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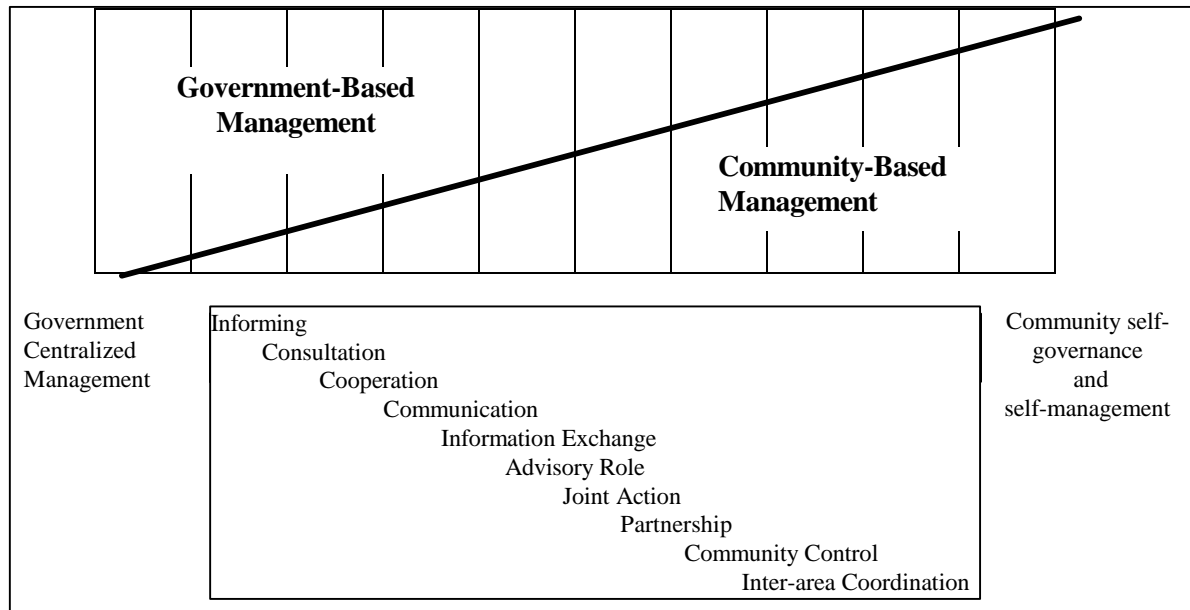
## **MEASURING CO-MANAGEMENT**

### **Introduction**

Co-management is an evolving method of managing natural resources that involves the sharing of management responsibility and/or authority of a resource between the government as owners of the resource, and the local community as users of the resource (Berkes 1989; Pomeroy and Williams 1994). Co-management arrangements blend together two “pure” management alternatives of state-level management and “local-level management” (Berkes, George and Preston 1991). There is no one set form of co-management. Rather, co-management occurs across a broad spectrum of possibilities of power sharing depending on country and site-specific

conditions.

Figure 1. Co-Management Scale



### Adopted from Berkes (1994)

The following paper presents an approach used to measure a coastal co-management project in the Philippines. Although much literature exists on the theoretical components and benefits of co-management, comparatively few co-management agreements have been documented to determine if co-management works effectively, and the effects co-management has on the resource and resource users. To further understand the results of co-management applications, studying effective and operating co-management arrangements will be invaluable.

#### Overview of Cogtong Bay, Philippines

Cogtong Bay is a shallow bay located on the eastern coast of Bohol, an island province in the Central Visayas region of the Philippines. Limestone hills and a thin fringe of mangroves border

the outer limits and encompass the extensive mangrove stands, irrigated rice fields and coconut lands of the Bay's interior (Janiola 1996). Two types of primary economic activity prevail within the villages of both municipalities. The majority of inland village residents are farmers, while those in coastal villages are mainly fishers.

The combined population of Candijay and Mabini is 52,000 (Janiola 1996). The average annual household income in 1988 was about P4,800 or US \$228<sup>1</sup>, well below the Philippines per capita GNP of US \$1,630 (Mehra, Alcott and Baling 1993). Candijay is more of a commercial center than Mabini with many small stores, mills and public markets. Commercial activity in Mabini is very limited.

### **“The Story”**

Historically, a well-defined system of coastal resource tenure did not evolve in Cogtong Bay, perhaps because of the abundance of fish that were available. Prior to World War II, Cogtong Bay fishers recalled thick mangrove stands and rich coastal resources such as fish and shells. Generally, only residents of Candijay and Mabini harvested the resources, using low-intensive fishing and cutting methods. Therefore there was not a great need for formal coastal resource management plans. Property rights and rules did not exist for the fishery, but a few mangrove stands in Barangay Cogtong belonged to family units. Most mangroves however, remained open-access.

After World War II, a flux of migrants from other parts of Bohol settled around Cogtong Bay because of the Bay's rich coastal resources. Also after the war, an abundance of cheap black powder entered the market and blast fishing within the Bay began. However, the ecosystem's health was strong enough to handle these perturbations and fishers reported fish catches did not suffer in the late-1940s and 50s.

Pressure on the mangroves was not felt until the mid-1960s when fishpond technology was introduced to the area. The process involved clear-cutting large areas of mangroves. Witnessing the financial success of operating fishponds, other individuals (residents and non-residents alike) also began clearing mangrove areas for fishpond development in Cogtong. Hundreds of hectares of mangroves throughout the Bay fell victim to such “development”.

The late-1960s also marked the entry of large-scale commercial fishers to Cogtong Bay from areas outside of Candijay and Mabini. The early-1970s, saw heavy commercial fishing in Cogtong Bay. Adding to the stress on the coastal resources, commercial woodcutters also arrived in Cogtong Bay in the early-1970s. Large boats from neighbouring towns cut the mangrove wood for sale in larger market centers such as Tagbilaran and Cebu. Fishers around Cogtong Bay began to notice a declining fish catch by the mid-1970s. The average fish catch of artisanal fishers reportedly declined from 15-20 kg per fishing trip in the 1960s to about ten kg in the mid-1970s.

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<sup>1</sup> Conversion rates from Philippine Pesos to US dollars are at a ratio of 21PHP:\$1 US.

The downward trend continued in the late-1980s, and by 1988, or just before the CMMRCRM started, the average fish catch per trip had dwindled to seven kg. The seven-kg in 1988 represented less than one half of the average catch per trip in the 1960s.

Recognizing the importance of the fishery to their respective areas, the Municipal Councils of Candijay and Mabini increased efforts to conserve fishery resources. The Mabini Municipal Council established a marine park in 1978 where the only legal fishing method was with longline gear and for fish intended for consumption. Both Municipal Councils also began passing more legislation beginning in the 1980s restricting environmentally harmful fishing methods. However, the Bay had already become a haven for illegal fishers and cutters. Acting on their own, the Municipal Councils could not deter violators.

The national government was largely uninvolved in Cogtong Bay until 1984 when, as part of the Integrated Social Forestry (ISF) program, some mangrove areas were re-planted by residents of Barangay Cogtong. In exchange, the planters received Certificate of Stewardship Contracts (CSC). Despite being well received by local residents, the project terminated within a year.

From 1984 until 1989, the Municipal Councils in Candijay and Mabini continued a half-hearted fight against illegal fishers while the steady erosion of mangroves through illegal cutting and clearing for fishponds, household construction and commercial use continued. January 1, 1989 marked the official beginning of the Candijay-Mabini Mangrove Rehabilitation and Coastal Resource Management Project (CMMRCRM) in Cogtong Bay. The CMMRCRM was the lone coastal resource management project of a larger project, the Rainfed Resources Development Project (RRDP). The CMMRCRM was patterned after the 1984 Central Visayas Regional Project Nearshore Fisheries Component (1984-92) that used community-based coastal resource management to address coastal marine resource degradation and the associated poverty of resource-dependent coastal residents. The primary goal of the CMMRCRM was to transform the resource users of eight coastal villages located in two municipalities on the shores of Cogtong Bay into resource users **and** managers. The project was accordingly composed of four components: 1) Community Organizing; 2) Mangrove Rehabilitation (150 ha); 3) Coastal management, and; 4) Mariculture. Monitoring and enforcement with newly formed *Bantay Dagats*, (literally meaning Guardians of the Sea) information campaigns and coalescing national government policies regarding mangrove planting and fishpond development also became key and necessary activities of the project.

The main accomplishments of the CMMRCRM project relative to the primary goal were the establishment of fishers' associations (FA) capable of managing resources more effectively than individuals, and the issuance of property rights to resource users to address the open-access problem of the mangroves.

The staff from the Association Consultants Independente Philippines Inc (ACIPHIL), Department of Environment and Natural Resources (DENR), and Department of Agriculture (DA) all worked with the municipal and village government personnel as well as the various fishers associations (FA) organized by the CMMRCRM during project implementation.

In the post-project phase, village fishers continued to actively patrol their mangrove areas. Fishers also pushed for new resource management initiatives, such as a fish sanctuary at Lumisli Island, and for the continuing recognition of communal mangrove areas to protect the livelihood of marginalized firewood gatherers. Some fishers' associations entered into new mangrove reforestation contracts with the DENR. However, the weakening of local government support for law enforcement activities due to a change in political leadership and to budgetary constraints led to the resumption of illegal cutting and illegal fishing activities in Cogtong Bay. The dissatisfaction of coastal residents with the implementation of existing rules emerged, affecting the extent of perceived changes in the overall well-being of coastal resources. Fishers' associations, nonetheless, have reaffirmed their concern for coastal resource management and for the sustainability of their resource base, upon which their survival depends.

### **Discussion**

The arrangement in Cogtong Bay, the Philippines is an interesting co-management situation. The Candijay-Mabini Mangrove Rehabilitation and Coastal Resource Management Project (CMMRCRM) as a whole was a coastal resource management project. The national government vested authority to manage the mangroves with local residents through enabling legislation by issuing Certificate of Stewardship Contracts (CSC) as an instrument to promote tenurial security to mangrove growers. However, the ultimate goal of the majority of local project adapters was a healthy and abundant fishery (mangrove and fish populations are positively correlated). The situation provided an excellent opportunity to determine if co-management is a management option suitable only to single species management or if co-management can provide ecosystem management.

Since the project addressed coastal resource management, neither the mangroves, nor the fishery alone were used as indicators to measure the effects of the co-management agreement. Rather, a more holistic perception was required. As such, the effects on both the mangroves, and the fishery were assessed. To determine the effects the co-management arrangement had on the mangroves and fishery, three performance indicators of sustainability, efficiency, and equity were used.

Methodology for conducting the research, and measuring the co-management agreement stemmed from a framework originally developed by the Workshop in Political Theory and Policy Analysis at Indiana University, USA. From the workshop, the International Center for Living and Aquatic Resources Management (ICLARM) adopted a methodological approach to analyzing co-management labeled Institutional Analysis to study co-management arrangements. For a more complete discussion on institutional analysis, the reader is directed to IFM/ICLARM Working Paper No. 1 titled "Analysis of Fisheries Co-Management Arrangements: A Research Framework (1996).

### **Measuring Performance Indicators**

Equity, sustainability, and efficiency served as indicators to evaluate the success of the co-management project. More refined elements of each macro indicator were also analyzed (see Box 1). To gather data on local-level respondents' perceptions on the performance indicators,

questionnaires were administered to local community residents, and key informant interviews conducted. The evaluation is concerned with the impressions of the local community members because the project was implemented to improve the quality of life at the local level. Therefore, the opinions of government and implementing agencies on the success of co-management are not as important. Respondents were asked to rank on a scale of zero (worst) to ten (best) (with a visual aid of a ladder diagram to anchor their responses) opinions on equity, sustainability, and efficiency issues. The questions were based on the issues summarized in Box 1.

Box 1. Performance Indicator Questions

<b>Equity</b>	<b>Sustainability</b>
Participation in community affairs in general	Overall well-being of coastal resources
Participation in coastal resource management	Community compliance with mangrove rules
Influence over community affairs in general	Community compliance with fishery rules
Influence over coastal resource management	Knowledge of mangroves
Control over mangrove resources	Exchange of information on mangroves
Fair allocation of mangrove harvest rights	Exchange of information on fishery
Satisfaction with mangrove management	<b>Efficiency</b>
Benefits from mangrove area	
Overall well-being of the household	Collective decision-making on mangrove use rules
Household income	Quickness of resolving community conflicts on mangrove issues

The first step in measuring performance indicators once the data were compiled involved the calculation of mean differences between perceptions local-level users had of the situation for *today* when compared to *before the project* for each indicator. A paired comparison t-test is used to determine if the mean differences between the two time periods are statistically significant. A paired comparison t-test is also done to compare the perceptions of local community residents have of the *today* levels in comparison to *future* (five years from today) opinions to extrapolate if positive or negative trends are expected.

A second level of analysis determines if the members of fishers’ associations have different opinions than non-members. Again, a t-test is conducted between the responses given by members and non-members to determine if a statistically significant different exists.

The results of the comparison give both a geographic comparison between the two villages, as well as a temporal comparison between the past, present and future. A result is a fairly detailed and reliable assessment of co-management according to the opinions of local residents on the basis of equity, sustainability and efficiency.

Results from the analysis in the first village (Cogtong) showed: 1) statistically significant increases

in the perceived levels of all the performance indicators except overall well-being of coastal resources and household income for the before to today comparison; 2) positive statistically significant changes in all performance indicators for the comparison of today versus five years from now and; 3) that members perceived more positive and statistically significant changes in the indicators - mainly related to empowerment. Marcelo, the second village produced similar results. All performance indicators had statistically significant results from the comparison of today and before the project, as well as in the comparison of perceptions on today and five years from now. Comparing between members and non-members of fishers' organizations, members perceptions increased in all categories save well-being of coastal resources, while non-members had positive results for all measures.

The methodology employed by ICLARM and adopted to research the co-management experience in Cogtong Bay was able to measure the local residents' perceptions on whether the project increased equity, sustainability, and efficiency. Such tangible evidence is imperative in learning more about co-management and the strengths and weaknesses.

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