuaries, and a mangrove forest reserve up to 10%;
- Reduced the incidence of illegal fishing by 90%;
- Raised the consciousness level within the associated barangays relative to environmental protection – encompassing 80% of the community populations;
- Reduced barangay wastes by 50%; and
- Encouraged and gained the participation of two more barangays in environmental protection and conservation initiatives – Cayucyucan and Mambungalon.

Accordingly, if acceptance for the IINRMC VMG framework gains general 'community' consensus throughout Brgy. Cayucyucan, the duplication of past IINRMC results would be dependent on resolving key social and environmental-economic orientations. As an example, within the **Functional Analysis** portion of this report, threats in relation to self/group, and/or political interests surfaced time and time again within all analytical phases: social, institutional, economic, and environmental. These interests have also become 'enculturated' within the community's societal fabric, and could hamper broad-based equitable participation in CRM initiatives, if not addressed appropriately.

As social and institutional relationships need 'remolding', so does the community's relationship/orientation with their natural environment. Throughout the Functional Analysis it was evident that the community has a 'production' orientation relative to their natural resource base. Local legislation - BO 002-S92, in reference to current mangrove forestry management orientations, is also production based. However, to meet long-term goals, sustainable environmental production, conservation and preservation processes must take precedence in the short-term, and this may become a central stumbling block to meeting CRM and community VMG projections.

Considering the said community and CRM stakeholder orientations, and the plausibility of the adoption of the IINRMC's VMG framework, situational diagnosis process and CRM action plan prioritizations were based on the following:

1. The degree of socio-environmental urgency presented – relative to the significance of perceived threats towards mitigating the problem/issue base;
2. The availability of in-situ and ex-situ assistance, and the capacity of the assistance to mitigate the problem/issue base;

3. Probable levels of equitable participation and benefit distributions relative to probable problem/issue base mitigation outcomes;
4. The level of cultural, and socio-political disruptions that may be caused by pursuing the problem/issue base; and
5. The degree in which the mitigation measure could be sustained considering short and long term in-situ needs and broader-based goals.

All problems and issues identified in this study were given credence. As central themes emerged, root problem/issue bases were once again re-identified, cross-referenced, and scrutinized relative to the mitigation-prioritization criteria given. Present below are the most probable/priority coastal resource management related problem/issue bases selected for mitigation and action plan incorporation. Note that these are not ranked in order of importance. CRM mitigation requires a balance between social, institutional, economic, and environmental perspectives, and all are inter-related. Not addressing each of the given problem/issue bases equitably could result in serious participation lapses, i.e. the number one issue across all sectors identified, and gaps in the CRM process that would, in effect, significantly impact set VMG achievements.

Social and Institutional

- Lack of importance given to grassroots community centered – co-developed forms of organization development and capability backstopping
- Inappropriate socio-political, and environmental orientations
- Inappropriate or lax cross boundary, institutional, and organizational relationships
- In-situ CRM development centered on 'production' orientations and special interest entities

Economic and Environmental

- Endemically low incomes thwarting community conservation and preservation of the natural resource base
- Endemically low incomes preventing income diversification potentials
- High dependency upon, and competition for, natural resources to meet current subsistence levels
- Marine habitat destruction and exploitation through the use of active and non-selective gears
- Exploitative levels of natural resource extractions relative to all coastal ecosystems
- Disruption of seagrass and mangrove forest physical and functional links (i.e. bio-life cycles)
- Inappropriate or absent ecosystem management

Barangay Cayucyucan CRM Action Plan (AP)

Introduction to the Action Plan:

Barangay Cayucyucan was included in the main thrust of the San Miguel Bay Integrated Coastal Fisheries Management Plan – Philippine Fisheries Sector Program (FSP) beginning in 1989. However, efforts to bring about effective coastal resource management to the barangay fell dramatically short of their intentions primarily due to the lack of consideration given to the socio-cultural, and environmental-economic orientation of its residents. As a consequence of non-equitable sectoral representation and self-interest vs. meaningful active participation, natural resource based productivity levels have fallen below subsistence needs.

In 1998, CRM efforts were renewed in three neighboring island barangays namely, Apuao, Caringo, and Quinapaguian. These communities share many of the socio-cultural orientations noted in Brgy. Cayucyucan, and have been able to improve their coastal environment equitably through balanced CRM planning and implementation modes – balanced between environmental production, conservation, and preservation. Hence, it is this experience, and these efforts that Brgy. Cayucyucan can benefit from the most.

Socio-environmental re-orientation, organizational and institutional enhancements, and effective environmental management processes needed in Brgy. Cayucyucan mirror those that were needed in the island communities. With interest building in the IINRMC CRM program in the community, and now with over 100 active members, Cayucyucan residents are well positioned to formulate and activate their own in-situ CRM plan, and amalgamate this into the IINRMC framework. Note that the following is not a CRM plan, but a CRM 'Action Plan' that could be used to guide the community and CRM change agents to achieve a Vision, a Mission, and a Goal.

> **Vision:** For Barangay Cayucyucan to become a prosperous community, one with a heightened sense of awareness and values for the environment, with democratic and efficient leaders in the local government who respond to equality, environmental protection and conservation, and who are firm believers in the Lord Almighty.

Mission: For Barangay Cayucyucan to become an equitable partner in the IINRMC organization of small fisherfolks, advocating for programs on environmental protection and conservation, and the fostering of cooperation with the local government and the different sectors of society in working for genuine development.

Goal: To be recognized by the local government as a partner in the IINRMC organization and as a local partner in coastal and marine resource management – one that creates positive impacts on the consciousness, livelihood and environment in the areas the Council represents.

Table 12. Overview of action plan goals, indicators, means of verification, and assumptions relative to CRM planning and implementation activities in Brgy. Cayucyucan and the local marine environment.

General Goal to 'Action Plan'	General 'Action Plan' Assumptions		
	Indicators	**Means of Verification**	**Assumption**
Establishment of community-based CRM initiatives – and the amalgamation of such into current local CRM environmental protection and management systems – that are sensitive to cultural traditions, positive and balanced towards the coastal environment and socio-economic conditions, and contributory to the preservation of in-situ ecosystems.	Cognitive re-orientation of community values respective of CRM conservation and preservation perspectives.	Illegal coastal fishing and inappropriate area utilization significantly reduced.	Community is receptive to socio-environmental re-orientation needs.
	Enhancement of working relationships within the CRM stakeholder community.	Broad-based receptive, balanced, and active participation in CRM endeavors from all coastal stakeholders.	CRM related change agents provide the community with sustained logistical, organizational, financial, and socio-political support.
	Establishment of income generation activities in line with CRM value systems.	Income bases diversified/enhanced, relative to baseline bio-ecosystem improvements – comparable reference.	
	Formation, establishment, sustainable activation, and amalgamation of CRM systems area-wide.	Active CBCRM plan amalgamated with that of the IINRMC area CRM plan.	Community is acceptant of IINRMC frameworks and participation requirements.

Following is a four-point CRM action plan component system designed to meet the stated VMGs relative to in-situ capabilities, and immediate CRM needs that are attainable over a three year period - relative to the most probable forms of participation to occur:

Component 1: Socio-Environmental Community Orientation Modeling – first addresses socio-orientations to establish a point of cognitive problem/issue base recognition, and the activation of plausible paths to needed adjustments and/or corrections to complement other action plan component objectives.

Component 2: Socio-Environmental Institutional Participation and Capacity Building – addresses the need for enhanced and equitable institutional/organizational development and cooperation to ensure broad-based equitable representation and participation in CRM and community development initiatives.

Component 3: Socio-Environmental Economic Dependence Shift – aims to balance and enhance the use of natural coastal resources in line with environmental conservation and protection values.

Component 4: Coastal Conservation, Preservation and Management – aims to amalgamate the efforts of the first three components into a comprehensive area-wide CRM socio-environmental system that benefits not only Barangay Cayucyucan residents, but the municipality of Mercedes and its inter-linked ecosystems as a whole.

AP - Program Component 1: Socio-Environmental Community Orientation Modeling (SECOM)

Overview of Functional Objectives:
Build local awareness, conscientization, and participation levels in community and CRM related activities (i.e. a re-orientation and/or enhancement of current socio-environmental orientations conducive to CRM value systems).

Establish a cognitive understanding of the current socio-environmental situation, its inner workings, and functional relationships enabling the community to move forth in the development of a pro-active and participatory CRM initiative.

Establish a cause and effect ecological model using socio-ecological baseline data obtained in APC 1-2-3.

A review of current situational data.

Overview of implementation methods to targeted outputs

1.1. Gathered PCRA and AP-socio-environmental situational data is to be presented for discussion by ISO CRM change agents to Brgy. Cayucyucan community members and IINRMC representatives. Points of conflict are to be synthesized in a workshop form relative to in-situ understandings and culturally oriented mitigation measures. Such should be documented and formulated for use in affiliated AP components.

1.2. Community workshops are to be conducted in relation to 'ecological modeling'. This is to be done by unveiling cause and effect economic–environmental relationships through association via participatory data gathering, presentation, and synthesis of initial baseline socio-ecological data achieved.

1.3. Employ institutional and organizational coastal development stakeholder relationship mapping processes – from a social development vs. environmental management perspective – in conjunction with an analysis of recognized coastal management agencies in-situ (community and LGU) and ex-situ (provincial and national). Facilitation modes should be cooperative in nature to foster and develop respect for a diversity of information and educational forms that may present themselves during these activities. Note that this activity should be conducted by sector to avoid heightening tensions between groups perceived to have negative relationships, and again as a group to gauge relationship-building efforts.

1.4. Employ Participatory Stakeholder Analysis Worksheets (PSAWs) in a community and/or sectoral workshop format to unveil socio-institutional risks; clarify community, institutional, and organizational roles and responsibilities; and identify training and capacity issues and needs relative to community APCs.

Suggested Monitoring and evaluation benchmarks:

PSAW Workshops should be conducted twice. The first employment of this tool should be done as an initial activity to set baseline monitoring and evaluation data relative to community CRM understandings and orientations. As a final activity to AP component

1, the PSAW workshop should be conducted again. Significant changes in outputs should be evident if participation levels were broadly and actively represented throughout APC-1.

Ideally, there should also be a series of completed reports for each activity undertaken that could be readily used and incorporated into APC-2,3, and 4 processes. Notably, PCRA and AP reports should have also been updated according to new information derived in APC-1 activities.

Table 13. Logical framework matrix for APC-1 (SECOM) relative to Brgy. Cayucyucan CRM initiatives.

Logical Framework Matrix for SECOM Program			
Proponent Description	**Indicators of Change**	**Means of Verification**	**Assumption**
Output 1.1 A review of current situational data with community residents and IINRMC representatives.	N/A	Activity, synthesis, and documentation are complete.	Information needed is available and presented in a manner conducive to community levels of understanding
	Limitations	**Opportunities**	**Threats**
	Quality of the output is dependent on community representation and participation.	Opportunity to gain an in-depth understand of internal and external socio-cultural and political workings of the community	Participants not being receptive to this form of 'social investigation' or awareness building format.

	Indicators of Change	**Means of Verification**	**Assumption**
Output 1.2 Construction of a community culturally oriented ecological model.	Attitude re-orientation and increased levels of socio-environmental understanding in line with CBCRM values.	Completion of activities and documentation. FGDs and one-on-one interviews.	Initial data is available or can be obtained through participatory data gathering processes. Participation is broad-based. Cause and effect socio-environmental relationships are understood.
	Limitations	**Opportunities**	**Threats**
	Quality of the output is dependent on community representation and participation.	The activity may present new forms of indigenous or traditional knowledge in relation to ecological uses of species and associated methodologies.	Workshop can be extensive and time consuming; hence, its lengthiness may hinder future participation levels if not facilitated appropriately.

	Indicators of Change	Means of Verification	Assumption
Output 1.3 Process review of the central CRM actors from a social development vs. environmental management perspectives in-situ / ex-situ.	N/A	Documentation and actor-based interviews.	Participants are respectful of the process and understand the importance of gaining true and accurate information. Available human, and financial resources.
	Limitations	**Opportunities**	**Threats**
	Quality of the output is dependent on community representation and participation.	The activity may present previously unknown relationships and abilities that could be tapped for CRM initiatives.	The 'negative' degree in which certain relationships are classified may increase tensions between identified groups. Broad participation may not reveal true internal relationships.

	Indicators of Change	Means of Verification	Assumption
Output 1.4 Socio-institutional risk identification, role and responsibility clarification, and the identification of training and capacity issues and needs relative to community APCs.	Participation modes shift from informative and consultative to functional, interactive and self-mobilization.	Documentation and synthesis complete. Comparison between PSAW outputs 1 and 2.	Attendance/participation is broad-based and the mode of education and conscientization processes are conducive to community learning modes. Available human, and financial resources.
	Limitations	**Opportunities**	**Threats**
	Quality of the output is dependent on community representation and participation.	The activity eliminates misconceptions related to CRM needs, i.e. centrally, needed abilities and responsibilities.	Misconceptions of, or disagreements over roles and responsibilities may occur. Identified CRM needs may be overwhelming and perceived as unattainable by some participants resulting in discouragement.

AP - Program Component 2: Socio-Environmental Institutional Participation and Capacity Building (SEIPCB)

Overview of Functional Objectives:

Develop a heightened sense of CRM conservation values in relation to socio-cultural and environmental-economic dimensions within Brgy. Cayucyucan.

Structurally organize and mobilize quasi-CRM research, and information dissemination groups for the development of 'capable' participatory partnerships in CRM initiatives relative to ecosystem conservation, habitat rehabilitation, and equitable socio-political representation.

Develop a SERA profile report that links consequences of action/method, reason, and result in terms of environmental uses – quantitatively and qualitatively.

Cultivate capable community leaders, and accredited community organizations to spearhead community involvements in CRM and community development initiatives.

Overview of implementation methods to targeted outputs

2.1. The use of APC-1 participants should be used as a 'selection' venue for cross community individual sectoral identifications relative to group formations. Expressed vested and concerned interest should be tapped, harnessed, and accessed, relative to quasi-CRM research group involvement – all activities should remain 'open' to additional interests and participation.

2.2. The use of participatory adult forms of education is to be employed during SERA training processes (guided by ISO CRM officers, facilitated through IINRMC affiliates) aimed at the collection of:

A) Historical catch per unit effort (CPUE) profile vs. economic NRB utilization profiling.

B) Bio-resource quantification profiling vs. environmental-economic activity profiling.

C) Cultural resource utilization profiling.

During these data gathering functions, bio-monitoring systems within all ecosystems and prospective protected areas must be established (see appendix 3 for plausible monitoring systems). Note that all data collected should be correlated into a baseline format for future monitoring purposes. Ex-situ institutional stakeholders should also be encouraged to attend these activities if possible, and data shared with external CRM affiliated agencies.

2.3. Periodic (bi-weekly is suggested) evening presentations of ongoing research activities, their processes and results given by community participants. As these activities are intended to become monitoring activities, following initial research, monitoring research and community presentations should be conducted biannually.

2.4. Institutional OD and ODM training focused on adult forms of educational understanding – to be guided by ISO CRM officers, facilitated through capable Brgy. Cayucyucan members, institutional/agency and IINRMC affiliates.

Suggested Monitoring and evaluation benchmarks:

It is imperative to remember that AP-2 aims to establish active exchanges within the community and the 'ex-situ CRM' community, and to sustain these exchanges through meaningful participation. Naturally to monitor and evaluate AP-2 undertakings, quasi-groups must be formed and fulfill their mandated tasks, and the effectiveness of their endeavors would depend on the extent of cross-sectoral involvement/exchanges. Participation through AP-2 should at least be sustained at inception levels; moreover, general community interest and acceptance of the initial CRM processes can be gauged by shifts in attendance at situational update venues, and the level of support or interest shown by LGU and government line agency representation.

Notably, the compiled SERA report should be verified by a qualified external CRM consultant, distributed to relevant CRM support networks, and ratified/accepted as a respectable and comprehensive research document by Brgy. Cayucyucan residents, its barangay council, the IINRMC, the LGU, and concerned government line agencies.

Training programs should have also culminated in the accreditation of formerly non-accredited barangay organizations, and Brgy. Cayucyucan being recognized as a formal and equal partner within the IINRMC and its established networks.

Table 14. Logical framework matrix for APC-2 (SEIPCB) relative to Brgy. Cayucyucan CRM initiatives.

Logical Framework Matrix for SEIPCB Program			
Proponent Description	**Indicators of Change**	**Means of Verification**	**Assumption**
Output 2.1 Formation of quasi-CRM research, and information dissemination groups.	N/A	Groups formed and active	APC-1 tasks accomplished and amalgamated in to APC-2 2.1 output effectively. Selection of needed actors is comprehensive and participation levels adequate to meet required outputs. Available human, and financial resources.
	Limitations	**Opportunities**	**Threats**
	N/A	Actors involved have the chance to be taught and share their strengths with IINRMC trainers. Enhancement of inter-barangay relationships and cooperation.	Participation representation may be skewed rather than gaining a diversified balanced.

	Indicators of Change	**Means of Verification**	**Assumption**
	Understanding of human-ecological relationships is evident.	Participation in presentation activities gains sustained support and interest. SERA report accepted by relevant stakeholders.	Participation is broad-based and delivery of the training processes is acceptable and understandable relative to the participants' abilities and cultural/social orientations. Available human, financial, and ecological resources.
	Limitations	**Opportunities**	**Threats**
Output 2.2 Completion of a SERA that encompasses relevant ecosystems.	The activity is intensive and requires three weeks to complete; thus, sustained participation must be financially compensated for time spent.	Actors involved have the chance to be taught and share their strengths with IINRMC trainers. For the actors, seeing their ecosystems as a whole relative to modes of use and resulting conditions is very sobering, and such turns into an effective form of advocacy. Community is presented with a situational analysis compiled by community members, not external consultants.	The activity is intensive and requires three weeks to complete; thus, sustaining continued participation is difficult unless financial compensation for time spent is provided.

	Indicators of Change	Means of Verification	Assumption
Output 2.3 Situational updates by quasi-organized research groups.	The community gains an understanding of human-ecological relationships and begins to take initial steps towards positive behavioral changes respective of their environmental situation.	Participation in presentation activities gain sustained support and interest in CRM endeavors. SERA efforts and presentation accepted by community stakeholders. FGDs and one-on-one interviews.	Presentations are given by the trainees and in a format understandable to the greater community. Attendance is broad-based and the following FGDs are constructive. Data collected and presented is accurate, and sustained. Available human, financial, and ecological resources.
	Limitations	**Opportunities**	**Threats**
	Some questions raised may require further explanations by a CRM qualified practitioner. *[Note: Popular educational training formats have no limits, only trainers.]*	Updates provide communities with situational information and a chance to participate in discussion forms to vent and mitigate their concerns.	SERA data is aimed at not only bio-data, but also how the ecological situation came about and the actors involved; hence, allegations/blame may ensue and may create divisions within the community – although this has never happened to date.

	Indicators of Change	Means of Verification	Assumption
Output 2.4 OD and ODM training outputs.	The broadening of organizational capabilities and activities. Organizational formations and accreditation.	Organizational formations and accreditation. Organizational formations active in planning and implementation phases of their respective mandates.	Available human and financial resources. Training is comprehensive and understood in active form by participants. Organizational formations and accreditation are not interfered with politically, but rather supported.
	Limitations	**Opportunities**	**Threats**
	N/A	The training and its associated outputs give community residents a chance to learn skills that they 'missed out" on during their formal education/or lack of.	Socio-political interference. Skewed participation.

AP - Program Component 3: Socio-Environmental Economic Dependence Shift (SEEDS)

Overview of Functional Objectives:

Establish active inter-agency network capacities for the sharing of information, expertise, and resources aimed at helping the residents of Brgy. Cayucyucan modify their methods and rates of natural resource extractions to sustainable natural production levels, and environmental protection standards.

Lessen the degree in which barangay residents rely on their natural environment for productivity related extractions, and move them towards a more active environmental reproductive and conservative approach relative to livelihood support mechanism.

Establish a network of economic cooperation (physical and functional) between represented IINRMC communities that allows for natural resource base exchanges of functional habitats for sustainable economic alternatives and advancements.

Identify and establish equitable marginalized sector-based income generation projects acceptable to CRM value based standards.

Overview of implementation methods to targeted outputs

3.1. The use of in-situ and ex-situ participatory information sharing and partnership building processes is to be employed to ensure that participation in CRM endeavors are rewarded equitably by the maintenance of such exchange systems. As an example, in-situ livelihood developments should be considered as research projects with monetary returns. Hence, bio-economic research can be exchanged between participants not only to improve and sustain supportive relationships, but also to exchange and provide beneficial experiences and skills learned to enhance CRM related economic endeavors within the network systems.

3.2. Community and IINRMC livelihood frameworks are to be integrated through skill and opportunity sharing. Since the IINRMC currently has economic developments

within Brgy. Cayucyucan, initial Cayucyucan livelihood developments should focus on 'island' water resources such as seaweed farming, to advance and reinforce the cooperative elements of the IINRMC framework. [*Note: current IINRMC and community aquacultural developments within the mangrove forests of Brgy. Cayucyucan must be converted to 'mangrove friendly' farming methods.*] Initial exposure to 'mangrove friendly' farming methods should be facilitated through training related and 'active' cross visits. [*Note: all proposed livelihood developments must undergo socio-enviro-economic impact assessment (SEEIA) – needed adjustments should be made if warranted – before implementation of the projects proceed.*] It is highly recommended that an encompassing SEEIA for all livelihood developments be conducted and pertinent recommendation be implemented.

3.3. Livelihood SWOT analyses are to be conducted from two perspectives: in-situ relative to barangay boundaries and community, and as a joint analysis between the community and the IINRMC island communities. In effect, this analysis will signify areas for 'opportunistic' exchanges and developments giving way to ensuring equitable and open cooperation. It must be noted that, impartial and skilled consultants (e.g. ISO CRM practitioners) should conduct this activity/process.

Suggested Monitoring and evaluation benchmarks:

The monitoring of the APC-3 objectives has some inherent difficulties; the first being that the degree in which a network functions is highly subjective – an increase in network size or activity does not always equate to 'success' – and secondly, economic monitoring in marginalized coastal communities is difficult to establish and maintain since records are either kept in an individual's head, or subsistence monetary values are seldom acknowledged as income, not culturally or socially acceptable to share, among many others.

There are three forms of monitoring that can be employed in association with APC-3 objectives: the first would be a periodic survey of what and how many formerly

recognized fishing gears/methods have either been altered, re-deployed in less environmental sensitive areas, or abandoned altogether as a result of alternative economic avenues. Secondly, network function can be monitored and evaluated according to rates of occurrence in form and function if recorded. An analysis of these records should indicate in which direction the network is functioning, be it facilitative from a proactive or reactive stance. Over time, network systems that function appropriately become highly proactive in nature. Lastly, process documentation methods should be incorporated into all livelihood development activities and exchanges. The documentation/projects/exchanges can then be evaluated using SWOT analysis over the course of project developments. The analysis should be responsive socio-culturally, institutionally, and financially, relative to CRM value systems and operations. Notably, documentation must be established from within the APC-3 interactions; however, it is advisable that evaluation processes be done internally and externally.

Table 15. Logical framework matrix for APC-3 (SEEDS) relative to Brgy. Cayucyucan CRM initiatives.

Logical Framework Matrix for SEEDS			
Proponent Description	**Indicators of Change**	**Means of Verification**	**Assumption**
Output 3.1 Establishment and activation of inter-agency network capacity.	Active cooperation between IINRMC and government line-agencies. Network systems become highly proactive in nature.	Verification of network function through process documentations, i.e. rates of occurrence in form and function. Documented analysis of records (SWOT) indicating the direction of network function (facilitative – proactive – reactive).	Cooperation between IINRMC and government line agencies can be established. Available manpower and financial resources.
	Limitations	**Opportunities**	**Threats**
	Cooperation is limited to the form of livelihood activities and available expertise, as well as resources.	Sharing of skills, resources, and experiences between community and IINRMC and government line agencies resulting in enhanced and diversified livelihood opportunities.	Community socio-political interest/relationships may marginalize certain sectors at a predisposed disadvantage. Skewed participation. Poor relationships and conflicting mandates between external government line-agencies (DENR-DA).

	Indicators of Change	Means of Verification	Assumption
Output 3.2 Establishment and integration of cooperative livelihood developments within the IINRMC structural framework.	Income diversification. Establishment of cooperative livelihood developments (community and current IINRMC community). Change in aquacultural methods utilized. Increased levels of skills relative to livelihood developments.	Comparative survey analysis to determine shifts in income sources and production methods employed. Documentation and analysis of cooperative developments and formalization efforts. Frequency of external assistance monitoring in form and function relative to production outputs	Cooperation between community, IINRMC and government line agencies can be established. Communities are in agreement with the terms and functions of cooperative livelihood integration. Available human, financial, and ecological resources. Environmental conscientization has taken hold. SEEIA reports and activities are carried out and recommendations are adhered to.
	Limitations	**Opportunities**	**Threats**
	Livelihood establishments tend to be limited relative to cooperation, available expertise, and resources (internal and external).	All communities are disposed to unique advantages that were formally not available. Potential induction of tourism based incomes. Increased partnership building and cooperation relative to all CRM endeavors.	Community socio-political interest/relationships may marginalize certain sectors at a predisposed disadvantage. Cultural intermixing through the 'tourism advantage' may cause an influx of unwanted activities, and may cause further socio-economic marginalization within the community.

	Indicators of Change	Means of Verification	Assumption
Output 3.3 Identification and establishment of marginalized sector-based income generation projects.	Income increases and diversifications. Establishment of cooperative livelihood developments (community and current IINRMC 'special sector' community). Increased levels of opportunity and skills relative to livelihood developments.	Comparative survey analysis to determine shifts in income sources and production methods employed. Documentation and analysis of cooperative developments and formalization efforts.	Cooperation between community, IINRMC and government line agencies can be established. Communities are in agreement with the terms and functions of cooperative livelihood integrations. Available human, financial, and ecological resources. Environmental conscientization has taken hold. SEEIA reports and activities are carried out and recommendations are adhered to.
	Limitations	**Opportunities**	**Threats**
	Livelihood establishments tend to be limited relative to cooperation, available expertise, and resources (internal and external).	Movement towards equitable development and cooperation between all stakeholders.	Some self and political interests may view 'special sector' projects as unfair. [*Note: Current IINRMC 'special sectors' have not experienced this form of perception to date.*]

AP - Program Component 4: Coastal Conservation, Preservation and Management (CCPM)

Overview of Functional Objectives:
Amalgamate and intensify Brgy. Cayucyucan and island community Bantay Dagat efforts and improve supportive LGU and Philippine National Police (PNP) links, resulting in a streamlined and compliant coastal protection unit and system.

Encourage the adoption of non-exploitative resource extraction methodologies, and/or modification of existing gears to non-exploitative modes.

Safeguard all ecosystems and ecosystem processes (physical and functional) including their associated links through the development and implementation of a multi-zone user system that complements spatial and temporal bio-life cycles.

Establish a barangay CRM program that complements the IINRMC CRM and LGU programs through ecosystem management orientations.

Overview of implementation methods to targeted out-puts

4.1. LGU, IINRMC, and community relationship building processes are needed to meet the targeted output. Joint community, IINRMC, PNP, and LGU paralegal trainings need to be conducted to ensure consistency between respective Bantay Dagat community operations. A formal venue also needs to be established to periodically inform/update the respective communities of Bantay Dagat endeavors and results. This venue is also to be used for socio-environmental education, fisheries regulatory updates, and CRM orientation purposes, and as a venue to discuss relevant problem-issues-opportunity-solution bases (e.g. supportive fund sourcing schemes, schedules, tasks, responsibilities etc).

4.2. CRM often focus on the re-orientation of fishers and their actions. Continual community environmentally oriented conscientization, education, and mobilization efforts – relative to natural resource base utilization patterns – must be maintained and formally conducted on consistent bases (once a month if possible). Efforts are

to be centered on appropriate modes of environmental reproduction and conservation – through education and active 'on the ground' implementation (i.e. as a functional part of an in-situ CRM program).

4.3. Habitat management efforts are to be applied to all ecosystems within the barangay boundaries (lowland and agricultural lands, mangrove forests, and seagrass and seaweed beds – coral reef areas are insignificant), and environmental protection applied through laws enforcement modes, e.g. Bantay Dagat.

Lowland and agricultural lands: Although soil stability is not a problem in these areas, herbicide, fungicide, pesticides, and fertilizer run-off may become a problem in the future. Hence, the adoption of organic farming methods should be tested for viability and employed, if feasible. A 'run-off' monitoring program should be implemented in cooperation with DA representatives, and community farm monitoring activities employed (e.g. herbicide, fungicide, pesticides, and fertilizer application, harvest quantities, and problems experienced etc). Areas within the lowlands are also to be identified for 'fuel wood' production; then subsequently planted, and managed.

Mangrove forest systems: Current rehabilitation efforts should proceed; however, the mode as to which this should occur must be oriented appropriately. It is recommended that 50% of the proposed reforestation area be covered under the current LGU-MOA and reforested as a mangrove ecosystem – not tree farm – and 50% under a CBFMA with the DENR. Community use must also be regulated in accordance with CRM value systems; thus, a comprehensive management plan should include areas for conservative environmentally friendly uses – spatial and temporal considerations (multi-use zoning for 20 hectares is suggested), as well as areas for preservation, i.e. protected area/nursery ground (10 hectares is suggested). Current ordinances should be re-evaluated and brought in line with national laws.

Seagrass and seaweed beds: Currently this system is being highly exploited through extraction pressures. Portions of the ecosystem must be preserved to safeguard the function of the system as a maturation and nursery ground for marine inhabitants, and as a functional – life cycle – connection to the mangrove forest ecosystem. Two significant seagrass and seaweed bed protected areas are to be established; one encompassing the entrance to the mangrove forests extending 200m seaward; the second should be a significant portion of the outlying deep bed areas (position to be established by the community).

4.4. In-situ and ex-situ solid community organization methods are to be applied to all APCs as one functional operation aimed at preparing and equipping the community with the needed CRM skill and relationships. If possible, AP proponent implementations must maintain a cross-representation participatory balance between all CRM stakeholders respective of gender, financial, educational, and sectoral etc. representations. As CRM development activities progress in Brgy. Cayucyucan, activities should be oriented and facilitated in such a manner as to ease the amalgamation of Cayucyucan CRM endeavors into the broader CRM framework of the IINRMC and LGU.

Suggested Monitoring and evaluation benchmarks:
Appendix 2 details a suggested socio-environmental monitoring system to be implemented for CCPM outputs. The monitoring of network functions and relationships should follow the processes laid out in APC-3, as well as for the Bantay Dagat proponents of this section in conjunction with the processes given in Appendix 3. It is suggested that biannual progress reports be formulated relative to CRM activities undertaken and evaluated against all indicated benchmarks and given VMG statements. Such should be present in an open form within formed councils and affiliated communities.

Table 16. Logical framework matrix for APC-4 (CCPM) relative to Brgy. Cayucyucan CRM initiatives.

Logical Framework Matrix for CCPM			
Proponent Description	**Indicators of Change**	**Means of Verification**	**Assumption**
Output 4.1 Amalgamation and intensification of community Bantay Dagat efforts.	Reduction in illegal fishing and habitat use activities.	Documentation. Certification and activation of fish wardens.	Bantay Dagat efforts receive necessary LGU, PNP and community support and paralegal training. Available human and financial resources. Active CRM program integration.
	Limitations	**Opportunities**	**Threats**
	Efforts are limited to the degree of support and resources offered to maintain operations.	Through time and effort, achievements may be worked into advocacy formats to canvass for a municipal 'closed access' regime.	Complication of efforts posed by Barangay Basud. Cross-LGU political interest conflicts. Internal and external conflicts of interest.

	Indicators of Change	**Means of Verification**	**Assumption**
Output 4.2 Adoption of non-exploitative resource extraction methods, and/or modification of existing gears to non-exploitative modes.	Reduction in illegal fishing and habitat use activities. Increases in natural resource production bases, and habitat condition improvements.	Documentation. REA (habitat, inhabitants, and CPUEs).	Available human, financial, and ecological resources. Ecological conscientization processes have been internalized and acted upon by all stakeholders. Active CRM program integration.
	Limitations	**Opportunities**	**Threats**
	Available human, financial, and ecological resources. Quality of the output is dependent on levels of community representation, participation, and compliance.	To increase socio-environmental capacities.	Internal and external conflicts of interest. Natural resource base community 'production' orientations have not been filtered out or significantly reduced. Lack of available human and financial resources, and socio-economic incentives.

	Indicators of Change	Means of Verification	Assumption
Output 4.3 Safeguarding of ecosystem physical and functional links.	Ecosystems no longer being inappropriately used. Movements of passive gear positions to indicated buffer zones in CRM plan. Appropriate ordinances and MOAs for ecological protection established and stakeholder in compliance with such. Active and sustained environmental monitoring systems	Monitoring reports and annual documentation. REA (habitat, inhabitants, and CPUEs).	Community socio-environmental monitoring systems are established and active. Available human, and financial resources. Participation levels and the composition of participation are adequate to ensure equitable CRM and socio-economic benefits.
	Limitations	**Opportunities**	**Threats**
	Quality of the output is dependent on levels of community representation, participation, and compliance.	To increase socio-environmental capacities. Sustainable development in harmony with the natural environment can be achieved to benefit future generation. Potential induction of tourism based incomes.	Internal and external conflicts of, and promotions of interest bases. Natural resource base community 'production' orientations have not been filtered out or significantly reduced. Cultural intermixing through the 'tourism advantage' may cause an influx of unwanted activities, and may cause further socio-economic marginalization within the community. Lack of available human and financial resources, and socio-economic incentives.

	Indicators of Change	Means of Verification	Assumption
Output 4.4 Establishment of a local CRM program and the amalgamation of such into the IINRMC CRM program framework.	General socio-environmental conditions improving. CRM has become a central concern and point of activity with stakeholder communities. Increased and sustained CRM cooperation municipal wide. Brgy. Cayucyucan CRM plan an incorporate component of the IINRMC general CRM plan in all aspects.	Monitoring reports and annual documentation. Degree of change, cooperation, and activity within the community – FGD and one-on-one interviews for verification. Annual program analysis jointly undertaken by stakeholders and evaluated by external consultants. Formalized changes to IINRMC CRM boundaries. Accepted and accredited integrated CRM plan by all relevant CRM stakeholders respective of IINRMC CRM program frameworks.	Available human and financial resources. Socio-ecological conscientization processes have be internalized and acted upon by all stakeholders. Problems and issues that have arisen during CRM integration activities have been amicably mitigated. All stakeholders desire CRM program integration.
	Limitations	**Opportunities**	**Threats**
	Quality of the output is dependent on levels of community representation, participation, internalization, CRM efforts, and compliances with APC-1-2-3-4 activities and intentions.	Through positive achievements, processes undertaken can be modeled and expanded into adjacent areas, and may be worked into advocacy formats to canvass for a municipal 'closed access' regimes with confidence and support.	Perceived 'advantage oriented' imbalances between the current IINRMC 'communities' not individual perspectives. [*Note: IINRMC membership is not sectoral or community based, but individual based, i.e. one person, one vote regardless of barangay affiliations, as are the distribution of benefits and responsibilities.*]

Suggested Institutional Arrangement of AP CRM Initiative

Due to current socio-ecological dynamics within the encompassing areas, and the activity of the IINRMC and institutional CRM agents (ISO), a workable AP institutional arrangement scheme for Brgy. Cayucyucan would entail the adoption of the IINRMC framework. However, equitable 'adoption' necessitate changes in the electoral and organizational frameworks of the IINRMC. Below is a layout of the current IINRMC management framework, suggested community framework, and the suggested amalgamated organizational and electoral framework.

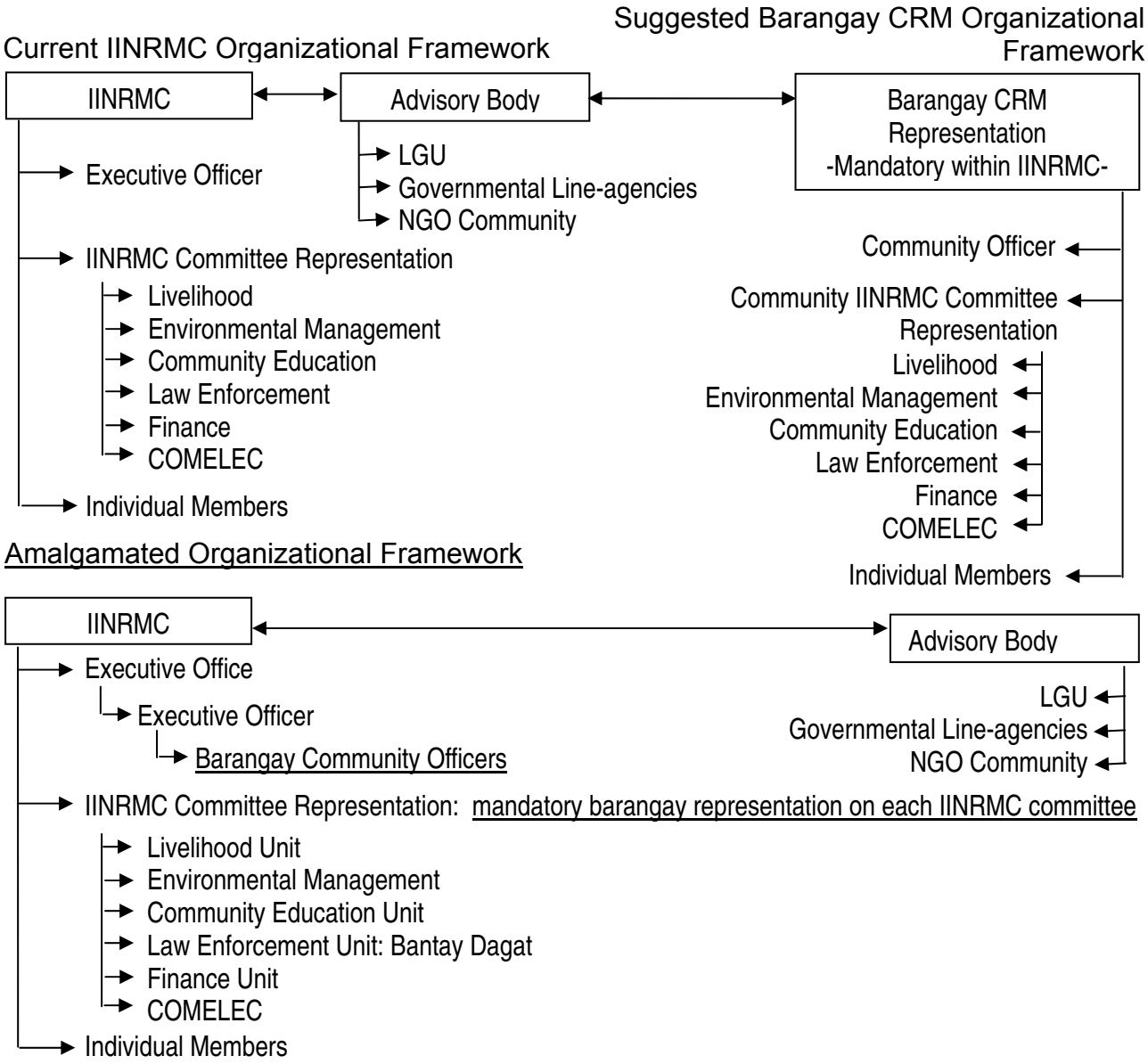


Figure 7. Suggested institutional arrangement of AP CRM initiative in consideration of in-situ and ex-situ change agents and coastal stakeholders.

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Appendices:

Appendix 1. Questionnaire guide and form for Municipal and Barangay Officials used for discovery of perceived environmental problems within Barangay Cayucyucan, Mercedes, Camarines Norte, Philippines.

1.0 Socio-Ecological Resource Base

1.1 Name at least three identified environmental problems in the municipality (i.e. with the fishing, agricultural, agro-forestry sectors, barangay sanitation or the well-being of the community as examples), and their causes and possible solutions.

Major Problem	Possible Causes	Possible Solutions
1.		
2.		
3.		

1.2 With respect to the following natural resources and facilities, what condition would you say they are in (5 being excellent, 1 being very poor, 0 if absent)?

Resource Base	Ranking	Resource Base	Ranking	Resource Base	Ranking
coral reefs		agriculture land		fresh water bodies (lakes, ponds, etc)	
mangrove forests		forest land		freshwater streams	
seagrass beds		agro-forest land		freshwater wells	
shoreline		trees/plants		barangay sanitation	
other (specify)		other (specify)		other (specify)	

1.3 For those elements above given a ranking of 2, 1, or 0 indicating the absence of the facility, in your opinion, how does the condition of this resource/facility impact the well-being of the municipality?

_____

_____

1.4 From your experience or through municipal records, how would you classify the condition of the natural resource base and community facilities in the past (5 being excellent, 1 being very poor, 0 if absent)?

Resource Base/Facility	Ranking: 5 year intervals starting from respondent's current assessment given in question 5.1 – N- into the past (years)						Perceived problems with the resource base and or in the sector?
	N	5	10	15	20	25	
coral reefs							
mangrove forest							
seagrass beds							
shoreline							
agriculture land							
forest land							
agro-forest land							
trees/plants							
freshwater bodies (lakes, ponds, etc)							

freshwater streams							
freshwater wells							
barangay sanitation							
others (specify)							

2.0 Health Data

2.1 During the past five years, what illnesses/diseases have been commonly reported in the municipality?

Types of illnesses/diseases	Barangay illness most often reported

2.2 Currently, what is the most common form of wastewater and solid waste disposal?

Waste water disposal: _____ septic tank _____ septic field _____ central sewage system
_____ none (specify where wastewater would commonly be disposed)
_____

Solid waste disposal: _____ burn _____ barangay dump _____ municipal dump
_____ no specified process (specify where solid waste would be commonly be disposed)
_____

2.3 What changes in the handling of wastewater and solid waste disposal does the municipality envision in the future? _____

2.4 What existing health facilities does the municipality have?
_____ local hilot/albularyo _____ health clinic _____ private physician
_____ hospital (specify whether private or government _____)

2.3 What changes in the health facilities does the municipality envision in the future?
_____

3.0 Problems and Issues and the Future

3.1 What are the problems and issues faced by your municipality? What is the municipality doing to combat these problems or plans to do in the future?

Problems Actions or Proposed Solutions

_____ _____
_____ _____

3.2 Personally, how do you perceive the situation in the coastal and agricultural community?
_____
_____

3.3 Personally, how do you envision the situation in the coastal and agricultural community?
_____
_____

The End

Appendix 2. Questionnaire guide and form for Community Members used in Focus Group Discussions and one-on-one interviews for the discovery of PCRA related and perceived environmental problems within Barangay Cayucyucan, Mercedes, Camarines Norte, Philippines.

Name of Barangay: _____

1. **Name of respondent.** _____
2. **Family/household resident information.**

Name	Family Position	Sex	Age	Civil Status	Educational level	Occupation	Estimated Monthly Income Contributed to the Family

3. **Economic data.**

3.1. What is/are your main source/s of income and each contribution as a whole?

_____ Fishing % Derived _____
_____ Agriculture % Derived _____
_____ Agro-forestry % Derived _____
_____ Business (specify) _____ % Derived _____
_____ If no source of income, what is your source of living?
_____
_____ Others, specify _____

3.2. For how long have you derived/made your income for the sources you have indicated in question 3.1?

_____ Fishing # of Years _____
_____ Agriculture # of Years _____
_____ Agro-forestry # of Years _____
_____ Business (specify) _____ # of Years _____
_____ Others, specify _____ # of Years _____

4. **Property ownership.**

4.1. Land

_____ owned, how big? _____
_____ not owned, but leased _____, how much a year? _____
_____ tenant, what is the sharing system? _____

4.2. Fishing gear

_____ motorized boat (specify number _____)
_____ banca (specify number _____)
_____ nets (specify types of nets _____)
_____ other fishing gears (specify _____)

4.3. Animals owned

_____ carabao, how many _____
_____ cattle, how many _____
_____ chickens, how many _____
_____ horses, how many _____
_____ ducks, how many _____
_____ pigs, how many _____
_____ goats, how many _____

5. Credit facility.

5.1. If you need to borrow money, where do you usually go?

_____ relatives _____ neighbors/friends
_____ credit coop _____ pawnshop
_____ *suki* _____ banks
_____ loan sharks ("5/6") _____ others (specify _____)

5.2. How is repayment done?

_____ specified period of time, with interest rate (specify rate _____)
_____ no specific period of time, without interest rate
_____ other arrangements (specify _____)

6. Income generating projects.

6.1. Is your family or a member of your family engaged in income generating projects?

_____ Yes _____ No

6.2. If yes, what projects? _____

6.3. Who in your family is/are mostly engaged in this? _____

7. What economic activities are primarily done by specific member(s) of your family?

Nature of Activities	Mother/Wife	Father/Husband	Daughter (s)	Son (S)
Fishing				
▪ fish capture				
▪ processing/drying of fish				
▪ preparing gears for fishing				
▪ gleaning				
▪ mariculture				
▪ others, specify				
▪ feeding				
▪ marketing/selling				
▪ planting				
▪ harvesting				
▪ others, specify				
Other income-generating activities				
▪ small-scale business				
▪ handicrafts				
▪ marine/freshwater-based				
▪ land-based				
▪ others, specify				

8. For fishers, fill in the following tables the best you can:

8.1. Fishing gears.

Fishing gears	Yes	No	Indicate if owned,shared or leased	How many
Banca				
Pumpboat				
Nets				
▪				
▪				
Fish traps				
Others (specify)				
▪				
▪				

8.2. Fishing methods.

Fishing methods	1-3 times a week	4-7 times a week	Is the use of this gear environmental friendly?		
			Yes	No	Why
hook & line					
nets:					
▪					
trawling					
muro-ami					
kayakas					
fish traps					
spearing w/o compressor					
others (specify)					

9. Fishing skills. What particular fishing method are you or your family skilled in?

Respondent _____

Father _____

Son(s) _____

Brother(s) _____

10. Fishing practices.

10.1. Indicate your fishing activities at a typical time of day.

Time of the day	No. of hours spent	Who do you go fishing with?	Type of gear used	Type of fish caught	Ave. number of kilos	How much is sold?
Morning						
Afternoon						
Evening						

10.2. Normally, how many times a week do you go out to fish? _____

11. Fishing grounds and seasons. Name the different seasons for fishing and indicate your normal fishing grounds for each season.

Season for fishing	Fishing ground (indicate the area)	How far are these from the shore?	Fishes caught

12. Who usually comes from outside to fish in your fishing grounds?

12.1.

From where?	How often?	How many?	How long?	What methods?

12.2. What do you think about these outsiders who come to fish in your fishing grounds?

_____

_____

_____

13. Gleaning activity.

13.1. Who in your household gleans on the reefs?

Who?	What time of the day?	For how long?

13.2. What do you find on these reefs?

14. Marketing of fish catch.

14.1. What are the existing market outlets for your fish catch in…

a. your barangay? _____ _____

_____ _____

b. other localities _____ _____

(please specify) _____ _____

14.2. Do you maintain a regular buyer/middleman (*suki*) for your catch?

_____ Yes _____ No

If yes, what other personal or economic needs are provided by your *suki?*

_____ _____

_____ _____

14.3. What difficulties/problems have you encountered with your *suki?*

_____

_____

14.4. If you don't maintain a regular buyer, to whom do you usually sell your fish?

_____

_____

14.5. Who is usually responsible for selling your fish catch?

_____

_____

14.6. In cases where you have excess fish catch or at times when the price of fish is very low, what do you usually do with your catch?

_____ sell despite low price _____ give to neighbors, friends, relatives

_____ consume everything _____ others (specify _____)

15. Expenditures from fishing.

15.1. How much money do you owe for your boat or other gears?

_____

15.2. How much money do you spend each week on gas, oil, or fuel for the boat?

_____

15.3. How much money do you spend for other maintenance (e.g. nets)

_____

16. Perceived changes in marine resources. What differences do you see between the present and the past (10 years ago) with regard to:

Changes in:	Better now	Better years ago	No change	Why?
Fish size				
Fish abundance				
Tridacna abundance				
Sea turtle abundance				
Lapu-lapu abundance				
Coral abundance and diversity				
Other organisms				

17. Perceived problems. Name at least three (3) of the biggest problems with fishing in your area, their causes and possible solutions that you could think of.

Biggest problems in fishing	Possible causes	Possible solutions
1.		
2.		
3.		
4.		
5.		

18. For farmers and agro-foresters, fill in the following table the best you can:

Type of harvestable goods	Type of insecticide used	Amt. ha/yr	Type of herbicide used	Amt. ha/yr	Type of fungicide used	Amt. ha/yr	Type of fertilizer used	Amt. ha/yr

Amt. ha/yr = amount used per hectare per year.

19. For farmers and agro foresters, fill in the following table the best you can with respect to changes (3 years ago. 6 years ago, 9 years ago) in the amounts you have needed to use to achieve your harvest**:**

Type of harvestable goods	Type of insecticide used	Amt. ha/yr			Type of herbicide used	Amt. ha/yr			Type of fungicide used	Amt. ha/yr			Type of fertilizer used	Amt. ha/yr		
		3	6	9		3	6	9		3	6	9		3	6	9

Amt. ha/yr = amount used per hectare per year.

19.1. Are you or anyone living in your residence engaged in group income-generation projects?
_____ Yes _____ No

19.1.1. If yes, please describe.

_____

19.2. What natural resource base/s do you think this livelihood is based on (in relation to question 19.1)?

_____

20. Health data.

20.1. What is your primary source of drinking water?
_____ piped water _____ stream/spring _____ dug open well
_____ water pump _____ river

20.2. Toilet facility: _____ out-house _____ water sealed _____ flush type
_____ no toilet (specify where waste is disposed)

_____

Waste water disposal: _____ septic tank _____ central sewage system
_____ septic field _____ none (specify how and where waste water is disposed)

_____

Solid waste disposal: _____ burn _____ barangay dump _____ municipal dump
_____ no specified process (specify how and where solid waste is disposed)

_____

20.3. What existing health facilities do you use in your community?

_____ local hilot/albularyo _____ health clinic _____ private physician

_____ hospital (specify whether private or government _____)

20.4. In the past three years, what illnesses/diseases did your family experience?

Types of illnesses/diseases	Who in the family?

21. Membership in organization.

Household member	Name of organization	Position	Type of organization
Husband	1.		
	2.		
	3.		
Wife	1.		
	2.		
	3.		
Daughter(s)			
1.			
2.			
3.			
Son(s)			
1.			
2.			
3.			

22. Is there any organization/group, NGO or government agency in your barangay with environmental programs?

_____ Yes _____ No

22.1. If yes, what is/are these? Please indicate environmental programs and services for each.

_____

_____

_____

_____

_____

_____

23. Natural Resource Base and Community Facility Conditions

23.1. With respect to the following natural resources and facilities, what condition would you say they are in (5 being excellent, 1 being very poor, 0 if absent)?

Resource Base	Ranking	Resource Base	Ranking	Resource Base	Ranking
coral reefs		agriculture land		fresh water bodies (lakes, ponds, etc)	
mangrove forest		forest land		freshwater streams	
seagrass beds		agro-forest land		freshwater wells	
shoreline		trees/plants		barangay sanitation	
other (specify)		other (specify)		other (specify)	

23.2. For those elements above given a ranking of 2, 1, or 0 indicating the absence of the facility, in your opinion, does the condition of this/these resources/facilities impact your livelihood activities? _____ Yes _____ No

23.2.1. If you have indicated 'YES' in the above question, in your opinion, how does the condition of this/these resources/facilities impact your livelihood activities or well-being?

_____

_____

_____

23.2.2. If you have indicated 'NO' in the above question (5.2), in your opinion, how do your economic activities affect the condition of this/these resources/facilities?

_____

_____

_____

24. Natural Resource Base and Facility Management

24.1. In your opinion, what level of management is currently being employed in the given resource bases (5 being excellent, 1 being very poor, 0 if absent)?

Resource Base	Ranking	Resource Base	Ranking	Resource Base	Ranking
coral reefs		agriculture land		fresh water bodies (lacks, ponds, etc)	
mangrove forest		forest land		freshwater streams	
seagrass beds		agro-forest land		freshwater wells	
shoreline		trees/plants		barangay sanitation	
other (specify)		other (specify)		other (specify)	

24.2. Have you observed the use of destructive fishing methods being done in your seas?

_____ Yes _____ No

If yes, what are these? _____

Why do you think are these done?

_____

If no, why have these not been used?

_____

24.3. Is there any organization/group, NGO or government agency in your barangay implementing environmental programs? Yes _____ No _____

If yes, what is/are these? Please indicate the environmental programs and services for each.

_____

_____

_____

24.4. Are you or anyone living in your residence currently engaged in any form of group natural resource management and/or facility management projects?

_____ Yes _____ No

If yes, please describe.

_____

24.5. With respect to your daily activities (i.e. livelihood related or not), do you practice any forms of personal natural resource management and or sanitation strategies?

_____ Yes _____ No

If yes, please describe

_____

24.5.1. Are these practices cultural based: Yes ___ No ___ or belief based: Yes ___ No ___

If yes, please describe

_____

25. Historical View of the Natural Resource Base and Community Facilities

25.1. From your experience, how would you classify the condition of natural resource base and community facilities in the past (5 being excellent, 1 being very poor, 0 if absent)?

Resource Base/Facility	Ranking 5 year intervals starting from respondents current assessment given in question 5.1 - N- into the past (years) -						Perceived problems with the resource base and/or in the sector?
	N	5	10	15	20	25	
coral reefs							
mangrove forest							
seagrass beds							
shoreline							
agriculture land							
forest land							
agro-forest land							
trees/plants							
fresh water bodies (lakes, ponds, etc)							
freshwater streams							
freshwater wells							
barangay sanitation							
other (specify)							

25.2. What differences have you seen between the present and the past in relation to the following:

Changes in (specify others)	Changes - 5 year intervals starting from now – N - - into the past (years) -						Why?
	N	5	10	15	20	25	
Fish Size							
Fish Abundance							
Agricultural Yield							

Agro-Forestry Yield							
Others							

26. Problems and Issues.

26.1. What are the problems and issues faced by your family? How do you think these problems may be solved?

Problems	Proposed Solutions

26.2. What are the problems and issues faced by your community? How do you think these problems may be solved?

Problems	Proposed Solutions

27. How do you perceive the situation in your coastal community now?

_____
_____
_____

28. How do you envision your coastal community to be five years from now?

_____
_____
_____

29. Name at least three of the major problems in your community (i.e. with the fishing, agricultural, agro-forestry sectors, barangay sanitation or the well-being of the community as example), their causes and possible solutions.

Major Problem	Possible Causes	Possible Solutions
1.		
2.		
3.		

The End

Appendix 3. Suggested Community-Based Coastal and Marine Protected Area Monitoring and Evaluation System for Barangay Cayucyucan, Municipality of Mercedes, Camarines Norte, Philippines.

Before Beginning the Monitoring Program

The key to a successful MPA monitoring and evaluation system is that it must be created at a community level in conjunction with the community. This would entail monitoring systems based on current levels of understanding and built in practices enhanced by 'change agents' to amalgamate the said understandings with mainstream data gathering techniques. By doing so, the evaluation of the data can be not only used by the community to draw conclusions and judgments, but also the community's coastal management partners; Local Government Units, Non-Government Organizations, and the academe alike etc.

At the point of this intervention, it is assumed that baseline studies have been conducted in the area prior to the implementation of this monitoring program to provide for the initial comparative evaluation. This data would include basic Resource Ecological Assessment (REA) information in the targeted and surrounding areas, for example: biotic abundance studies (primarily those of frequently targeted species – fish and invertebrates), biodiversity studies using line transects and quadrant techniques, the physical composition of the areas (e.g. area coverage in relation to substrates, coral content and condition, seagrass and seaweed bed content and condition, and mangrove forest content and condition, if applicable), siltation readings, a user profile and extractive resource profile with associated economic values of the area inside and adjacent to the proposed marine protected area (MPA) is also needed. The aforementioned data may seem overwhelming for a community to initially undertake; however, through the aid of CRM practitioners, such studies are relatively easy to teach in a teacher's training format and can be conducted with generally available resources within the community – with perhaps the exception of the biodiversity studies. The initial profile can also be downgraded or simplified to an initial area composition profile, fish abundance profile (in and adjacent to the proposed MPA) and a 'mapped' Catch Per Unit Effort (CPUE) profile in adjacent areas. This data would be significant enough to obtain MPA performance evaluation data.

Basic Assumptions to the Monitoring System

The following MPA monitoring and evaluation scheme is based on the premises that a basic REA has been conducted and the community has been trained in basic data gathering techniques; as well, the instrumentation of measure has been developed with and by the community. Moreover, monitoring activities put forth are simplified (but not watered down) and aimed at sustaining community involvement and interest in coastal management, particularly in MPA developments.

Monitoring the Biophysical Parameters of the MPA:

The use of a manta tow (English et al., 1994) should be used to obtain baseline composition data throughout the MPA's coral reef systems. Subsequently, such an assessment should be conducted bi-annually or at least annually, and the information obtained and comparatively charted by the community. Data gathering should be focused on coral coverage, the condition of such, as well as other notable changes such as new anchor damage, cyanide and dynamite damage, coral bleaching, crown of thorns infestations, and other intrusive damages to the substrates.

Seagrass and seaweed beds, if included into the MPA design, need monitoring as well. The initial baseline data would entail the setting up of quadrant and line transect sites randomly selected and the data complied with the help of technical advisors. English et al., (1994) can be used as a general guide to the techniques. For the monitoring base, the use of either random or stationary quadrant sites will be adequate to obtain observable changes within the ecosystem. The monitoring of such should be done bi-annually, or at a minimum annually. Data to be collected should include species present and relative densities in relation to area coverage and abundances.

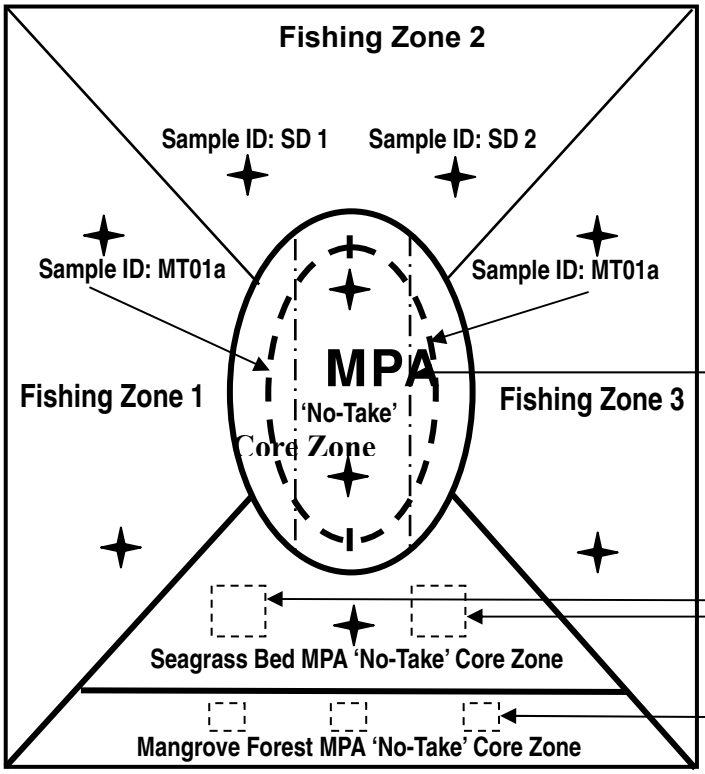
The mangrove forests, if included into the MPA design, will also have to be monitored. As the baseline data is conducted, quadrant sites – one within each bio-zone 10m x 10m - of the forest will need to be mapped and marked in detail (i.e. the location of each tree and associated heights and diameters at breast height (DBH), and the number of seedling present (English et al., 1994). It will be these marked quadrants that are to be re-assessed on a yearly bases and calculated for growth and proliferation parameters. If the community is given the correct equipment, soil and water pH values can also be taken.

Additionally, a secchi-disk reading should be taken on a monthly basis as a minimum, to provide information in relation to siltation patterns and increased inland activities resulting in siltation flows that may negatively affect the wellbeing of the MPA's biological communities. In total there are four central activities to be conducted; namely, the manta tow for the coral reef system, quadrant assessments for seagrass/seaweed beds and the mangrove forest, and siltation readings throughout. Again English et al., (1994) can be used as a general guide to the techniques, and these methods could be adjusted to fit community perceptions through notations.

Following are simplified 'associated' data charts that will be adequate to collect verifiable scientific data, equivalent to a mapping system that can be used when collecting in-situ data. Each is then followed by an 'accumulative' and 'comparative' chart for evaluation use.

Simplified Sample Map for the Proposed MPA:

The following map should be used as a guide in manta tow and fish, invertebrate, growth, and siltation surveys within the MPA, as well as siltation census readings, fish and invertebrate catch data in permitted extractive/harvestable areas (Fishing Zones 1-2-3) outside of the MPA.



***[Note:** The community and technical advisors will determine the number of quadrants and transect lines to be established.]*

Sampling fish census transect lines: FC.1. 2. 3 etc.

Sampling stations for secchi disk readings: SD.1, 2, 3 etc.

Sampling quadrants: SG.1a etc.

Sampling quadrants: MGF.1a etc.

Coral Reef Mata Tow Monitoring in MPA Zone

Chart 1. Sample in-situ MPA 'Manta-Tow' associated coral reef biophysical data composition in area coverage as a percentage category.

MPA Section or Reef Name: _____. Sample ID: MT01a
Time: ____. Date: _____. Wind Speed: _____. Cloud Cover: _____. Data Collector: _____.

Tow #	Area Coverage (category %)						Ranked Physical Damage				
	Hard Corals		Soft Corals	Substrates							
	Dead	Live		Sand	Seaweed	Seagrass	**COT	Dynamite	Cyanide	Coral Bleaching	Remarks
1											
2											
3											
4											

* Rock substrates are not recorded but obtained mathematically.
** COT: Crown of Thorns frequency in numbers.

Chart 2. Sample in-situ MPA 'Manta-Tow' accumulative data associated coral reef biophysical data composition in area coverage as a percentage category.

Sample ID	Area Coverage (category %)						Physical Observations			
	Hard Corals		Soft Corals	Substrates						
	Dead	Live		Sand	Seaweed	Seagrass	COT	Coral Bleaching	Remarks	Date
MT01a										01/02/04
MT02a										01/02/04

* Rock substrates are not recorded but obtained mathematically.
** COT: Crown of Thorns frequency in numbers.

Chart 3. Sample in-situ MPA 'Manta-Tow' comparative data associated coral reef biophysical data composition in area coverage as a percentage category.

Sample ID	Area Coverage (category %)						Physical Observations			
	Hard Corals		Soft Corals	Substrates						
	Dead	Live		Sand	Seaweed	Seagrass	COT	Coral Bleaching	Remarks	Date
MT01a										01/01/04
MT01a										01/06/04
MT01a										01/01/05
MT02a										01/01/04
MT02a										01/06/04
MT02a										01/01/05
										Etc.

* Rock substrates are not recorded but obtained mathematically.
** COT: Crown of Thorns frequency in numbers.

Seagrass and Seaweed Monitoring in MPA Zone

[*Note: Ranking is mathematically converted to area coverage – density units will be set by the community and technical advisors. Most likely the unit of measure will be the number of vertical strands / m^2 for the seagrasses and seaweeds, and the average number of observable specimens / m^2 as well. The methodology put forth in English et al., (1994) can be used as a general guide to the technique and is rather easy to facilitate.*]

Chart 4. Sample in-situ biophysical associated data composition in area coverage as a percentage category for the seagrass/seaweed bed quadrant census in the proposed MPA core zone.

MPA Section: _____ Time: _____. Date: _____. Data Collector: _____.
Observations: _____.

Quadrant ID	Seagrass Species Observed	Density & Ranking	Seaweed Species Observed	Density & Ranking	Invertebrate Species Observed	Density
SG.1						
SG.2						

Chart 5. Sample in-situ biophysical accumulative data composition in area coverage as a percentage category for the seagrass/seaweed bed quadrant census in the proposed MPA core zone.

MPA Section: _____ Time: _____. Date: _____. Data Collector: _____.
Observations: _____.

Quadrant ID	Number of Seagrass Species Observed	Average Density & Ranking	Number of Seaweed Species Observed	Average Density & Ranking	Number of Invertebrate Species Observed	Average Density
SG.1						
SG.2						

Chart 6. Sample in-situ biophysical comparative data composition in area coverage as a percentage category for the seagrass/seaweed bed quadrant census in the proposed MPA core zone.

Date	Number of Seagrass Species Observed	Average Density & Ranking	Number of Seaweed Species Observed	Average Density & Ranking	Number of Invertebrate Species Observed	Average Density
01/01/04						
01/06/04						
01/01/05						

Mangrove Forest Monitoring in the MPA Zone

Assumption: Quadrants have been permanently mapped and marked; thus, each map should have an orientation point and identification number that can be used for a comparative evaluation. The methodology put forth in English et al., (1994) can be used as a general guide to the technique and is rather easy to facilitate.

Chart 7. Sample in-situ annual biophysical associated data composition for mangrove forest quadrant censuses in the proposed MPA core zone.

MPA Section: _____. Data Collector: _____. Quadrant ID: _____.
Date: _____. Soil Ph: ____. Water Ph: ____. Number of Seedlings: _____.
Observations: _____.

Mature Tree Species	DBH (cm)	Height (m)	Sapling Species	DBH (cm)	Height (m)	Animal Species	
						Species Observed	Number of Individuals (#s/m^2)

Chart 8. Sample in-situ annual biophysical accumulative data composition for mangrove forest quadrant censuses in the proposed MPA core zone.

MPA Section: _____. Data Collector: _____. Date: _____.
Observations: _____.

Quadrant ID	Mature Tree Species Total Volume (m^3)	Sapling Tree Species Total Volume (m^3)	Total Number of Seedlings	Animal Species		Average Ph	
				Main Species of Interest	Number of Individuals (#s/m^2)	Water	Soil

Chart 9. Sample in-situ annual biophysical comparative data composition for the mangrove forest censuses in the proposed MPA core zone.

Date	Mature Tree Species Total Volume (m^3)	Sapling Tree Species Total Volume (m^3)	Total Number of Seedlings	Animal Species		Average Ph	
				Main Species of Interest	Number of Individuals (#s/m^2)	Water	Soil
01/01/04							
01/01/05							
01/01/06							
01/01/07							
01/01/09							

Water Clarity: Secchi-Disk Monitoring In and Outside of the MPA Zone

Note: Secchi-disk readings should be taken on a monthly basis as a minimum. The materials needed are simple and one can refer to English et al., (1994) for a general guide to the technique.

Chart 10. Sample in-situ physical water clarity <u>associated</u> data composition for the proposed MPA core zone and adjacent areas.

MPA/ Fishing Zone Section: _____. Data Collector: _____. Date: _____.
Observations: _____.

Point Location for Secchi-Disk Reading		Water Depth (m) for Reading
MPA Zone Location ID	Outside MPA Zone Location ID	

Chart 11. Sample in-situ physical water clarity <u>accumulative</u> data composition for the proposed MPA core zone and adjacent areas.

MPA/ Fishing Zone: _____. Data Collector: _____. Date: _____.
Observations:_____.

MPA Zone Location ID	Outside MPA Zone Location ID	Average Water Depth (m) for Reading

Chart 12. Sample in-situ monthly water physical clarity <u>comparative</u> data composition for the proposed MPA core zone and adjacent areas.

Date	MPA Zone Average Water Depth (m) for Reading	Outside MPA Zone Average Water Depth (m) for Reading
01/01/04		
01/02/04		
01/03/05		
Etc.		

Fish Census for MPA 'No-Take' Coral Reef Area:

The coral reef fish census should be conducted biannually as a minimum. The materials needed are simple and one can refer to English et al., (1994) for a general guide to the technique. The key to making this technique and the data achieved appropriate is to have the community it self form categories of fish species in o general groups, not individuals. For example, groupers, snappers, emperors, butterfly, jacks, and parrotfish etc, or classifications of such relative to how they are sold in the market, e.g. class A, B, C. In essence finding a terminology of 'relation' is needed based on the community's understanding and perception. Afterwards, if warranted, data can be cross-referenced to scientific classifications (i.e. local names and classifications translated to family, genus and species levels by specially trained staff. Following is a useable sample chart format that can be adapted by the community. Note that fish size is left out since this is a very subjective measurement to make visually when one is underwater and may complicate the data gathering processes beyond its perceived benefits. Observable differences in fish size can be recorded and noted but not necessary in relative contexts.

Chart 13. Sample bi-annual associated fish abundance estimated data for the proposed MPA core coral reef zone areas.

MPA Section or Reef Name: _____. Line Transect Sample ID: _____.
Time: ____. Date: _____. Wind Speed: _____. Cloud Cover: _____. Data Collector: _____.

Abundance Counts	1	2-4	5-15	17-25	26-40	41-80	81-140	Etc.
Classification 1.								
Classification 2.								
Classification 3.								
Etc.								
Abundance Counts	1	2-4	5-15	17-25	26-40	41-80	81-140	Etc.
Classification 1.								
Classification 2.								
Classification 3.								
Etc.								

Chart 14. Sample bi-annual accumulative and/or comparative fish abundance estimated data for the proposed MPA core coral reef zone areas.

MPA Section or Reef Name: _____.

Abundance Counts	1	2-4	5-15	17-25	26-40	41-80	81-140	Etc.	Abundance Counts	1	2-4	5-15	17-25	26-40	41-80	81-140	Etc.
Date: 01/01/04									Date: 01/07/04								
Classification 1.									Classification 1.								
Classification 2.									Classification 2.								
Classification 3.									Classification 3.								
Etc.									Etc.								
Totals.									Totals.								
Date: 01/01/05									Date: 01/07/05								
Classification 1.									Classification 1.								
Classification 2.									Classification 2.								
Classification 3.									Classification 3.								
Etc.									Etc.								
Totals.									Totals.								

Fish Catch Data for Areas Outside the 'No-Take' MPA Zone

Retaining community support for the MPA requires that the proposed benefits of such be shown. The data can be used in advocacy processes in support of such developments. Again, it is important that the community itself formulates the content of the data into user-friendly categories. A complicated fish catch data format can easily complicate the analysis; as well, the compliance to collect such data consistently and appropriately by individuals engage in harvesting marine based resources may be hindered. Notably, the data collection should be coordinated in association with a zoned resource base map of coral reef, seagrass/seaweed, and mangrove areas near the MPA. This data should also be collected in relation to time/effort factors on a frequency basis to provide for a unified unit or measure i.e. Catch Per Unit Effort, which can mitigate frequencies and inconsistencies in data collections.

The frequency of this data is very important. Data should be collected by all individuals and groups involved in the harvesting of the said resources consistently (each time the activity occurs). Accordingly, critical to achieving frequency and consistency, the amount of 'data-work' to the individual must be reduced and formatted in an applicable way. For example, if shellfish are collected and sold by the caltex can as a unit of measure, then this should be reflected in the 'associated' (field) data charts and later transformed to

a mainstream measurement. Additionally, all associated data collected for harvested goods should be transformed, i.e. weighed, sized, categorized, and named appropriately (locally for community presentation purposes – scientifically for mainstream resource management proposes). If detailed data is desired, harvested catches can be randomly selected and processed.

[***Note:*** *Associated (field) data can be compiled into accumulated data by the individual and submitted monthly to the data managers if desired. It is recommended that a central weighing and data drop off station be made available and managed collectively*].

Chart 14. Sample associated marine resource harvest data outside the MPA core zone area.

Fishing Zone ID: _____. Ecological Zone: _____. Data Collector: _____.
Date: _____. Gear Type: _____. Number of Crew Members: _____.
Vessel Type: _____. Travel Time to Extraction Site: _____. Hours Spent Harvesting: ____.
Hours Between Harvests for Stationary Gear: _____. Observations: _____.

Catch Categories	Common Species Captured		Weight (Kg)	Option: Catch Value (PhP)
Classification 1. _____				
Classification 2. _____				
Classification 3. _____				
Etc.		Totals:		

The following can be unified by either gear type or area, even both.

Chart 15. Sample accumulative marine resource harvest data out-side of the MPA core zone area site in CPUE measurements based on a monthly average for individual fishers or collective groups.
Fishing Zone ID: _____. Ecological Zone: _____. Data Collector: _____.
Date: _____. Gear Type: _____. Observations: _____.

Catch Categories	Common Species Captured	Number of Crew (Avg.)	Total Catch Weight (Kg)	Catch Time (Hrs.)	CPUE per individual (Kg/Hr)
Classification 1. _____					
Classification 2. _____					
Classification 3. _____					
Etc.					

Chart 16. Sample bi-annual comparative marine resource harvest data outside the MPA core zone area for CPUE measurements for individual fishers or collective groups.

Open Water Ecological Zones

Date	Common Gear Types	Common Species Captured	Total Harvest (Kg)	Average CPUE per individual (Kg/Hr)
01/01/04	Classification 1. _____			
	Classification 2. _____			
	Classification 3. _____			
	etc.			
01/07/04	Classification 1. _____			
	Classification 2. _____			
	Classification 3. _____			
	etc.			

Coral Reef Ecological Zone

Date	Common Gear Types	Common Species Captured	Total Harvest (Kg)	Average CPUE per individual (Kg/Hr)
01/01/04	Classification 1. _____			
	Classification 2. _____			
	Classification 3. _____			
	etc.			
01/07/04	Classification 1. _____			
	Classification 2. _____			
	Classification 3. _____			
	etc.			

Seagrass/Seaweed Bed Ecological Zone

Date	Common Gear Types	Common Species Captured	Total Harvest (Kg)	Average CPUE per individual (Kg/Hr)
01/01/04	Classification 1. _____			
	Classification 2. _____			
	Classification 3. _____			
	etc.			
01/07/04	Classification 1. _____			
	Classification 2. _____			
	Classification 3. _____			
	etc.			

Mangrove Forest Ecological Zone

Date	Common Gear Types	Common Species Captured	Total Harvest (Kg)	Average CPUE per individual (Kg/Hr)
01/01/04	Classification 1. _____			
	Classification 2. _____			
	Classification 3. _____			
	etc.			
01/07/04	Classification 1. _____			
	Classification 2. _____			
	Classification 3. _____			
	etc.			

MPA Infractions/Violations

The following table should be posted in open view of the community, perhaps at the 'barangay hall' and updated as needed. A summary of the results can be given and discussed at a bi-annual presentation meeting or at any time there is a need to do so. Note that if putting a name to the infraction/violation chart is suggested, this should be carefully considered by all, and is not often recommended to do so.

Chart 17. Sample of associated MPA infractions.

Date	MPA Zone	Nature of Infraction/Violation	Resulting Action
Total Infractions:		Total Restitutions:	

All the following data charts have been simplified for community use. The comparative charts should be compiled and utilized by the management council and presented in graphical form to the respective communities and stakeholders bi-annually along with a synopsis of activities associated with such, followed by a discussion. The format presented can follow through to the five-year target as well as thereafter.

Reference:

English, S., Wilkinson C. and Baker, V. (eds.) 1985. Survey Manual for Tropical Marine Resources. Australian International Development Assistance Bureau. Australian Institute of Marine Science, Australia.

Appendix 4. Acronym List

AP	Action Plan
APC	Action Plan Component
BBD	Barangay Bantay Dagat
BC	Barangay Council
BCDO	Barangay Cayucyucan Development Organization
BCL	Barangay Communal Lands
BFAR	Bureau of Fisheries and Aquatic Resources
BFARMC	Barangay Fisheries and Aquatic Resource Management Council
BHC	Barangay Health Center
BO	Barangay Ordinance
BOD	Biological Oxygen Demand
Brgy	Barangay
BSP	(not listed by source)
BUDFI	Bicol Upland Development Foundation Inc.
Ca	Calcium
CBFMA	Community Based Forestry Management Agreement
CBICRM	community-based integrated coastal resource management
CCPM	Coastal Conservation, Preservation and Management
CEC	(not listed by source)
CENRO	Community Environment and Natural Resource Office
CGB	Community Grameen Bank
COD	Chemical Oxygen Demand
COMELEC	Commission on Elections
COT	Crown of Thorns Stardish
CPUE	Catch Per Unit Effort
CRCC	Community Roman Catholic Church
CRM	Coastal Resource Management
DA	Department of Agriculture
DAR	Department of Agrarian Reform
DBH	Diameter at Breast Height
DSWD	Department of Social Welfare
FGD	Focus Group Discussion
FRMP	Fisheries Resource Management Program
FSP	Fisheries Sector Program
ICLARM	International Center for Living and Aquatic Research and Management
IINRMC	Inter-Island Natural Resource Management Council
INC	Iglesia ni Cristo
ISO	Institute of Social Order
K	Potassium
LGU	Local Government Unit
MFARMC	Municipal Fisheries and Aquatic Resource Management Council
Mg	Magnesium
MOA	Memorandum of Agreement
MPA	Marine Protected Area
MWD	Municipal Water District
NGO	Non-Government Organization
NRB	Natural Resource Base

OD	Oxygen Demand
ODM	Organic Dissolved Matter
OM	Organic Matter
P	Phosphorus
PCRA	Participatory Coastal Resource Assessment
pH	Acidity Level
PNP	Philippine National Police
PSAW	Participatory Stakeholder Analysis Worksheets
RCS	Red Cross Society
REA	Resource Ecological Assessment
SECOM	Socio-Environmental Community Orientation Modeling
SEEDS	Socio-Environmental Economic Dependence Shift
SEEIA	Socio-Enviro-Economic Impact Assessment
SEIPCB	Socio-Environmental Institutional Participation and Capacity Building
SERA	Socio0Ecological Research Assessment
SMBICFMP	San Miguel Bay Integrated Coastal Fisheries Management Plan
SMBMC	San Miguel Bay Management Council
spp	(as in *Begonia spp.*)
SWOT	Strengths-Weaknesses-Opportunities-Threats
VMG	Vision-Mission-Goal

Appendix 5. List of Figures and Tables

Appendix 6. Picture File Index.

P1. Secondary growth mangrove forest habitat within Brgy. Cayucyucan.

P2. Constructed seawall blocking former ocean access to the mangrove forest, Brgy. Cayucyucan.

P3. Mangrove forest deforestation and sand mining resulting to shoreline erosion, Brgy. Cayucyucan.

P4. Use of mangrove forest trees for the construction of fencing throughout the entire barangay, Brgy. Cayucyucan.

P5. Solid organic and inorganic waste disposal on idle public lands, Brgy. Cayucyucan.

P6. Use of mangrove forest trees for the construction of fencing, house construction, and nipa roofing – common throughout the barangay, Brgy. Cayucyucan.

P7. Idle mangrove forest aquaculture pond – September 27, 2004, Brgy. Cayucyucan.

P8. Idle mangrove forest aquaculture pond (P7) February 10, 2005, indicating over-development of idle aquacultural ponds, and the use of non-mangrove friendly aquacultural techniques, Brgy. Cayucyucan.

P9. Beachfront, indicating the common class of fishing boat and crab trap gears utilized, Brgy. Cayucyucan.

P10. Beachfront indicating the difference between the common class of fishing boats utilized, and that of the highly marginalized fisher, Brgy. Cayucyucan.

P11. Inside clearing within the mangrove forest. Gear shown is non selective, but primarily used for the capture of grouper fry to supply 3 hectares of grouper aquaculture ponds, Brgy. Cayucyucan.

P12. Extensive grouper aquacultural pond within the mangrove forest backing on to scrublands – non-mangrove friendly techniques – trash fish feeds obtained from illegal fishers, Brgy. Cayucyucan.

P13. Focus group discussion with community residents encompassing the use of the natural coastal resource base, aquaculture initiatives, and CRM management problems and issues, Brgy. Cayucyucan.

P14. The barangay's central reason, and source of strength to undertake CRM initiatives, Brgy. Cayucyucan.

THE END