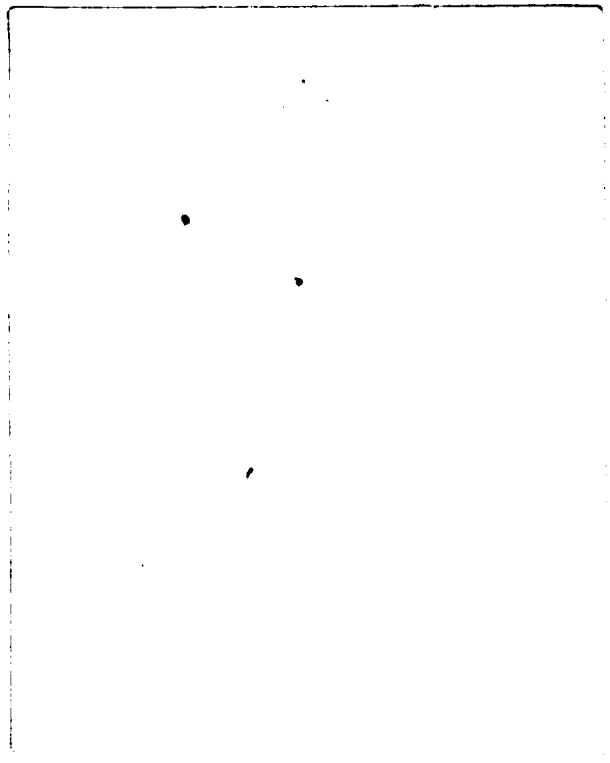
RESEARCH REPORT

# Fisheries Co-management Research Project



With funding from the Danish International Development Agency (DANIDA), a five-year collaborative research project was initiated in 1994 involving the International Center for Living Aquatic Resources Management (ICLARM), North Sea Centre (NSC), Hirtshals, Denmark, and National Aquatic Research Systems (NARS). The collaboration is based on a mutual interest to gain practical experience in research in fisheries co-management, to demonstrate its applicability as a sustainable, equitable and efficient management strategy, and develop models for use and adoption by governments, fisheries communities, NGOs and others.

The Fisheries Co-management Research Project conducts research in coastal, coral reef, lake and river/floodplain aquatic resource systems in Asia and Africa. The overall purpose of the project is to determine the prospects for successful implementation of fisheries co-management strategies. General principles and propositions which facilitate successful implementation of fisheries co-management strategies are being identified.

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Fisheries Co-management Research Project publications include Research Reports, Working Papers, Project Documents and Reprints.

M. Williams

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# FISHERIES CO-MANAGEMENT IN ASIA

## Phase 1 Project Report

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# Chapter One
# Introduction

In 1994, the International Center for Living Aquatic Resources Management (ICLARM) in Manila, Philippines and the Institute for Fisheries Management (IFM) at the North Sea Centre in Hirtshals, Denmark, in collaboration with national research partners (NARS) in several Asian (Philippines, Vietnam, Thailand, Malaysia, Indonesia, Bangladesh) and African (Malawi, Zambia, Zimbabwe, Mozambique, South Africa, Benin, Cote d'Ivoire, Senegal) countries, initiated the five-year Fisheries Co-management research project. The collaboration between ICLARM, IFM, and NARS was based on a mutual interest to gain practical experience in research in fisheries co-management, to demonstrate its applicability as a sustainable, equitable and efficient management strategy, and to develop models for use and adoption by governments, fisheries communities, NGOs and others. The project is funded by the Danish International Development Agency (Danida). Additional funding was obtained from the United States Agency for International Development, International Development Research Centre (Canada), Netherlands Development Cooperation, and Swedish International Development Cooperation Agency.

The purpose of this research report is to present a synthesis of the findings from the various research activities of the project in Asia. More specifically, and as stated in the project proposal, "The final product of the research will be the determination of prospects for and identification of principles and conditions of successful implementation of fisheries co-management as a sustainable, equitable and efficient management strategy." This research report will only report on the results of the project research activities in Asia. A separate research report will be prepared on the research results from Africa.

This research report will have eleven chapters. This first chapter will be an overview of the project objectives, expected benefits, strategy, research framework and research partners.

## Project Overview

The material for this section is taken from the project proposal that was prepared in 1993. The purpose of the section is to allow the reader to gain an overall understanding of the project, to be able to put the various research activities undertaken by the project into perspective, and to better evaluate the accomplishments, outputs and research results of the project. More detail about the project is available in Fisheries Co-management Project Document 2, Project Proposal.

### Project Objectives and Expected Benefits

The project has both a development and an immediate objective. The global development objective to which the Fisheries Co-management research project is to contribute: sustainable and equitable management of fisheries in developing countries to meet the nutritive and economic needs of poor people. The immediate objective of the project is to have a set of globally or regionally applicable fisheries co-management models developed and applied to selected aquatic resource systems in several countries and pilot sites in Asia and Africa.

The research project will, at the end of the project, have demonstrated the applicability of the fisheries co-management models as a viable alternative fisheries management strategy under varying conditions (political, social, cultural, economic, biophysical, technological) worldwide. General principles and propositions that facilitate successful fisheries co-management will have been identified and documented at both the national government and community/fisher organization levels. While fisheries co-management may not be a viable alternative fisheries management strategy for all countries and fishing communities, the research project will have established in what situation it can prove to be a sustainable, equitable and efficient management strategy and recommend how it can be successfully implemented. Specific methodologies and guidelines for implementing fisheries co-management at the national government and community/fisher organization levels will be available for use by the target beneficiaries. It is expected that several of the partner countries will have taken action at both the national government and community/fisher organization levels to implement fisheries co-management strategies.

Project Strategy

The project strategy is to conduct research in a variety of aquatic resource systems and countries around the world. The selection of several different aquatic resource systems (coastal, coral reef, lake, river/floodplain) and countries of the world to implement the project is to determine if fisheries co-management can be a viable management strategy under varying conditions (political, social, cultural, economic, biophysical, technological). Asia and Africa were selected as the two regions of focus for the project based on priority regions for fisheries research identified by ICLARM's strategic plan (ICLARM 1992). The partner countries selected to conduct the project were given priority based on a number of criteria. These criteria include number of beneficiaries to be affected by the research results, magnitude of impact on beneficiaries, extent of potential use by NARS and host government, extent to which results will strengthen national programs, interest of NARS and host government to participate in project, contribution of project results to sustainable, equitable and efficient fisheries resource management in the country, probability of achieving research objectives, and potential for methodological and paradigm transfer to other countries, NARS and resource user groups. Partner countries in Asia are Philippines, Vietnam, Thailand, Malaysia, Indonesia and Bangladesh.

The overall purpose of the project is to determine the prospects for successful implementation of fisheries co-management strategies. The project will not advocate or promote fisheries co-management, but systematically and comparatively document and assess models and processes of co-management at national government and community levels and their results and impacts. General principles and conditions that facilitate successful implementation of fisheries co-management will be identified.

The analysis of co-management falls in the area of common property theory. Co-management arrangements can be analyzed in terms of who hold what kind of property rights over a resource, or who control the fishery. Common property resources such as fisheries are non-exclusive by nature. As a class, they have two characteristics that distinguish them from other kinds of resources: (a) the

difficulty of exclusion, that is, the control of access to the resource; and (b) subtractability, that is, the capability of each user of subtracting from the welfare of others. These two problems often create a divergence between individual and collective economic rationality which, unless mitigated, leads to a "tragedy of the commons", a situation that typically occurs in the absence of property rights to the resource. For this project, a working hypothesis was developed based on the work of Elinor Ostrom (1990, 1992) in which she identifies several preconditions which characterize the emergence of viable self-managed, community-based management institutions. These conditions are reported and examined in chapter nine.

The research activities of the fisheries co-management project are conducted through three components: (1) comparative case studies of fisheries co-management; (2) country research; and (3) information exchange. The first component, comparative case studies, makes use of secondary data sources such as project reports, research reports, NGO reports, scientific journal articles and other published materials, to gain insights into approaches, processes, performance, results and impacts of co-management at both national government and community levels. This research component resulted in a scientific journal article by Sen and Raakjaer-Nielsen (1996). The second component, country research, is a comparative assessment to evaluate and document the approaches and processes of fisheries co-management implementation at the community/fisher organization level and performance results, and to examine the legal, policy and administrative conditions for fisheries co-management at the national government level. The purpose of the country research is to gain detailed and practical understanding and experience into the approaches, institutional arrangements, performance, and legal and policy factors affecting implementation of fisheries co-management. The country research makes use of a variety of research activities, including historical reviews of co-management experiences, case study analysis, impact evaluations of co-management arrangements, hypothesis testing of advantages or benefits of co-management, government legal, institutional and policy analysis, pilot sites, and workshops. The country research is conducted at both national government and community/ fisher organization levels. The country research is conducted in collaboration with NARS partners. The third component, information exchange, is a networking and training activity among and between the research partners.

The research project makes use of a comparative analytical approach, relying on a common research strategy and research framework for use in each partner-country and resource system, in order to integrate and improve the understanding and implementation of co-management strategies. The institutional analysis research framework (Chapter Two) provides for a structured approach to examining and documenting the origin, current status, operation and performance of fisheries co-management systems. Institutional analysis, which examines how institutional arrangements, the set of rights and rules by which a community organizes activities and which affect user behavior and incentives, provides the basic research framework for studying fisheries co-management institutions. The research framework was designed to be both specific enough to provide guidance in case study settings, but general enough for use in a range of situations, and useful in both documentation and implementation of fisheries co-management systems. The research framework will be used in all three components of the research. The use of the common framework will allow for data to be collected and analyzed in a standardized format, the results to be compared, and generalizations made about fisheries co-management systems for use within the country and shared with other

countries worldwide.

Data for this research report comes from research undertaken by ICLARM staff and NARS partners in the Philippines, Vietnam, Thailand, Malaysia, Indonesia, and Bangladesh over the last five years. Over fifty individual researchers worked with the project and twenty-five individual research projects and activities have been undertaken during the life of the project (see Appendix 1 for a list of projects and publications). The ICLARM staff and NARS partners in order to sequence and coordinate research activities in each country and the region prepared annual research workplans.

## The Research Report

This research report will have eleven chapters. Following this introductory chapter, Chapter Two will be a presentation of the institutional analysis research framework used in the research. Chapter Three will include a definition of co-management and a discussion of the theoretical concepts behind co-management and its advantages and disadvantages. Chapter Four is a discussion of the current approaches to community-based resource management and co-management for the sustainable governance of coastal fisheries in Asia. Chapter Five presents a discussion of the role of government, primarily national government, in co-management. In implementing the fisheries co-management project, it became necessary to develop new research methods and to further refine existing methods. In Chapter Six, four methods for research on co-management, rapid appraisal, process documentation, impact and performance evaluation, and measuring success, are discussed. In Chapter Seven, a process for community-based fisheries co-management is presented and discussed. In conducting the research on fisheries co-management, a number of hypotheses concerning the purported advantages of co-management versus centralized management systems were identified to be tested. Three of these hypotheses were tested during the research project, transaction costs, enforcement and compliance, and institutional resilience. The results of the research are presented in Chapter Eight. A number of co-management case studies from around Asia, all conducted using the institutional analysis research framework, are presented in Chapter Nine. An overall purpose of the project was to determine the prospects for successful implementation of fisheries co-management strategies. In Chapter Ten, general principles and conditions that facilitate successful implementation of co-management are presented. The final chapter, Chapter Eleven, is a discussion of the prospects for the future of fisheries co-management in Asia and a further research agenda.

## References

Ostrom, Elinor. 1990. Governing the Commons: the Evolution of Institutions for Collective Action. Cambridge University Press, Cambridge.

Ostrom, E. 1992. Crafting Institutions for Self-governing Irrigation Systems. Institute for Contemporary Studies Press, San Francisco.

Sen, S. and J. Raakjaer-Nielsen. 1996. Fisheries co-management: a comparative analysis. Marine Policy.20(5);405-418.

# Chapter Two
# Analysis of Co-Management Arrangements in Fisheries and Related Coastal Resources: A Research Framework

## 1. Introduction

This chapter presents the institutional analysis research framework that has been developed by the project to carry out the research. The aim is to provide a common analytical framework which will enable comparison between case studies, country research and co-management models. This will allow data to be analyzed in a systematic way and allow generalizations to be made about conditions that facilitate successful co-management.

## 2 Institutional Analysis

In conducting research on coastal resources co-management we are essentially interested in understanding how rules affect the behavior of the resource users and other stakeholders and the outcomes achieved. Institutional analysis provides the framework for the research. It focuses on the institutional arrangements, the set of rights and rules by which a group of resource users and government organizes resource governance, management and use in collective action situations. The purpose of institutional analysis is to separate the underlying rules from the strategy of the players. Institutional analysis examines how institutional arrangements affect user behavior and incentives to coordinate, cooperate and contribute in the formulation, implementation and enforcement of management regimes[1]. When carrying out institutional analysis, it is also important to examine some aspects of organizations because their strategies can influence, or lead to change, in institutions.

### 2.1 Institutions

Institutions constitute the central element in co-management analysis. Depending on the discipline of social science there are different definitions of institutions. Political scientists, influenced by rational choice and game theory traditions, view institutions as *"frameworks of rules, procedures and arrangements"*, or *"prescriptions about which actions are required, prohibited, or permitted"* (Powell and DiMaggio 1991). The new institutional economists, particularly economic historians, contend that *"institutions are regularities in respective interactions, customs and rules that provide a set of incentives and disincentives for individuals"*. The organizational economists conceive institutions as *"governance structures, social arrangements geared to minimize transaction costs"* (*ibid. p 8*). From a sociological perspective, institutions are: *"a system of norms that regulate the relations of individuals to each other, and define what the relations of individuals ought to be"* (Scott, 1995).

In this research framework institutions are: ***"the rules of the game in a society; the humanly devised constraints that shape human interactions, and are affected by social, cultural, economic and political factors"***. By adding "cultural factors" among the list of factors that affect the institutions this definition is a slightly modified version of North (1990).

Berger and Berger (1972) have identified five basic characteristics of institutions: (i) Externality: that

[1] It should be noted that not every detail of institutional analysis will be discussed in this paper. The reader is encouraged to make use of the publications in the reference list for more specific discussion of several aspects of institutional analysis.

institutions are experienced as having external reality, that is, an institution is something outside the individual, something real in a way different from the reality of the individual's thoughts, feelings or fantasies; (ii) *Objectivity:* that institutions are experienced as possessing objectivity; (iii) *Coerciveness:* that institutions have coercive power. The fundamental power of an institution over the individual is precisely that it is objectively there and that it can not be wished away; (iv) *Moral authority:* that institutions have moral authority. Institutions do not simply maintain themselves by coercive power, they claim the right to legitimacy; and (v) *Historicity:* that institutions have the quality of historicity. Institutions are not only facts but also historical facts, they have a history.

Institutions can either be formal or informal and may be created or evolve over time. Depending on the situation, the formal rules may be in written form and the informal ones may not. The nature of institutions can further be explained by the use of an iceberg analogy. The top visible part of the iceberg can be taken as the formal and written institutions, whereas, the lower part of the iceberg, which is not visible but exists, can be taken as the informal and unwritten institutions. Both formal and informal codes may be violated and therefore, punishments are enacted. Whether they can be enforced, the cost of enforcement, and the severity of the punishment then determine the essential part of the functioning of institutions.

## 2.2 Organizations

Organizations are groups of individuals bound by some common factors to achieve particular objectives. The origin of organizations and how they evolve is influenced by the institutional framework and in turn organizations influence how the institutional framework evolves. Organizations are created for specific objectives, and in the course of attempting to accomplish their objectives they initiate the process of institutional changes. Organizations can be political such as a local council, economic such as a cooperative, social such as a church, or educational such as a school.

North (1990) used the analogy of a football game to describe institutions and organizations. The rules of the game are institutions, some of which are formal and written, while others are in a form of unwritten codes of conduct, which underlie and supplement the formal rules. In this analogy, the football team is the organization. The main point to note here is that, in an organization, there exist both formal and informal institutions.

Culture constitutes the organizational environment and makes organizations possible and meaningful. In organizational theory, culture has for a long time been treated as an independent variable. Max Weber was one of the first to examine the emergence of rational legal rules, which he thought was essential to support the development of organizations (Scott, 1995). Thus, organization is a cultural phenomenon that varies according to a society's path or stage of development. It is based on this that Sandersen (1996) warns that to regard organizations at the local level, as implied in the co-management model, as a universal panacea for improved fisheries management might be an ethno-centric ideological stand on the part of the industrialized Western world. Modernization, development and formal organization are products of a specific western epistemological and institutional tradition.

## 2.3 Rights and Rules

The term's "rights" and "rules" are often used interchangeably in referring to the uses of natural resources. "Rights" refer to particular actions that are authorized (Ostrom 1990). A right is a claim to a benefit stream that is consciously protected, in most cases by the state. Rights define the uses that are legitimately viewed as exclusive and the penalties for violating those rights. The specification of a right does not define how the right is to be exercised. How rights are exercised is defined by "rules". Rules define specifically what acts

are required, permitted, and forbidden in exercising the authority provided by the right. For every right that an individual holds, rules exist that authorize particular actions in exercising the right. For example, a right provides the authority for a fisher to operate on a specific fishing ground. How the fisher exercises that right through the fishing activity is specified by rules which may dictate the type of fishing gear used or the time of year when the fishing gear can be used. Thus rules specify both rights and duties. The important aspect of rules in terms of institutional analysis is that they may create different incentives that affect cooperation among users. The more complete the set of rights, the less exposed the resource users are to the actions of others, and the less risk the users face in organizing themselves into groups (Ostrom 1990).

Schlager and Ostrom (1993) distinguish between different types of rights:

a) Access right: the right to enter a defined physical property e.g. participate in the fishery.

b) Withdrawal right: the right to obtain the "products" of a resource; e.g., catch a certain amount of fish.

c) Management right: the right to devise operational-level rights of withdrawal.

d) Exclusion right: the right to devise operational-level rights of access.

e) Transfer right: the right to sell or lease all or part of the above collective-choice rights.

The sources of the rights of access, withdrawal, management, exclusion and transfer are varied. These rights may originate by government that explicitly grants rights to resource users. These *de jure rights* are given formal and legal recognition. Rights may also originate from resource users. Government does not usually recognize such indigenous or de facto rights, devised and enforced by the users. These two types of property rights may overlap, complement or conflict with each other. While de facto rights may eventually be given recognition by government, until they are formally legitimized, they are less secure than de jure rights (Schlager and Ostrom 1993). While most authorities tend to ignore de facto rights, many have proven to be efficient and equitable.

Rules are defined by authority relationships that specify *who* decides *what* in relation to *whom*. Ostrom (1992) identifies three levels of rules that are all closely linked:

*1. Operational rules*, govern and regulate resource use (e.g. fishing regulations). Operational rules directly affect the day-to-day decisions made by the users (e.g. fishers) concerning when, where and how to harvest (fish); who should monitor the actions of others and how; what information must be exchanged or withheld, and what rewards or sanctions will be assigned to different combinations of actions and outcomes. Operational rules can be formal (written, legitimized) or informal (unwritten, customary/ traditional). In both circumstances those to whom they apply understand them.

*2. Collective choice rules*, are rules about how the resources and their exploitation should be managed e.g. in a co-management institutional set-up. Such institutional arrangements are needed to adjudicate conflicts, enforce decisions, formulate and change operational rules, detect and sanction against rule violation, and hold officials accountable. In a broad sense, collective-choice rules include qualifications for participation in the management organization and whether membership is compulsory. They may state what proportion of the group of resource users must agree before a rule may be adopted. Of critical importance are the arrangements

for monitoring and enforcing compliance with the operational rules and for settling disputes.

There may be multiple levels of collective-choice entities depending upon the situation. In some situations only one entity, e.g. a national fisher's association, may be constituted to adopt and enforce their own collective-choice and operational rules. In another situation, multiple collective-choice entities, at national, regional and/or local levels, may subject resource users to multiple sets of operational rules. For example, national-level regulations may overlap with local-level regulations that may overlap with customary or traditional practices. Issues of coordination and control must be addressed when multiple levels of collective-choice entities are in place (Tang 1992).

*3. Constitutional-choice rules* by determine who is eligible to participate in the system and establish the process by which collective-choice rules are created, enforced and modified. Constitutional-choice rules include, for example, the national legislation which establishes the national administrative and management structure and legitimize co-management arrangements.

Operational or working rules are nested within collective choice rules which are in turn nested within constitutional rules. In other words, the rules affecting operational choice are made within a set of constitutional choice rules.

## 3. Research Framework

Based on the theoretical concepts described in Section 2, an analytical framework has been developed for use by project researchers on coastal resources co-management. The purpose of institutional analysis is to separate the underlying rules (institutions) from the strategy of the players (organizations). Institutional analysis examines how institutional arrangements affect user behavior and incentives to coordinate, cooperate and contribute in the formulation, implementation and enforcement of management regimes. When carrying out institutional analysis, it also important to examine some aspects of organizations because their strategies can influence, or lead to change in, institutions. Such an analysis can then be used to make generalizations about the type of co-management arrangements appropriate for different situations. In particular, the analysis would enable:

(1) The identification of the *existing property rights system* in order to determine who defines rights to exploit the resource, which has access to the resource and whether any of these rights are transferable.

(2) The *scale and level of user group involvement* in order to determine the ways, in which user groups do or can, participate in co-management. Scale refers to the types of tasks which can be carried out by user groups, whilst level refers to the political level at which user groups are involved such as local, regional or national. Scale is related to level in the sense that different tasks can be carried out at different levels.

(3) The *nature of the representation of user groups* in the decision-making process in order to determine the participants in the co-management arrangement, which user groups are legitimate participants in the decision-making process and who can claim rights to participate.

(4) The *type of management organization* (existing or possible) in order to determine the type of co-management arrangement most appropriate for a particular resource or resource system.

The research framework allows for the essential elements of the action situation to be identified and examined. The framework is used to collect and organize information on key contextual variables that characterize collective action situations at multiple levels. The same sets of contextual variables are used to describe and analyze all situations. These contextual variables will take on different values in different situations. By utilizing the same set of contextual variables, it is possible to conduct a systematic and comparative analysis of diverse situations and identify relationships among variables for evaluative, diagnostic and design purposes. The research framework is adapted from theoretical and empirical work on the Institutional Analysis and Development (IAD) framework developed by researchers at the Workshop in Political Theory and Policy Analysis at Indiana University, USA.

The framework, of which a graphical representation is given in Figure 1, enables the following analyses:

1. Institutional Arrangements Analysis: This component links contextual variables characterizing key attributes of the resource (biological, physical) and the resource users (technology, market, social, cultural, economic, political) with the management institutional arrangements (rights and rules). The contextual variables are each composed of a number of attributes. A causal relationship exists among and between the contextual variables, the institutional arrangements (the focus of the analysis) and the resulting transactional (action) situations. The institutional arrangements and the contextual variables affect the actions of the resource users and authorities responsible for fisheries management by shaping the incentives and disincentives they have to coordinate and cooperate in resource governance, management and use; the incentives, in turn, shape the patterns of interaction and behavior between the co-management partners, i.e. the types of co-management arrangement established and the way it functions.

2. Co-management Performance Analysis: The co-management arrangement results in outcomes. These outcomes will, in turn, affect contextual variables as well as behavior of resource users, other stakeholders and public authorities (indicated by dotted line in figure 2). Time is a critical element. All the contextual variables can change through time. This may cause change in institutional arrangements that, in turn, affect incentives, patterns of interaction and outcomes. The outcomes of co-management institutional arrangements can be evaluated in terms of e.g. management efficiency, equity, and sustainability of resource utilization.

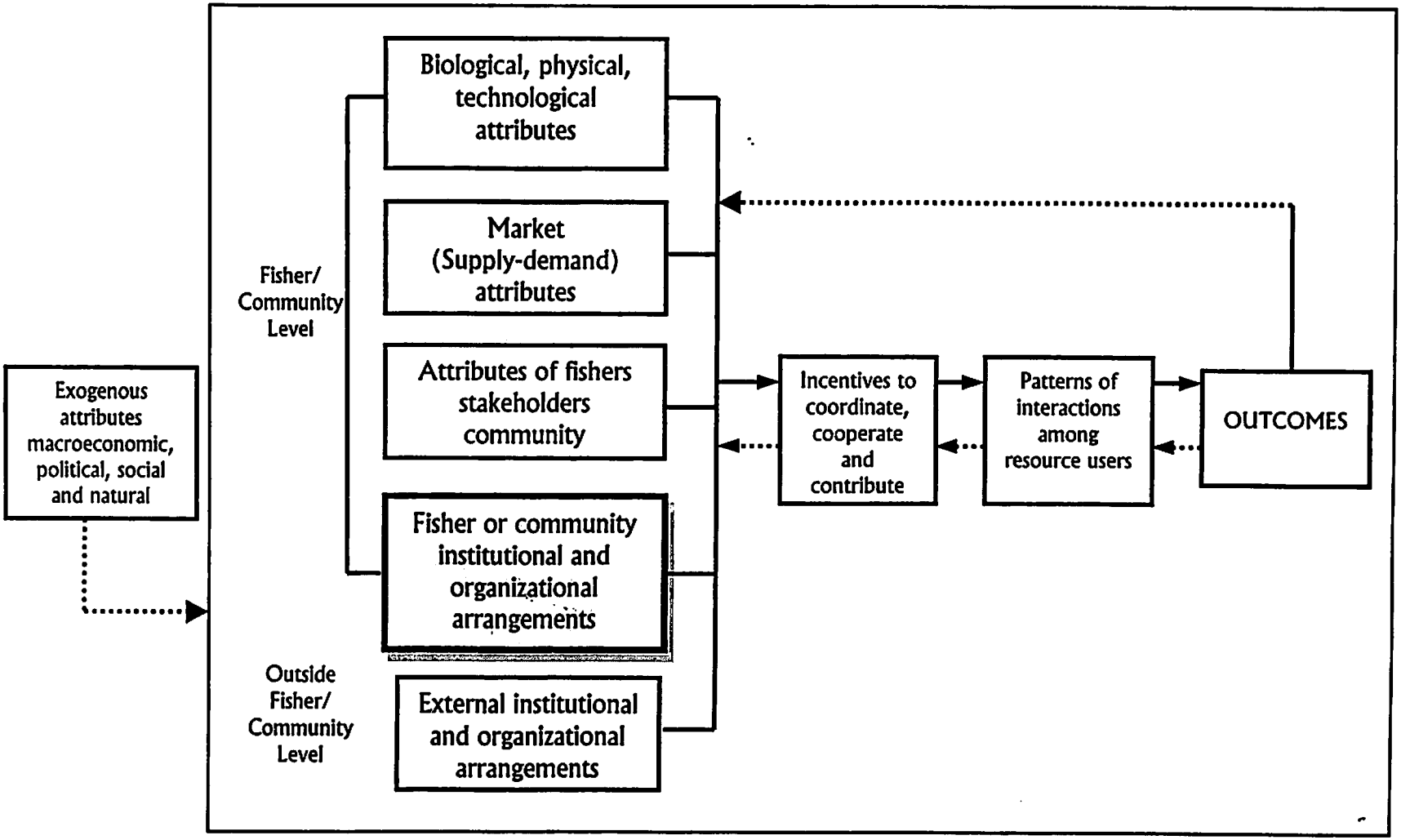
3. Characteristics of Successful Co-management Institutional Arrangements: The most important aspect of this analysis is the specification of what conditions and processes bring about successful long-enduring, fisheries co-management arrangements. From the analysis we can identify a list of principles and propositions about conditions and processes.

   The institutional analysis focuses on how rules combine with various contextual variables to structure the action situation and to generate particular types of outcomes. The analysis begins with an identification of variables affecting the action situation: the institutional, biophysical, technological, market, socio-cultural, economic, and political attributes and conditions of the resource users and the resource. These variables form the context within which resource users, other stakeholders, and authorities coordinate and cooperate to establish institutions and organizations to govern, manage and use the resources; from which emerges some patterns of interaction. Patterns of interaction result directly from the mutual choice of strategies by members of the group. These patterns of interaction result in outcomes.

In analyzing institutional arrangements, the basic strategy is to separate and dissect the parts of the action situation - contextual variables, incentives, patterns of interactions and outcomes (Figure 1). The purpose of this is to examine relationships between and among the parts. Each part of the framework has a causal relationship with other parts, some stronger and some weaker depending upon the involvement of human choice in the relationship. Biophysical and technological attributes can have a direct affect on outcomes, for example, high levels of fishing effort can lead to overexploitation of resources, regardless of whether or not institutional arrangements are in place. Institutional arrangements, on the other hand, have an indirect affect on outcomes as they lead to changes in human behavior and choice, which affect interactions and outcomes (Oakerson 1992). Different combinations of these parts can be examined depending upon the situation. These relationships can be analyzed forward or backward depending upon if one is using the framework as an evaluative, diagnostic or design tool. Explicit and implicit assumptions about the relationships help structure and guide the analysis.

In a short-run analysis of an action situation, the contextual variables are assumed to be unchanging. Over a longer period, however, change will occur in them. Yields may increase, gear type may change or the day-to-day rules may be restructured. A dynamic element can be introduced into the framework. One approach treats institutional changes as exogenous; the aim is simply to understand how a series of changes in resource attributes or institutional arrangements affects patterns of interaction and outcomes. Another approach examines long-term relationships between attributes and institutional arrangements in an iterative and causal fashion. For example, outcomes can affect patterns of interactions resulting in a process of learning by the resource users; causing, in turn, individuals to modify their strategies. These relationships can be traced through the framework to identify factors that cause the strategies to change (Oakerson 1992).

# Figure 1. A Research Framework for Institutional Analysis




*Adapted from Oakerson 1992*
*Fisheries Co-Management Project*

## 3.1 Institutional Arrangements Analysis (applied to fisheries co-management)

### 3.1.1 Contextual variables

(a) Biological, physical and technological attributes

Problems and constraints over resource use most often originate in the biological and physical attributes of the resource and in the harvesting technology used. The biophysical and technological environment of the fishery commonly structures the nature of interactions among fishers. The vulnerability of fishers to scarcity and uncertainty in supply and its effects impact upon their incentives to engage in collective action. Collective action situations have been shown to develop when a group of individuals are highly dependent on a resource and when availability of the resource is uncertain or limited. If the resource availability problem is repeatedly experienced, and if it exists within a single community of users, the users are likely to develop institutional arrangements to deal with the problem. To understand the actions fishers have taken and the institutions that they have developed requires an understanding of the fishing grounds, fish stocks, fishing activity, boundary conditions and fishing technology. Key questions to be considered are shown in Table 1.

**Table 1. Biological, physical and technical attributes**

1. Type of ecosystem (marine coast, coral reef, estuary, lake, river, floodplain, other?)
2. Boundaries (physical, administrative, restrictions in access to fish resources)
3. Health status of fish habitats (spawning areas, nursing areas, fishing grounds)
4. Characteristics of target fish species and stocks (migratory or sedentary; status of stocks)
5. Characteristics of fisheries (industrial, artisanal, fishing technologies used, physical range of fishing operations, seasonal variations in fishing activities)
6. Post harvest utilization of catches (fresh, salted, dried, smoked, fermented, frozen, canned, etc.)

1 - 6 MUST INCLUDE MAJOR CHANGES IN RECENT YEARS

Oakerson (1992) has identified three considerations for analyzing these attributes:

> (1) The relative capacity of the fishery to support many fishers simultaneously without mutual interference and/or without diminishing the aggregate yield of the fishery for the group (subtractability). The harvesting activity of an individual fisher subtracts from the amount of fish available for other fishers to withdraw. The catch of one fisher affects the amount of fish that can be harvested by other fishers utilizing the same fishing ground. Oakerson (1992) states, "The analysis should specify as precisely as possible the 'limiting conditions' that pertain to natural replenishment or maintenance of the resource. Physical limits established by nature or technology provide critical information for devising rules to maintain jointly beneficial use."
>
> (2) The degree to or relative ease with which access to the fishery is limited (exclusion). The physical nature of fishing grounds means that exclusion (or limiting access) of fishers is both difficult and costly. A single fisher would find it difficult to exclude other fishers; therefore, fishing grounds are subject to joint use. Oakerson (1992) states, "Two types of exclusion can be distinguished: (1) access may be fully regulated on an individual basis, or (2) it may be partially regulated and applied only to those outside the immediate community. This distinction is related to the potential exposure to

increases in demand. Within a definite community of users, increases in aggregate demand derive mainly from expanded operations. If there is open access, however, increases in the number of users can also contribute to an increase in total demand on the resource." Thus, fishery is characterized by high levels of interdependence among fishers. The action of one fisher affects the actions and outcomes of other fishers. These interactions can lead to conflicts among fishers over space and amount of fish (Schlager 1990).

(3) The spatial boundaries of the fishery, which determine the minimal scale on which effective coordinated resource management can occur (indivisibility). Physical boundaries having to do with divisibility of the fishery derive from nature, human design and technology. Fishing gear type, terrestrial and oceanographic features, customs, culture, government, organizations and scale all dictate the division or partitioning of the fishery into smaller units for management purposes (Oakerson 1992).

The basic institutional forms for fisheries management are fundamentally shaped by these three characteristics of the resource. In addition to the above, two other concerns are important.

*Technological problems* occur when fishers physically interfere with each other in the fishing activity. Gear conflicts may occur or the placement of gear may interfere with the flow of fish, often referred to as crowding. *Assignment problems* occur when fishers, desiring to fish the most productive spots, fail to allocate themselves efficiently across spots, leading to conflicts (Schlager and Ostrom 1993).

(b) Market (supply and demand) attributes

Resource problems are often market-based. Market attributes (price, structure, stability) can effect the incentives for resource use activities, effort levels and compliance with rules. Market attributes include those related to the operation and function of the market and those related to fisher and fish trader relationships. The first of these comprise market availability and orientation (local, regional, national, international), stability and transparency of supply and demand over time and competitive situation. The second includes such attitudes as credit linkages between fishers and fish traders, and rules on market behavior.

Key questions to be considered are shown in Table 2.

**Table 2. Market attributes (including major changes in recent years)**

1. Types of fisheries taking place (commercial, recreational, subsistence)
2. Market orientation of the fisheries (local, regional, national, international markets)
3. Value of fish products (high or low value market)
4. Market structure (many or few suppliers/ buyers, market dominance, power relations between suppliers and buyers, interdependencies)

1 - 4 MUST INCLUDE MAJOR CHANGES IN RECENT YEARS

(c) Socio-economic and socio-cultural attributes of fisher and fishing community

Fisher and community attributes include religious beliefs and practices, traditions and customs, sources of livelihood, the degree of social, cultural, economic and locational heterogeneity or homogeneity, asset ownership, level of community integration into the economy and polity, and others. Whether individual or

in combination with others, each of these attributes potentially affects incentives to cooperate. General assumptions about fishers and stakeholders are related to how they behave both individually and in groups. Stakeholders, indirectly dependent upon the fishery for their livelihood, such as fish traders, processors and transporters, are also included since their relationship with fishers can provide incentives or disincentives for the fishers to cooperate (Table 3).

**Table 3. Socio-economic and socio-cultural attributes**

1. Homogeneity /heterogeneity of fishers, fish traders, fish processors and other stakeholders (ethnicity, religion, fishing gear use, gender, ownership of boats and fishing gear)
2. Dependency on fisheries/fish trade/fish processing for livelihood; other sources of income/subsistence.
3. Indigenous knowledge relevant to fisheries management (ecological and biological knowledge of resources and habitats, knowledge of catchability and fishing technologies)
4. Cultural factors affecting community or group attitude to fisheries/fish trade/fish processing and determining behavior of individuals/groups

Some literature suggest two key attributes which lead to incentives to cooperate (Ostrom 1990, 1992, Runge 1992): (1) if a community of fishers exhibits a high degree of social, cultural and economic homogeneity in terms of kinship, ethnicity, religion, interests, beliefs, customs, livelihood strategies, etc.; and (2) if there is a high dependence or reliance of fishers on the fishery for their livelihood and the number of alternative livelihoods available in the community is low. If the fishers are highly dependent upon the fishery and if the availability of the resource is uncertain or limited, fishers are more likely to facilitate collective action to deal with the problem.

(d) Institutional and organizational arrangements at community level

Institutional arrangements concern the rights and rules that apply to and regulate the fisheries in which community members take part. The research focus is on power structures at the local level, decision-making arrangements, participation of fishers and stakeholders, legitimacy, and mechanisms for enforcement and compliance with rules.

Organizational arrangements concern the characteristics of the fora in which decisions are made and collective action taken at the local level. Important issues are representation, decision-making procedures, implementation of decisions in the field, and interface with other related fora (dealing with other resources than fish, e.g. tourism). The questions that are considered critical are given in Table 4.

**Table 4 Institutional and organizational arrangements at community level**

1. Community power structures and leadership (role, functioning and importance of traditional leadership structures in decision-making inside/outside the fisheries sector)
2. Organizations established/appointed to serve as co-management partner (legal basis, mandate, representation, decision-making system/procedures, mechanisms for implementation of management decisions/enforcement)
3. Local regulation of access to fish resources (principles for allocation of fishing rights or for exclusion of groups or individuals)
4. Operational rules in place concerning fish catch, fish trade and fish processing, including origin of rule
5. Legitimacy of institutional arrangements and organizational set-up involving fishers and other stakeholders. Attitudes towards co-management
6. Mechanisms for conflict resolution among resource users

1 - 6.5 MUST INCLUDE MAJOR CHANGES/NEW DEVELOPMENTS IN RECENT YEARS

Fisheries co-management arrangements often identify the community level as the most important level for partnership and sharing of management responsibility. Therefore institutional analysis at this level is of crucial importance to the understanding of co-management arrangements.

(e) External institutional and organizational arrangements

Institutional and organizational arrangements at higher levels than the community level most often affect the institutional and organizational arrangements at the community level. The relations can vary widely. Some community level institutional arrangements (e.g) the establishment of operational rules for fishing in waters adjacent to the local community) may have been subject to constitutional approval and may be supported by both enabling legislation and government enforcement. Other institutional arrangements at the community level may not have that legitimacy vis-a-vis fisheries and other authorities at municipal, district, regional or higher levels.

Organizational arrangements at the community level may have been developed and designed at a higher level to meet higher level needs and fit into a multiple layer, nested structure. They may for this reason have to follow rules and procedures that are more or less compatible with the local conditions. Institutional and organizational arrangements outside the fisheries sector may impact on community institutional and organizational arrangements. Key questions are given in Table 5.

**Table 5 External institutional and organizational arrangements**

1. Overall structure of national political and administrative system (relation between legislative and administrative system; centralization/decentralization)
2. Department of Fisheries and other relevant organizational structures involved with fisheries management (mandate and legal basis, structural organization, management function and tasks at national, provincial, district etc. levels)
3. Legal basis for co-management arrangements (enabling legislation, administrative decree, other)
4. Government agencies outside the fisheries sector whose mandate and activities interfere with or impact on fisheries.
5. Power structures outside the fishing communities which impact on local power structures and leadership (e.g. influences of political leaders, high ranking military or police chiefs)
6. Role of donor organizations in promoting/enabling co-management arrangement.

1 - 6 MUST INCLUDE MAJOR CHANGES/NEW DEVELOPMENTS IN RECENT YEARS

(f) Exogenous (macroeconomic, social, political, natural) attributes

A variety of factors exogenous to the fishery resource, fisher and community have an impact on fisher or community institutional arrangements. These are factors that are beyond the control of the fishers and community, and at times also higher level entities. These are surprises or shocks to the community or management system, brought about by macroeconomic, social, political or natural occurrences or interventions that affect the survival of the institutional arrangements. They may include typhoons, war, civil unrest, change of political system, economic crisis, etc. Institutional analyses should always be viewed in a historical and dynamic perspective.

These factors can provide an indication of how well the institutional arrangements are functioning and surviving through their capacity or resiliency to accommodate sudden change. Critical issues are listed in Table 6.

**Table 6. Exogenous (macroeconomic, social, political, natural) attributes**

1. Political and economic context of co-management arrangement (change in political system and overall economic development since colonial time; major events which impact on the survival of institutions (e.g. market liberalization)).

2. Disasters caused by war/civil unrest, typhoons, earthquake, flooding etc. which impact on the survival of institutions

### 3.1.2 Incentives to cooperate and coordinate

The contextual variables and the institutional and organizational arrangements for decision making and implementation of decisions made give incentives and disincentives for individuals and groups to cooperate, engage in collective actions and coordinate activities to achieve desired outcomes. The focus of the research is on the relative importance of the various variables and arrangements in creating incentives for fishers and stakeholders to coordinate, cooperate and contribute as individuals and as groups. The contextual situation and the institutional arrangements in place also give government authorities responsible for fisheries

management incentives and disincentives to coordinate and cooperate with fishers and other stakeholder groups at various administrative levels. The dominant incentives for government agencies may to a large degree relate to the exogenous economic and political attributes and to institutional and organizational arrangements external to the local community. Table 7 lists these questions.

**Table 7. Patterns of interaction among co-management partners**

1. Major incentives for groups of fishers and other stakeholders to engage in fisheries co-management
2. Major incentives for government agency to engage in co-management
3. Origin and development of co-management initiative; driving forces in the process
4. Characteristics of co-management arrangement in place (type of arrangement)
5. Ways and means of communication between the co-management partners
6. Mechanisms in place for conflict resolution between the co-management partners

### 3.1.3 Patterns of interactions between co-management partners

The incentives for groups of fishers and stakeholders and government agencies responsible for fisheries management to coordinate and cooperate will be reflected in the pattern of interaction between the parties. For research of co-management arrangements the analytical focus will be on the institutional and organizational arrangements established for the co-management partnership to materialize as well as the evolution process of the partnership. The analysis will allow for a typology of the co-management arrangement in question but should also provide detailed information on how the practical aspects of fisheries co-management are dealt with in the action situation at various administrative levels. This includes e.g. the monitoring of fish stocks and fishing effort, the enforcement of fishing regulations, regulatory interference with fish markets, structural adjustments, etc. (Table 7).

It is the pattern of interaction between the co-management partners in the action situation, which determine the dynamics of the co-management (evolution) process and ultimately the outcome of co-management. How co-management arrangements evolve over time is of particular interest.

### 3.1.4 Outcomes

The co-management outcomes are produced as a result of the patterns of interaction between the co-management parties. The consequences affect both those involved directly in the action situation and those indirectly involved.

The outcomes of co-management institutional arrangements can be evaluated in terms of performance, that is, the meeting of management objectives and the impact on the resource and its users. It is expected that in certain situations co-management institutional arrangements will perform better than other types of fisheries management institutional arrangements, such as centralized management or self-management.

The performance of co-management institutional arrangements can be evaluated at two levels. The first level of evaluation relates to overall institutional performance of co-management versus other types of management arrangements. These advantages include equity, more economical in terms of administration and enforcement, increased sense of ownership of the resource by users, higher degree of acceptability and rule compliance, improved information about the resource, improved social cohesion in the community, and more participation (Pomeroy and Williams 1994). A comparative assessment of the performance of different

co-management institutional arrangements can be conducted at this level of evaluation.

The second level of evaluation relates to performance in meeting specific management objectives and impacts at the operational level. Each individual co-management case has objectives established by the participants, both resource users and government that are to be achieved. Performance evaluation is conducted to determine how well the objectives are achieved and what the impacts of the management activity are on both the human and biophysical environment.

The most common evaluative criteria are efficiency, equity and sustainability.

**Efficiency**

There are various measures of efficiency. The first aspect of efficiency is whether fishers have achieved an optimal rate of use of the fishery (Oakerson 1992). A less rigorous criterion is that fishers are not exceeding the sustainable yield of the fishery. A second measure of efficiency has to do with the flow of benefits resulting from the co-management institutional arrangements and the costs (such as transaction costs) of establishing and maintaining such arrangements. Ostrom, Schroeder and Wynne 1993) state, "Economic efficiency is determined by the magnitude of the change in the flow of net benefits with an allocation or reallocation of management resources." A minimal efficiency criterion is that the benefits of operating and maintaining co-management arrangements exceed the full set of direct and indirect costs. A comparative efficiency criterion is that the difference between the benefits and the costs of co-management institutional arrangements in one setting is the same as or greater than those of similar arrangements in a similar setting elsewhere (Ostrom 1992) (Table 8).

**Table 8. Efficiency of co-management arrangements**

1. Stakeholders assessment of the return for the time and effort invested by them in the co-management arrangement (in terms of appropriateness of rules and regulations, enforcement of decisions made)

2. Government authorities assessment of the cost-effectiveness of co-management in comparison with previous management arrangements (government expenses for establishing and operating co-management arrangement assessed in relation to the compliance with rules and the need for monitoring and control.

As management processes are established to achieve particular objectives, the cost-effectiveness of the process compared to others has to be evaluated. One of the purported advantages of co-management compared to centralized management is that it will reduce transaction costs - the costs of information gathering and processing, coordination of decision-makers/user groups and regulation enforcement. Some of these costs remain fixed regardless of the management regime, such as information that is required by law. Other transaction costs vary with the quality of data and the process used to make decisions. Hanna (1994) points out that a centralized approach is often associated with low program design costs but high implementation, monitoring and enforcement costs as the management regime may have little legitimacy with user groups. A co-management approach, on the other hand, is associated with high program design costs, as effective participation is time-consuming and therefore costly. However, co-management is likely to lead lower implementation, monitoring and enforcement costs, as legitimacy of the regime is greater (Hanna 1995).

**Equity**

Equity (fair treatment for all people involved in managing, governing and using the resource) has four main components (Hanna 1995):

a) *Representation:* a more equitable management regime should represent the range of interests in the fishery and accommodate the full diversity of those interests.

(b) *Process clarity:* the management process should have a clear purpose and a transparent operation.

(c) *Homogenous expectations:* the extent to which participants have similar expectations concerning the management process and its objectives.

(d) *Distributive effects:* the management process should address the distributional changes embedded in the options under consideration.

Equity can be measured in several ways. First, is the distribution of an individual's return on contributions to the management and governance effort roughly similar to the benefits they receive? Oakerson (1992) states, "The presence of inequities may lead to the collapse of reciprocity, resulting in less efficient use. Equity problems are apt to be aggravated by asymmetries (unequal proportions) among users, which create opportunities for some to benefit at others' expense. This, in turn, can lead to costly conflict where all parties lose." Corruption and abuse of authority may contribute to inequities. A second measure is to determine if there are patterns of redistribution that fishers wish to achieve at this level of institutional arrangements (Table 9).

**Table 9. Equity effects of co-management arrangements**

1. Changes in the representation of the various stakeholders' interests in the decision making process
2. Changes in the transparency and clarity of the decision making process vis-a-vis the stakeholder groups (information systems and procedures established)
3. Convergence of expectations of stakeholders as regards the objectives of fisheries management and the management process
4. Changes in the distribution of the (access to) benefits from the fisheries among stakeholder groups and individuals

**Sustainability**

Sustainability can be divided into stewardship, resilience and governance. *Stewardship*, the tendency for resource users to maintain productivity and ecological characteristics of the resource, is divided into three components: time horizons, monitoring and enforcement. To promote resources stewardship, the management process should expand time horizons beyond the short term. A sense of stewardship will be more likely if the effects of the management regime can be monitored and where necessary, enforcement measures taken (Table 10).

**Table 10. Sustainability effects of co-management arrangements**

1. Changes in attitudes of fishers/stakeholders towards maintaining productivity of fish resources and integrity of ecosystem (changes in time horizons, interest shown in monitoring of stocks and habitats, compliance with rules and regulations and participation in enforcement at the individual level).
2. Changes in governance (compliance at group/community level; changes in conflict resolution, existence of effective measures/procedures for rule enforcement)
3. Ability of co-management arrangement to handle major changes in contextual attributes (e.g. fluctuations in resource base, changes in market structures, new entrants in social system etc.)

*Resilience* is the ability of the management system to absorb and deal with changes and shocks. The three components of resilience are rule flexibility, structural adaptation and market adaptation. Rules should be flexible enough to respond quickly to changing conditions. The management regime should be able to adapt to both changes in the structure of the industry as well as changes in the market (Hanna 1995).

*Governance* includes the level of rule compliance as a major aspect. The willingness of fishers to regularly follow operational-level rules reflects the viability of the rules as coordinating devices. Other measures of governance may include overall reduction in conflict, existence of an effective conflict resolution mechanism, and existence of practical and implementable enforcement procedures.

## 3.2 Characteristics of successful co-management institutional arrangements

The most important research task for an institutional analysis of fisheries co-management is to specify conditions and propositions for successful development of co-management institutions and which arrangements are most favorable for maintaining it. A number of questions need to be answered: Why are some co-management arrangements successful, while others fail? Why do some co-management arrangements endure for long periods of time? How can we improve the success rate for implementation of co-management arrangements?

The success of co-management institutional arrangements may be related to specific contextual variables or attributes, and these may affect the development and maintenance of the arrangements. The research framework provides a means to identify attributes that lead to successful co-management from those which lead to failure. For example, specific biophysical or fisher attributes, such as boundary definitions or fish stock characteristics or social homogeneity of the community, may be critical factors for success of co-management. They may be more critical than the institutional arrangements themselves. By identifying these attributes and then examining their relationship with patterns of interaction and outcomes, it is possible to specify conditions and propositions which can lead to successful development and maintenance of fisheries co-management institutional arrangements.

Over the last decade, research done at different locations around the world has documented many cases of co-management in fisheries and other natural resource systems. From the results, certain conditions are emerging which appear to be central to the chances of developing and sustaining successful co-management institutional arrangements. Ostrom (1990, 1992) and Pinkerton (1989) have made useful contributions to our existing knowledge about key conditions for successful fisheries co-management. These key conditions are discussed in Pomeroy and Williams (1994). These conditions should not be taken as complete as continued

research is needed to reveal more about co-management arrangements and the factors leading to successful performance.

**References and Further Reading**

Acheson, J. M., 1975. The lobster fiefs: economic and ecological effects of territoriality in the Maine lobster industry. *Human Ecology,* 3, pp. 183-207.

Berger, P.L. and B. Berger. 1972. Sociology: A Biographical Approach. New York: Basic Books Inc.

Berkes, F., D. Feeny, B.J. McCay and J.M. Acheson, 1989. The benefits of the commons. *Nature* Vol.340, No.6229.

Bromley, D.W. 1991. Environment and Economy: Property Rights and Public Policy. Blackwell: Cambridge, Massachusetts.

Bromley, D.W. 1991. The Commons, Property and Common-property Regimes. *In* D.W. Bromley (ed) Making the Commons Work. Institute of Contemporary Studies Press: San Francisco.

Commons, J.R. 1968. Legal Foundations of Capitalism. Madison, Wisconsin: University of Wisconsin Press.

Feeny, D., F. Berkes B.J. McCay and J. M. Acheson, 1990. The Tragedy of the Commons: Twenty-Two Years Later. *Human Ecology*, Vol. 18, No. 1

Feeny, D. 1992. Where do we go from here? Implications for the Research Agenda. *In* D.W. Bromley (ed) Making the Commons Work. Institute of Contemporary Studies Press: San Francisco.

Gardner, R. and E. Ostrom. 1991. Rules and Games. Public Choice. 70(2):121-149.

Hanna, S., 1990. The Eighteenth Century English Commons: A Model for Ocean Management. *Ocean and Shoreline Management* 14, pp. 155-172. Elsevier Science Publishers Ltd. UK.

Hanna, S., 1994. Co-management. In Gimbel, K.L., *Limiting Access to Marine Fisheries: Keeping the Focus on Conservation.* Centre for Marine Conservation and World Wildlife Fund US.

Hanna, S., 1995. Industry Participation and Fishery Management Performance. *Presented at the Fifth Conference of the International Association for the Study of Common Property, Bodo, Norway, 24-28 May 1995.* To appear in Ocean and Coastal Management 1995.

Hardin, G. 1968. The Tragedy of the Commons. Science. 162:1243-1248.

Hilton, R.M. 1992. Institutional Incentives for Resource Mobilization: An Analysis of Irrigation Systems in Nepal. Journal of Theoretical Politics 4(3): 283-308.

Kiser, L.L. and E. Ostrom. 1982. The Three Worlds of Action: A Metatheoretical Synthesis of Institutional Approaches. *In* E. Ostrom (ed) Strategies of Political Inquiry. Beverly Hills, California: Sage.

McCay, B. J., 1993. *Management Regimes. Property Rights and The Performance of Natural Resource Systems*. Background Paper prepared for the September 1993 Workshop, The Beijer International Institute of Ecological Economics.

North, D.C. 1990. *Institutions, Institutional Change and Economic* Performance. Cambridge Series of Political Economy of Institutions and Decisions. Cambridge University Press, Cambridge.

Oakerson, R.J. 1992. Analyzing the Commons: A Framework. pp. 41-59. *In* D.W. Bromley, (ed) Making the Commons Work: Theory, Practice and Policy. Institute for Contemporary Studies Press, San Francisco.

Ostrom, E. 1986. A Method of Institutional Analysis. *In* F-X Kaufmann, G. Majone and V. Ostrom (eds). Guidance, Control and Evaluation in the Public Sector. pp. 459-475. Berlin and New York: de Gruyter.

Ostrom, Elinor. 1990. Governing the Commons: the Evolution of Institutions for Collective Action. Cambridge University Press, Cambridge.

Ostrom, E. 1992. Crafting Institutions for Self-governing Irrigation Systems. Institute for Contemporary Studies Press, San Francisco.

Ostrom, E., L. Schroeder and S. Wynne. 1993. Institutional Incentives and Sustainable Development: Infrastructure Policies in Perspective. Westview Press, Boulder, Colorado.

Ostrom, V. D. Feeny and H. Puht (eds) 1993. Rethinking Institutional Analysis and Development: Issues, Alternatives and Choices. 2nd edition, Institute for Contemporary Studies Press, San Francisco.

Ostrom, E., R. Gardner and James Walker. 1994. Rules, Games and Common Pool Resources. University of Michigan Press, Ann Arbor.

Ostrom, E. 1994. Self-organising Resources Regimes: a Brief Report on a Decade of Policy Analysis. *In* The Common Property Resource Digest No. 31, October pp. 14-19.

Ostrom, E. 1994. Neither Market Nor State: Governance of Common-pool Resources in the Twenty-first Century. Lecture presented at the International Food Policy Research Institute, Washington D.C.

Pinkerton, E. (ed) 1989. Cooperative Management of Local Fisheries. Vancouver, University of British Columbia Press.

Pomeroy, R.S. and M.J. Williams. 1994. Fisheries Co-Management and Small-Scale Fisheries: a Policy Brief. ICLARM: Manila.

Powell, W.W. and P. J. Di Maggio (eds.). 1991. The New Institutionalism in Organizational Analysis. Chicago: University of Chicago Press.

Runge, C.F. 1992. Common Property and Collective Action in Economic Development. *In* D.W. Bromley (ed) Making the Commons Work. Institute of Contemporary Studies Press: San Francisco.

Sanderson, H.T. 1996. Maybe we can't cooperate: Institutional and cultural barriers in the development of co-management in Eastern Caribbean fisheries. Unpublished paper. Nordland Research Institute, Bodo, Norway.

Schlager, E. 1990. Model Specification and Policy Analysis: the Governance of Coastal Fisheries. Workshop in Political Theory and Policy Analysis. Indiana University, Bloomington, Indiana. Unpublished Ph.D. thesis.

Schlager, E. and E. Ostrom. 1993. Property Rights Regimes and Coastal Fisheries: an Empirical Analysis. pp. 13-41. *In* T.L. Anderson and R.T. Simmons (eds). The Political Economy of Customs and Culture: Informal Solutions to the Commons Problem. Rowan and Littlefield publishers, Lanham, Maryland.

Scott, W.R. 1995. Institutions and Organizations: Foundations for Organizational Science. Sage Publications, Thousand Oaks, CA.

Tang, Shui Yan. 1992. Institutions and Collective Action Self-governance in Irrigation. Institute for Contemporary Studies Press, San Francisco.

Thomson, James T. 1992. A Framework for Analyzing Institutional Incentives in Community Forestry. Community Forestry Note 10. FAO, Rome.

Williamson, O.E. 1985. The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting.

## Chapter Three
## Fisheries Co-management and Small-Scale Fisheries[2]

Global-scale changes in the supply, demand, value, management and uses of fisheries resources could threaten progress towards sustainable food security in many parts of the developing world, but they could also stimulate improved management and use of the resources. In many developing countries, population pressure and limited alternative employment opportunities, together with the inability and reluctance of governments to take the necessary conservation and management decisions, have resulted in severely overfished coastal and inland resources and increased threats to the livelihoods of fishers. A decrease in global fish production in the early 1990's brought about by overfishing and environmental degradation (pollution, habitat loss, coastal development) generated calls for improved management strategies and sustainable use of aquatic resource systems. Decision-makers and resource managers are searching for better ways of managing all fisheries, including the small-scale fisheries.

This chapter addresses some of the issues and options available to decision-makers and resource managers for fisheries management. It is argued that recent lessons point to potential benefits in some fisheries from management partnerships between the government, fishers and other stakeholders – fisheries co-management. The trend to greater formal involvement of users in management of resources was recognized in many chapters of the UNCED Agenda 21 declaration and are enshrined in such international instruments as the International Convention on Biological Diversity ratified in 1993. It is cautioned, however, that co-management is not a universal panacea and more experience and research is needed to learn about the conditions leading to successful fisheries co-management.

Despite intense fishing pressure and a decline in productivity due to habitat degradation and loss in many developing countries, small-scale fisheries in the inland, estuarine and near-shore areas still play an important role in local food security by providing food, income and employment. In most societies, the small-scale fishers suffer the greatest deprivations of scarcity as they have low social status, low incomes, poor living conditions and little political influence. They frequently compete for resource access with larger-scale fishers and other sectors of the economy. Small-scale fisheries are embedded in larger aquatic resource, social, economic and political systems and many of the solutions to improving standard of living lie outside the fisheries sector. The resources on which these people depend are still largely natural fish populations. Harvesting of these resources has expanded over the last four decades but has now reached its upper limits and is even declining in many cases.

It is estimated that at least 50 million people in developing countries are directly involved in the harvesting, processing and marketing of fish and other aquatic products and fish production provides some 150 million people overall with employment. Approximately 1 billion people rely on fish as a major source of their food, income and/or livelihood (ICLARM 1999). The combined effects of increasing population growth and stabilization of fish supplies has led to a decline in the per capita availability of fish supplies for human

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consumption, while prices have continued to rise due to a widening gap between supply and demand. Capture fish production has not been able to keep pace with the demand for fish. Production of fish by capture fisheries reached its upper limits in 1989 and began a decline.

The United Nations Food and Agriculture Organization estimates that almost 70 percent of fish stocks for which data are available are fully exploited, overfished, or otherwise in urgent need of management (Garcia and Newton 1994). The world fishing fleet reflects an overcapacity of about 30-40 percent. Fish discards represent a biological waste of 25 percent of total catch. Looming shortfalls have been compensated, though not adequately, by better than expected increases in aquaculture production, which now contributes roughly 20 percent of the total world production of fish.

Approximately 70 percent of the world production of food fish is now caught or produced in developing countries. The per caput consumption in the developing countries (9 kg) is about one-third of that in the developed countries (27 kg). The developed countries are net importers of food fish. Approximately 40 percent of the world's fish production is traded internationally (ICLARM 1999). Increasing international trade in fishery products is raising questions about the supply of food fish for poorer people in developing countries.

Present exploitation patterns of natural stocks are unsustainable. Based on present indications, production from natural stocks will likely be below current levels in the year 2020; at best they will maintain their present levels. To prevent further overexploitation of fisheries resources for those who depend on them, there is an imperative for better management. Many present fisheries resource management arrangements have failed to coordinate and restrain the many users. They have not kept pace with the technological ability to exploit the resource or with the driving incentives to exploit - economic returns, population growth, food, and employment. Management systems have focused on fisheries development and resource management but have failed to address the issues of econmic efficiency, equity and user conflict (Williams 1996). Increasing competition for and conflict over scarce resources will further stress fisheries management systems.

The approaches for management and governance of fisheries resources are undergoing a significant transition. There is a shift toward conservation and ecosystem- based management from traditional production and stock- and species-based management. Governance of fisheries is shifting toward privatization and rights-based management. Community-based management and co-management are in some cases replacing open-access and centralized government management. It is increasingly recognized that resources can be better managed when fishers and other stakeholders are more involved in management of the resources and use rights are allocated - either individually or collectively - to control access. Devolution of management authority and responsibility is bringing about shifts in local power elites and structures. These new approaches will require changes in the administrative levels of management and new laws and policies in support of the new management arrangements.

## The Search for Better Management Methods

The last 50 years has seen shifting philosophies in the fisheries development process. The period after World War II was one of reconstruction of the world's fishing fleets. The 1960s was a period of expansion with the

opening up of new fishing grounds, new technologies and long-range fleets. The 1970s were a period of continued growth in fishing but also increasing recognition of the overfishing problem and the need for equity. In the early 1980s, the United Nations Conference on the Law of the Sea brought about expansion of exclusive economic zones (EEZ) by coastal countries. Expanded EEZs caused a redistribution of access to ocean resources and use-rights and improved management. Throughout the 1980s and early 1990s there was growing concern globally about resource overexploitation and environmental degradation, threats to biodiversity, and a call for sustainable development. The 1990s has brought several international initiatives including the UN Conference on Environment and Development, the International Convention of Biological Diversity, and the Code of Conduct for Responsible Fisheries which have challenged countries to encompass sustainable utilization of fisheries resources (Garcia 1994). The enhancement of participation of resource users from mere consultation and top-down information to participatory decision making and interactive management is a central element of these initiatives.

The changing philosophies of the fisheries development process are reflected in changing approaches to fisheries resource management. A brief history of tropical fisheries management is warranted. Traditional and customary fisheries management regimes were in place in most countries before colonialism. Some coastal societies, especially in the Asia-Pacific region, had sophisticated traditions and customs and sea tenure systems to encourage conservation (Ruddle et al. 1992). Other areas were simply managed by default, since small populations did not cause overexploitation of marine resources (Johannes 1982).

Following colonialism, governance of coastal and marine resources was transferred from communities to local and national government bodies (Pomeroy 1995). In most colonies, centralized management agencies were established that controlled the level of exploitation, modernized fishing methods, and ensured exports back to the colonial country. The centralized approaches to management that began centuries ago in some country's, have continued under the neo-colonial regimes of newly independent nations as they consolidate power. By appropriating control over fisheries management, the national government has often underestimated the capacities of coastal communities, learned through often long and difficult experience, to manage local fisheries resource systems to meet their needs. In many instances, the national government has overestimated its ability to manage these same resources. When community-level institutional arrangements for coastal fisheries management are undermined, the usual common-property resource management regimes have been replaced, in many cases, by open access regimes.

Among Western-trained fisheries managers, the management of fisheries resources has been based on the conventional wisdom that it is possible to manage fisheries successfully if three facts are kept in mind: (1) when left to their own devices, fishers will overexploit stocks; (2) those stocks are extremely unpredictable; and (3) to avoid disaster, managers must have effective hegemony over them (Berkes 1994). The centralized management approach has been dominated by the assumption that any fishery must be characterized by intense competition, which will eventually lead to overexploitation and the eventual dissipation of resource rents, the so-called "tragedy of the commons". It also relies almost exclusively on scientific information and methods over traditional and customary knowledge and management systems. This has led managers in the direction of tighter government controls over fisheries. These controls have become, over time, both complicated and costly.

Centralized management has been widely criticized as a primary reason for the overexploitation of fisheries

resources, although in reality the fishers should share the blame with the mangers and scientists. Professionals have replaced the resource users as resource managers. The fishers have done little to monitor and enforce themselves. The centralized management approach involves little effective consultation with the resource users and is often not suited to developing countries with limited financial means and expertise to manage fisheries resources in widely dispersed fishing grounds.

In the last decade, following concern for fisheries overexploitation and environmental degradation, there have been changes in the objectives and policies of fishery management systems. The objectives have shifted from maximizing annual catches and employment to sustaining stocks and ecosystems, and from maximizing short-term interests to addressing both short- and long-term interests. Policy changes have shifted from open and free access, sectoral fishery policy, command and control instruments, and top-down and risk prone approaches to limited entry, user rights and user fees, coastal zone intersectoral policy, command and control and macro-economic instruments, and participatory and precautionary approaches (Garcia 1994).

The command and control system (the use of various harvest control regulations), which has been used to manage fisheries, is seen by many to be outdated and inadequate for the increasing problems in the fishery. In response to the failures of current fisheries management approaches, fishers and policymakers are developing a variety of alternative approaches to fill the management gap.

These alternative approaches are meant to deal with the "perverse economic incentive system" which arises largely from the fact that capture fisheries resources are characterized by ill-defined resource property rights (Munro, Bingham and Pikitch 1998).

From an economic perspective, the causes of overfishing are generally found in the absence of property rights or other institutions that might otherwise provide exclusive control over harvesting and, as a result, an incentive to conserve. These alternative approaches range from community-based management and co-management, meant to address the lack of participation and conflicts that were the legacy of centralized management, to rights-based management and limited or controlled access techniques, which are meant to reduce excess competition and investment and provide an incentive for greater economic efficiency.

It is interesting to note that while fisheries managers, until recently, had been tightening government controls, those in other fields of resource management had been moving in the direction of devolution, deregulation, decentralization and co-management (Berkes 1994). This slowness in moving in new directions in the fisheries case may be due in part to the complexity of natural and human ecosystems that exist in marine and coastal environments.

Fisheries management experts increasingly recognize that the underlying causes of fisheries resource overexploitation and environmental degradation are often of social, economic, institutional and/or political origins. The primary concern of fisheries management, therefore, should address the relationship of fisheries resources to human welfare; and the conservation of the resources for use by future generations. That is, the main focus of fisheries management should be people, not fish, *per se*. Policy interventions, if they are to bring about lasting solutions, must address these concerns.

Fisheries managers and researchers have also begun to recognize that a fishery cannot be effectively

managed without the cooperation of fishers and other stakeholders to make laws and regulations work. Fisheries management abounds with laws, rules and regulations in most countries; many of them are quite specific and well intentioned. However, the effective capacity of many fisheries agencies to regulate what goes on in widely scattered, often isolated fishing grounds, is distinctly limited. Without denying that the traditional community-based systems of fisheries management can often be inequitable and ineffective, state interventions that have chosen to ignore them have seldom fared better. National governments have, for the most part, failed to develop an adequate substitute for or complement to these traditional resource management systems. The promotion of nationalization and privatization as routine policy solutions has not solved the problem of resource overexploitation and, in many instances, has deprived large portions of the population of their livelihood (Bromley and Cernea 1989). Under these conditions, the devolution of fisheries management and allocation decisions to the local fisher and community level may be more effective than the management efforts which distant, understaffed and under-funded national government fisheries agencies can provide.

The conventional wisdom that fisheries resources which are held as communal property are subject to eventual overexploitation and degradation and that centralized management authority is needed to manage resources is not unequivocal and is challenged by a number of empirical studies. Traditional community-based management systems have an important role to play in the management of coastal fisheries. Recent investigations on community-based fisheries management systems have shown that when left to their own devices, communities of fishers, under certain conditions, may use fisheries resources sustainably, efficiently and equitably.

Fishers, the real day-to-day managers, must be equal and active participants in resource management. An open dialogue must be maintained between all the stakeholders in resource management. Property rights to the resource must be assigned directly to its stakeholders - the coastal communities and resource users. The "community" must be reinvigorated through a multi-sector, integrated approach to both resource management, and social, community and economic development. A new management philosophy is warranted in which the fisher can once again become an active member of the resource management team, balancing rights and responsibilities, and working in a cooperative (rather than antagonistic) mode with the government. Such cooperative or joint management, or co-management, is a rational extension of evolutionary trends in fisheries management over the past decades.

## Managing the Commons

Many authors agree that the analysis of co-management falls in the area of common property theory. The "commons" include natural resources, such as fisheries, wildlife, forests, irrigation waters and pasture lands, which by their physical nature are not owned by individuals but are shared by a community of producers (e.g. fishers) and consumers. "Common property resources" share two important characteristics. The first is excludability or the control of access to the resource. The physical nature of the resource is such that controlling access by potential users is a problem and may be costly. For example, migratory fish species present problems for regulating access to fishing. The second characteristic is subtractability; that is, the fish harvesting activities of one fisher subtracts from or lowers the catch per unit of fishing effort of other fishers. These two characteristics often create a divergence between individual and collective economic rationality

which, unless mitigated, leads to a "tragedy of the commons", a situation that typically occurs in the absence of property rights to the resource.

Solutions to the commons problem necessarily involve some form of access control and some form of institutional design to regulate use and to minimize the subtractability problem. The literature on common property regimes recognizes that solutions exist through three basic kinds of property rights regimes: 1) state property or state governance indicates that rights to the resource are controlled exclusively by the government agencies on behalf of all the citizens; 2) communal property or common property means that the resource is held by an identifiable community of users who can exclude others and regulate their own use; and 3) private property refers to a situation in which an individual or a corporate body has the right to exclude others and regulate the use of the resource.

The term "common property regime" is used to describe the system of property rights and rules under which the common property resources may be managed. Common property regimes aim to provide assurance that the resources on which all persons collectively depend will be available sustainably. In many parts of the world, rights to common property resources are all that separate the poor from destitution. Thus, development planners must eventually deal with the issue of institutional arrangements for property rights and rules over natural resources.

The "commons" has come to connote inevitable resource degradation. Many accepted that fishery resources which are held in common are often subject to overexploitation and degradation. They incorrectly identified all common property resources as being those in which entry into the fishery is uncontrolled, with no effective boundaries around the resource, an absence of property rights to the resource, and no restrictions on how the resource is to be exploited. This situation is more correctly classed as an open access fishery. This popular notion of the nature of common property resources is misleading and has led to inappropriate policy recommendations and project implementation in the fisheries sector. Policy recommendations have often focused on how to create individual property rights rather than on how to limit access. Common property management where joint rights exist is a legitimate form of management and can be successful if access is controlled. Many government management arrangements failed to conceive of or recognize the existence of local community-based fisheries management institutions that could effectively manage common property fisheries resources.

Common property regimes are forms of management grounded in a set of individually accepted rights and rules for the sustainable and interdependent use of collective goods; that is, a resource that is managed and controlled by a group. Such a regime is composed of a recognized group of users, a well-defined resource boundary that the group uses and manages, and a set of institutional arrangements (rights and rules) for the use of the resource. Common property represents private property for the group of co-users. These regimes have been shown to develop when a group is highly dependent on a resource and when availability of the resource is uncertain or limited. If resource availability problems are repeatedly experienced, such as low or no catches, and if a single community of users controls it, the fishers are likely to develop collective arrangements to deal with the problem.

The principal problem faced by group members of a common property regime is how to organize themselves. That is, how to change from a situation of independent action to one of collective action and coordinated

strategies to obtain greater joint benefits and reduce joint harm. A sense of commonality , commitment and compliance must be established for the collective good. Problems of the allocation of catch and assigning duties for resource use must be overcome.

Common property regimes can be very effective at controlling access to the resource. Most common property regimes are based upon the exclusion of certain potential users. The entire community, sensing security of tenure and enjoying.some of the benefits from access control, will actively take responsibility for monitoring and enforcement.

The establishment of common property regimes is a complex process that cannot be done solely by administrative decree. It must take into account general factors and their local context such as the nature of the resource, the characteristics of the users of and stakeholders in the resource, the characteristics of the legal, political and institutional environment in which the users reside, and external economic forces which shape resource use.

## Fisheries Co-management

Common property theory offers some insights into how fisheries might be better managed but, except in isolated cases, it cannot offer a complete solution since the theoretically ideal situation for common property management is not obtained and fishers therefore cannot manage fisheries entirely by themselves.

In the wake of the often ineffective historical record of centralized fisheries management, there is a need for the structure of governance to be changed. What is needed now is a more dynamic partnership using the capacities and interests of the local fishers and community, complemented by the ability of the state to provide enabling legislation, enforcement and other assistance. This approach to fisheries management will require a shift away from a centralized, top-down form of management to a new strategy in which fisheries managers and the fishers jointly manage the fisheries - "co-management" (Jentoft 1989; Pinkerton 1989; Berkes, George and Preston 1991; Berkes 1994) . Co-management includes shared governance structures between stakeholders in the resource and institutions of local collective governance of common property.

Fisheries co-management can be defined as a partnership arrangement in which government, the community of local resource users (fishers), external agents (non-governmental organizations, academic and research institutions), and other fisheries and coastal resource stakeholders (boat owners, fish traders, money lenders, tourism establishments, etc.) share the responsibility and authority for decision making over the management of a fishery (Figure 2). The partners develop an agreement that specifies their roles, responsibilities and rights in management. Co-management covers various partnership arrangements and degrees of power sharing and integration of local (informal, traditional, customary) and centralized government management systems. There is a hierarchy of co-management arrangements (Figure 3) from those in which the fishers are consulted by the government before regulations are introduced to those in which the fishers design, implement and enforce laws and regulations with advice from the government (Sen and Raakjaer-Nielsen 1996). It is generally acknowledged that not all responsibility and authority should be vested to the local level. The amount of responsibility and/or authority that the state-level and various local levels have will differ and depend upon country and site-specific conditions. Determining what kind and how much responsibility and/or authority should be allocated to the local levels is a political decision.

Figure 2. Fisheries Co-Management is a Partnership

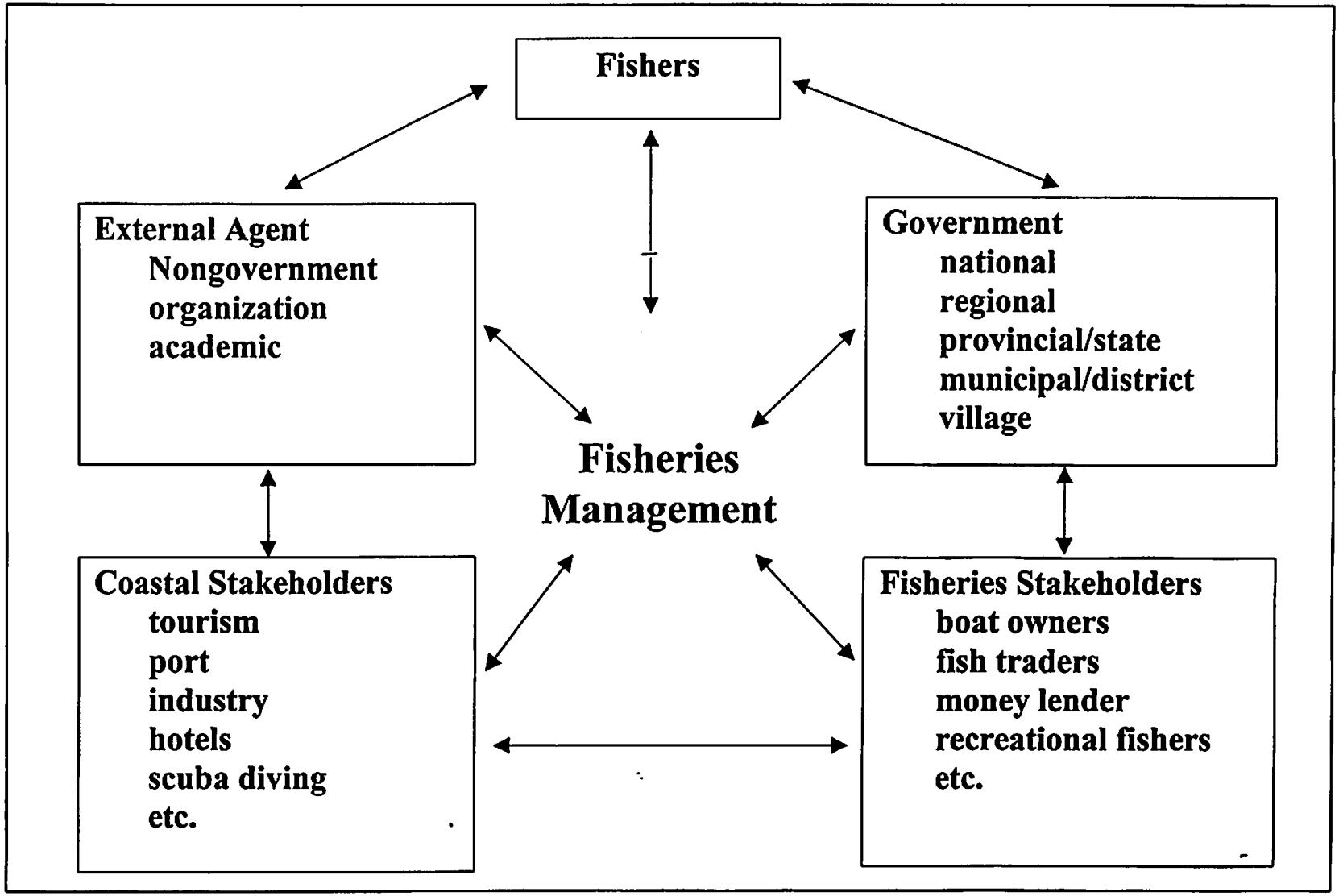
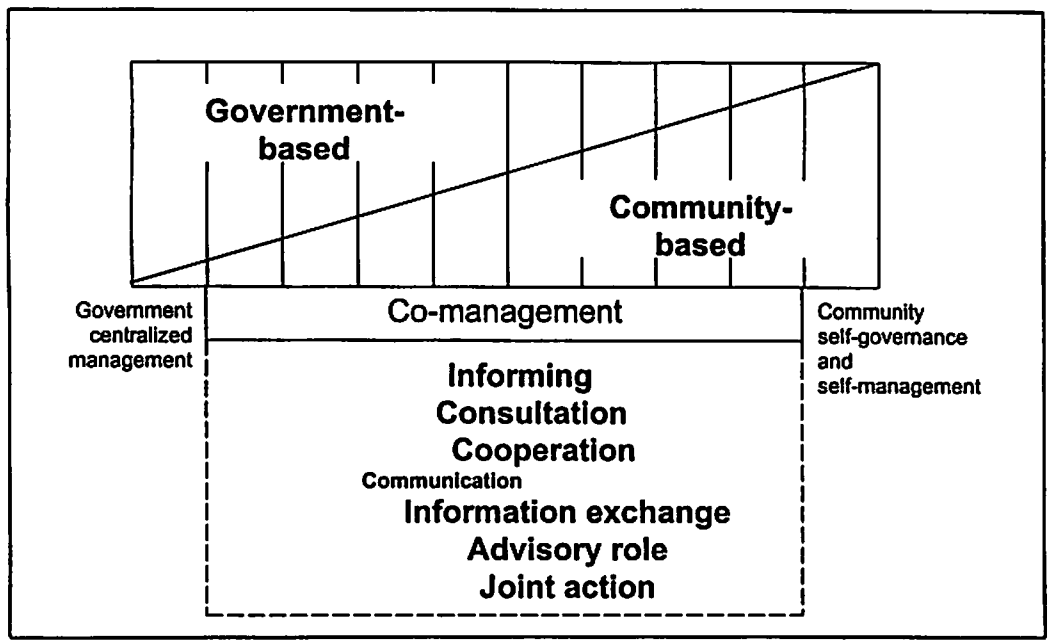


Figure 3. A hierarchy of co-management arrangements (after Berkers 1994).



Given the different conditions, processes, needs and demands within the small-scale fisheries sector, there is no simple management solution appropriate for every community, region or nation. There is no blue print formula for co-management but rather a variety of arrangements from which to choose to suit a specific context. Co-management should not be viewed as a single strategy to solve all the problems of fisheries management. Instead, it should be seen as a process of resource management, adjusting and maturing to changing conditions over time and involving aspects of democratization, social empowerment, power sharing and decentralization. Co-management is not a regulatory technique but should be seen as a participatory and flexible management strategy in which a forum or structure for action on participation, rule making, conflict management, power sharing, leadership, dialogue, decision-making, knowledge generation and sharing, learning, and development among resource users, stakeholders and government is provided and maintained. Co-management is consensus driven. Partnerships are pursued, strengthened and redefined at different times in the co-management process depending on the existing policy and legal environment, the political support of government for community-based actions and initiatives, and the capacities of community organizations to become government partners. The co-management process may include formal and/or informal organizations of resource users and stakeholders. The establishment and successful operation of fisheries co-management can be a complex, costly and multiyear effort (Rivera 1997, Pomeroy et al. 1999).

Co-management involves various degrees of delegation of management responsibility and authority between the local-level (resource user, stakeholder, community) and the state-level (national, provincial, municipal, village government). Co-management is a middle course between state-level concerns in fisheries management for efficiency and equity, and local-level concerns for self-governance, self-regulation and active participation. Co-management involves a formal or informal agreement with government to share power and to share the right to manage. Co-management can serve as a mechanism for not only fisheries management, but for community, economic and social development by promoting participation of fishers and the community in actively solving problems and addressing needs.

Other than fishers, stakeholders that derive economic benefit from the resource (e.g., boat owners, fish traders, business suppliers, police, politicians, consumers) will also need to be considered in the co-management arrangements. These stakeholders often hold considerable political influence in the resource management regime. A proper balance of representation among the stakeholders will prove crucial to the success of co-management.

In some cases, co-management may be simply a formal recognition of a system of fisheries management that already exists. Informal and customary community-based management strategies already exist side-by-side with formal state-level management strategies.

Co-management seeks equity in fisheries management. Co-management strives for more active fisher participation in the planning and implementation of fisheries management. Responsibility means fishers have a share in the decision making process and bear the costs of getting the benefits of those decisions. The theme of co-management is that self-involvement in the management of the resource will lead to a stronger commitment to comply with the management strategy and sustainable resource use. It is felt that the mutuality of interests and the sharing of responsibility among and between the partners will help to narrow the distance between resource managers and resource users and bring about closer compatibility of the

objectives of management.

Co-management also provides for local collective governance of common property. Capture fisheries resources are common property (pool) resources. As a class, they have two characteristics that distinguish them from other kinds of resources: (a) the difficulty of exclusion, that is control of access to the resource; and (b) subtractability, that is, the capability of each user of subtracting from the welfare of others. Solutions to the commons problem necessarily involve some form of access control and some forms of institutional design (rules) to regulate use and to minimize the problem of subtractability. The creation of property rights means that both the costs and benefits of any management action will be borne by the same individual or group, providing incentives to conserve. If it is not possible to vest property rights to capture fisheries resources on an individual by individual basis, it is possible to establish common property regimes and to vest property rights in a specific group of people on a collective basis.

As Jentoft (1989) put it, "how then is co-management to be distinguished from other common property management systems, such as government regulation or community-initiated regulation?". The answer is that co-management is a governance arrangement between pure state property and pure communal property regimes. The four property rights regimes (state property, communal property, private property and open access) are ideal, analytical types; they do not exist in the real world. Rather, resources tend to be held in overlapping combinations of these four regimes. Strictly speaking, pure communal property systems are always embedded in state property systems and state law and derive their strength them. It should be noted that while state law can enforce or strengthen communal property, it may not always do so. The level of support will depend upon the state's willingness to support communal property systems.

Community-based resource management (CBRM) is a central element of co-management. The advantages of CBRM systems have been well documented in various parts of the world. The better known of these initiatives has been in irrigation and social forestry but similar approaches are being applied in upland agriculture and wildlife management. Community-based fisheries management (CBFM) tends to be more difficult due to the complexity of fisheries and aquatic resource systems, the social and cultural structures of fishing communities, and the independent nature of fishers.

There is some debate, however, over the similarities and differences between co-management and CBRM. While there are many similarities between the concepts of co-management and CBRM, there are differences in the focus of each strategy. These differences center on the level of participation of government and when the government becomes involved in the process. CBRM is people-centered and community-focused, while co-management focuses not only on these issues but also on a partnership arrangement between government and the local community and resource users. There is also a difference in the way the process of resource management is organized, with co-management having a broader scope and scale than CBRM. The government most often plays a minor role in CBRM. Co-management, on the other hand, has a major and active role for government. Government serves a number of important functions including provision of supporting policies and legislation such as decentralization of management power and authority, the fostering of participation and dialogue, legitimization of community rights, initiatives and interventions, enforcement, addressing problems beyond the scope of the community, coordination at various levels, and financial and technical assistance, among others. Government provides legitimacy and accountability to CBRM through co-management. Government must establish commensurate rights and conditions and devolve some of their

own powers for both co-management and CBRM to be effective resource management strategies. Only government can legally establish and defend user rights and security of tenure at the community level. Co-management often addresses issues beyond the community level, at regional and national levels, and of multiple stakeholders, and allows these issues, as they affect the community, to be brought more effectively into the domain of the community. CBRM practitioners sometimes view government in an external role that is only brought into the project at a later stage or as needed. This often leads to misunderstandings and lack of full support from government. Co-management strategies involve government agencies and resource managers early and equally with the community and stakeholders in resource management, developing a trust between the participants.

Based on the above discussion on co-management and CBRM and on the literature on co-management, it is possible to develop several categories of co-management. Three categories of co-management can distinguished: (1) community-based co-management, (2) user-participation co-management, and (3) traditional or customary co-management.

When CBRM is considered an integral part of co-management, it can be called community-based co-management. Community-based co-management includes both the characteristics of CBRM and co-management, i.e., people-centered, community-oriented, resource-based, and partnership-based. Thus community-based co-management has the community as its focus, but recognizes that to sustain such action, a horizontal and vertical link is necessary. Successful co-management and meaningful partnerships can only occur when the community is empowered and organized. This category of co-management will be more complex, costly and time-consuming to implement than just CBRM due to the need to develop partnerships early in the process and to maintain them over time. Examples of community-based co-management can be seen in countries all over the world including Asia (Pomeroy and Pido 1995, Pomeroy 1995), Africa (Normann et al 1998) and the Caribbean (Brown and Pomeroy 1999). Community-based co-management seems to be more common in developing countries due to the need for overall community and economic development and social empowerment and not just resource management.

User participation co-management can best be characterized as government-industry interaction through involvement of user groups in making resource management decisions. The focus of this category of co-management is representation of fishers and other stakeholders through various organizational arrangements in management. Unlike community-based co-management, there is little or no attention given to broader issues of community development and social empowerment of fishers. Examples of user participation co-management can be seen in many developed countries in Europe and North America (Jentoft and McCay 1995, Nielsen and Vedsmand 1995, Hanna 1996, McCay and Jentoft 1996). User participation co-management seems to be more common in developed countries where the emphasis is to get the resource users participating in the resource management process.

Traditional and customary community-based management systems are or were utilized to mange coastal fisheries in various countries around the world. Existing examples in Asia and the Pacific have been documented over a wide discontinuous geographical range (Ruddle 1994). Many of these systems play a valuable role in fisheries management and have a future usefulness both locally and nationally. Ruddle (1994) points out that,

In many locations, legal issues are among the principal constraints on the viability or future usefulness of traditional marine management systems. Thus, if the contemporary usefulness of such systems has been formally recognized by government, they will require support by appropriate amendments to national laws, and lower order governments, such as provinces/states, with the explicit and easily-understood recognition of customary law and community-based management rights as local corporate entities, accompanied by procedures for establishing the recognition of these rights.

Co-management can serve as a mechanism to legally recognize and protect these traditional and customary systems and to specify authority and responsibility between the community and government. Thus, traditional or customary co-management is a formal and legal recognition by government of these local systems and a definition of shared powers and authority.

The potential advantages of co-management include efficiency and equity. Co-management can be more economical in terms of administration and enforcement than centralized systems. It involves self-management where the fishers take responsibility for a number of managerial functions. Co-management allows the community to develop a management strategy which meets its own particular needs and conditions, is more flexible and creative, and is more legitimate in their eyes. Co-management is adaptive, allowing for adjustments in activities in line with the results obtained and lessons learned. Community members understand their problems, needs and opportunities better than outsiders do. Fishers or local communities are able to devise and administer regulatory instruments that are more appropriate to local conditions than externally imposed regulations. Management is accountable to local areas not just to larger regions. By providing the fishers with a sense of ownership over the resource it gives them a powerful incentive not to heavily discount future returns from the fishery resource and thus to view the resource as a long term asset. Fishers are given an incentive to respect and support the rules because they complement cultural values, are self-imposed, and because they are seen as individually and mutually beneficial. Since the community is involved in the formulation and implementation of management measures, a higher degree of acceptability and compliance can be expected. Community members can enforce standards of behavior more effectively than bureaucracies can. Co-management makes maximum use of indigenous knowledge and expertise to provide information on the resource base and to complement scientific information for management. Its strategies can minimize social conflict and maintain or improve social cohesion in the community. Empowerment, through information, training and education, allows the fishers to share power with political and economic elite's and government.

Co-management may not be suitable for every fishing community. Many communities may not be willing to or capable of taking on the responsibility of co-management. A long history of dependency on government may take years to reverse. Leadership may not be available within the community to initiate or sustain the co-management efforts. For many individuals and communities, the incentive(s) - economic, social and/or political - to engage in co-management may not be present. The risk involved in changing fisheries management strategies may be too high for some communities and fishers. The costs for individuals to participate in co-management strategies (time, money) may outweigh the expected benefits. Sufficient political will may not exist among the local resource stakeholders or in the government to actually manage the fisheries in a responsible and sustainable manner. Actions by user groups outside the immediate community may undermine or destroy the management activities

undertaken by the community. Particular resource characteristics, such as fish migratory patterns, of the area may not make it possible for the community to manage the resource. There is no guarantee that the local community will organize itself into an effective governing institution.
In addition, the need to develop a consensus from a wide range of interests may lengthen the decision-making process and result in weaker, compromise measures. Co-management may result in shifts in power bases that may not be in the best interests of all partners. Co-management may result in increase in bureaucracy and regulation.

At the heart of co-management is a formal agreement between the partners. The agreement specifies the objectives, the partners to the agreement, and the rights and responsibilities of the partners. There is usually a management body that represents the partners and has joint authority.

The delegation of significant authority to manage the fisheries may be one of the most difficult tasks in establishing co-management systems. While governments may be willing to call for more community involvement, they must also establish commensurate rights and authorities and devolve some of their own powers (see Chapter Five). Fisheries administrators may be reluctant to relinquish their authority or parts of it. They may fear infringement by local fishers and their representatives upon what they consider their professional and scientific turf. In all cases of co-management, while responsibility is shared, the government holds the ultimate authority.

One fundamental debate in co-management is whether resource users can be entrusted to manage their resources (Berkes 1989). Unless governments and decision-makers that implement government policies can be convinced of the desire and the ability of users to manage themselves, not much progress can be made in co-management. As already stated above, government resource managers are often reluctant to share authority. However, it would be a mistake to interpret this solely as a self-serving motive to hang onto political power. Many managers have well considered reasons to be skeptical about local-level management. To convince managers that local-level management is possible, part of the responsibility falls on the resource users themselves. The ability for self-management, in turn, partially depends on the ability of the local community to control the resource in question.

Managers' reasons for skepticism include the lack of appropriate knowledge and know-how on the part of the fishers, and the ability of fishers to organize themselves to manage for long-term sustainability. Each of these points opens up its own debate. Even in countries with high standards of education, it is true that fishers tend to have lower levels of formal education than the general population. But the relevant knowledge of the fishers is not the same as formal education. It is well known that the knowledge held by fishers in many areas of the world, especially in traditional societies in which such knowledge accumulates by cultural transmission, may be extremely detailed and relevant for resource management (Johannes 1981; Freeman et al. 1991; Berkes et al. 1995). Indeed, it is the complementarity between such local knowledge and scientific knowledge that makes co-management stronger than either community-based management or government management.

Fishers' ability to organize for collective action has a number of prerequisites, essentially involving the question of local institutions, defined here as the set of rules actually used (rules-in-use) by a group of individuals to organize their activities (Ostrom 1990; North 1990). Not all groups of fishers have

appropriate local institutions; in such cases, any co-management initiative will necessarily start with institution-building. But institution-building is a long-term and costly process. Community organizing can take from three to five years before a self-sufficient organization is in place, on the basis of cases in the Philippines (Carlos and Pomeroy 1996), and five to ten years on the basis of a case in St. Lucia, West Indies (Smith and Berkes 1993). In the coastal fishery of Alanya on the Mediterranean coast of Turkey, locally designed rules for resource allocation and conflict reduction, by means of rotating and taking turns at fishing sites, developed over a period of ten to fifteen years in the absence of government support or any other intervention for institution-building (Berkes 1986).

Such experiences indicate that there often is a readiness and willingness on behalf of some groups of resource users to take responsibility for management. Thus, a key question for co-management is what management functions are best handled at the local or communal level, as opposed to the national government level. Pinkerton (1989) identified seven resource management functions that may be enhanced by the joint action of users and government resource managers at the local level: (1) data gathering, (2) logistical decisions such as who can harvest and when, (3) allocation decisions, (4) protection of resource from environmental damage, (5) enforcement of regulations, (6) enhancement of long-term planning, and (7) more inclusive decision-making. No single formula exists to implement a co-management arrangement to cover these functions. The answer depends on country-specific and site-specific conditions, and is ultimately a political decision.

The benefits sought by all actors in co-management are more appropriate, more efficient, and more equitable management. These benefits become concrete when considered in association with the following processes and goals: (1) co-management for community-based economic and social development, (2) co-management to decentralize resource management decisions, and (3) co-management as a mechanism for reducing conflict through a process of participatory democracy. Resource users have the benefit of participating in management decisions that affect their welfare; government has the benefit of reduced challenge to its authority (Pinkerton 1989; Jentoft 1989).

The issues are not easily resolved. Each policy bearing on co-management is embedded in a broader network of laws, policies and administrative procedures, at both national and local government level, and consequently will be difficult to change. The role of the government in co-management is to provide enabling legislation to facilitate and support the right to organize and make fisheries management arrangements at the local level, address problems beyond the scope of local arrangements, and provide assistance and services to support the maintenance of local arrangements. Government administrative and fisheries laws and policies will, in most cases, require restructuring to support decentralization and co-management. The actual form of co-management will depend upon the form of government and the political will for decentralization. Co-management cannot succeed in the absence of a favorable policy context.

## Key Conditions for Successful Fisheries Co-management

Over the last decade, research done at different locations around the world has documented many cases of co-management and community-based management in fisheries and other natural resource systems. From the results, certain conditions are emerging which appear to be central to the chances of developing

and sustaining successful co-management arrangements. These conditions should not be taken as complete as research is continuing to reveal more about the systems and the factors for successful performance. Indeed, more research is required to establish evaluative criteria for such outcomes as sustainability, equity and efficiency of fisheries co-management systems. Among the emerging conditions for successful co-management is that the more of these key conditions that exist in a particular situation or system, the greater the chance for successful co-management. (See Chapter 10 for further discussion of the key conditions).

The key conditions are (Ostrom 1990, 1992; Pinkerton 1989):

1. Clearly defined boundaries: The physical boundaries of the area to be managed should be distinct so that the fishers group can have accurate knowledge of them. The boundaries of the area to be managed should be based on an ecosystem that fishers can easily observe and understand. It should also be of a size that allows for management with available technology i.e., transportation and communication.

2. Membership is clearly defined: The individual fishers or households with rights to fish in the bounded fishing area and participate in area management should be clearly defined. The number of fishers or households should not be too large so as s to restrict effective communication and decision-making.

3. Group cohesion: The fisher group or organization permanently resides near the area to be managed. There is a high degree of homogeneity, in terms of kinship, ethnicity, religion or fishing gear type, among the group. Local ideology, customs and belief systems create a willingness to deal with collective problems. There is a common understanding of the problem and of alternative strategies and outcomes.

4. Existing organization: The fishers have some prior experience with traditional community-based systems and with organizations. Where the organization is representative of all resource users and stakeholders interested in fisheries management.

5. Benefits exceed costs: Individuals have an expectation that the benefits to be derived from participation in and compliance with community-based management will exceed the costs of investments in such activities.

6. Participation by those affected: Most individuals affected by the management arrangements are included in the group that makes and can change the arrangements. The same people that collect information on the fisheries make decisions about management arrangements.

7. Management rules enforced: The management rules are simple and monitoring and enforcement can be effected and shared by all fishers.

8. Legal rights to organize: The fisher group or organization has the legal right to organize and make arrangements related to their needs. There is enabling legislation from the government defining and clarifying local responsibility and authority.

9. Cooperation and leadership at community level: There is an incentive and willingness on the part of fishers to actively participate, with time, effort and money, in fisheries management. There is an individual or core group who takes leadership responsibility for the management process.

10. Decentralization and delegation of authority: The government has established formal policy and/or laws for decentralization of administrative functions and delegation of management responsibility and/or authority to local government and local group organization levels.

11. Coordination between government and community: A coordinating body is established, external to the local group or organization and with representation from the fisher group or organization and government, to monitor the local management arrangements, resolve conflicts, and reinforce local rule enforcement.

## Conclusions

The idea of active participation of local resource users and communities in development and management is not a new one; it has been part of the development process since the 1960s. What is different is the increasing commitment of governments to programs of decentralized co-management. Fisheries co-management aims specifically at achieving the sharing of authority and/or responsibility between government, the community of local fishers and other resource stakeholders to manage the fisheries.

Co-management systems that have arisen around the world show promise for addressing many of the issues of sustainability, equity and efficiency that exist in small-scale fisheries management today. Co-management is only one alternative fisheries management strategy that has recently emerged. Others include territorial use rights and rights based management. Co-management is an alternative that requires compromise, respect and trust between all parties involved. The potential advantages and disadvantages of co-management are well documented. The development of fisheries co-management systems is not automatic or simple, nor is its survival guaranteed.

Co-management is a political issue. The community of local fishers and the government will have to be restructured. Co-management addresses the critical management issues of who controls the rights to use the fisheries and who obtains the benefits from these resources.

## References and Further Reading

Baland, J.-M. and J.-P. Platteau 1996. Halting Degradation of Natural Resources. Is there a Role for Rural Communities? FAO/Clarendon Press, Oxford.

Berkes, F. 1994. Co-management: Bridging the Two Solitudes. Northern Perspectives. 22(2-3):18-20.

Berkes, F. 1994. Property rights and coastal fisheries. In: R.S. Pomeroy (ed.) Community management and common property of coastal fisheries in Asia and the Pacific: concepts, methods and experiences. p.51-62. ICLARM Conf. Proc. 45. ICLARM, Manila, Philippines.

Berkes, F. P. George and R.J. Preston. 1991. Co-management: the evolution in theory and practice of the joint administration of living resources. Alternatives 18(2): 12-18.

Borrini-Feyerabend, G. 1996. Collaborative Management of Protected Areas: Tailoring the Approach to the Context. IUCN-The World Conservation Union, Gland, Switzerland.

Bromley, D.W. (ed.) 1992. Making the commons work. San Francisco: Institute of Contemporary Studies Press.

Bromley, D.W. and M.M. Cernea. 1989. The management of common property natural resources: some conceptual and operational fallacies. World Bank Discussion Paper 57. World Bank, Washington, D.C.

Brown, D.N. and R.S. Pomeroy. 1999. Co-management of Caribbean community (CARICOM) fisheries. Marine Policy. 23(1).

Dyer, C.L. and J.R. McGoodwin (eds) 1994. Folk management in the world's fisheries: lessons for modern fisheries management. The University Press of Colorado: Niwot.

Garcia, S.M. 1994. The precautionary approach: its implications in capture fisheries management. Ocean and Coaslal Management. 22:99-125.

Garcia, S.M. and C. Newton. 1994. Current situation, trends and prospects in world capture fisheries. Paper presented at the Conference on Fisheries Management, Global Trends, June 14-16, Seattle, Washington.

Hanna, S.S. 1996. User participation and fishery management performance within the pacific fishery management council. Ocean and Coastal Management. 28:23-44.

Hviding, E. and E. Jul-Larsen. 1993. Community-based resource management in tropical fisheries. Centre for Development Studies, University of Bergen, Norway.

International Center for Living Aquatic Resources Management. 1999. ICLARM's Strategic Plan - 2000-2020. Draft. ICLARM, Manila, Philippines.

Jentoft, S. 1989. Fisheries co-management: delegating government responsibility to fishermen's organizations. Marine Policy 13(2): 137-154.

Jentoft, S. and McCay, B.J. 1995. User participation in fisheries management. Lessons drawn from international experiences. Marine Policy 19: 227-246

Johannes, R.E. 1982. Traditional conservation methods and protected marine areas in Oceania. Ambio. 11(5):258-261.

Korten, D.C. 1986. Community-based resource management. *In* D.C. Korten (ed.) Community management: Asian experiences and perspectives. West Hartford, Connecticut: Kumarian Press.

McCay, B.J. and Jentoft, S. 1996. From the bottom up: Participatory issues in fisheries management. Society and Natural Resources 9 (3):237-250.

McGoodwin, J. 1992. The case for co-operative co-management. Australian Fisheries (May 1992): 11-15.

Munro, G., N. Bingham and E. Pikitch. 1998. Individual transferable quotas, community-based fisheries management systems, and "virtual" communities. Fisheries. 23(3):12-15.

Nielsen, J. and T. Vedsmand. 1995. User participation and institutional change in fisheries management: a viable alternative to the failures of "top-down" driven control? Ocean and Coastal Management.

Normann, A.K., J. Raakjaer-Nielsen and S. Sverdrup-Jensen (eds). 1998. Fisheries co-management in Africa: proceedings from a regional workshop on fisheries co-management research. Institute for Fisheries Management, North Sea Centre, Hirtshals, Denmark.

Ostrom, E. 1990. Governing the commons: the evolution of institutions for collective action. Cambridge, England: Cambridge University Press.

Ostrom, E. 1992. Crafting institutions for self-governing irrigation systems. San Francisco: Institute for Contemporary Studies Press.

Pinkerton, E. (ed) 1989. Cooperative management of local fisheries. University of British Columbia Press: Vancouver.

Pomeroy, R.S., Editor 1994. Community management and common property of coastal fisheries in Asia and the Pacific: concepts, methods and experiences. ICLARM Conf. Proc. 45, ICLARM, Manila, Philippines.

Pomeroy, R.S. 1995. Community-based and co-management institutions for sustainable coastal fisheries management in Southeast Asia. Ocean and Coastal Management Vol. 27, No. 3, pp. 143-162

Pomeroy, R.S. and M.J. Wiliams. 1994. Fisheries co-management and small-scale fisheries: a policy brief. ICLARM, Manila, Philippines.

Pomeroy, R.S. and M. Pido. 1995. Initiatives towards fisheries co-management in the Philippines: the case of san Miguel bay. Marine Policy. 19(3):199-211.

Pomeroy, R.S., B. Katon, E. Genio and I. Harkes. 1999. Fisheries co-management in Asia: lessons from experience. ICLARM, Manila, Philippines.

Rivera, R.A. 1997. Re-inventing power and politics in coastal communities: community-based and coastal resource management in the Philippines. Marine Affairs Program. Dalhousie University, Halifax, Nova Scotia, Canada.

Ruddle, K. 1994. Changing the focus of coastal fisheries management. In: R.S. Pomeroy (ed.) Community management and common property of coastal fisheries in Asia and the Pacific: concepts, methods and experiences. ICLARM Conf. Proc. 45. ICLARM, Manila, Philippines.

Ruddle, K., E. Hviding and R.E. Johannes. 1992. Marine resource management in the context of customary tenure. Marine Resource Economics. 7(4):249-273.

Sen, S. and J. Raakjaer-Nielsen. 1996. Fisheries co-management: a comparative analysis. MarinePolicy.20(5);405-418

Williams, M. 1996. The transition in the contribution of living aquatic resources to food security. Food, Agriculture and the Environment Discussion Paper 13. International Food Policy Research Institute, Washington, D.C.

# Chapter Four
# Community-Based Resource Management and Co-Management of Coastal Fisheries in Asia[3]

The growing realization of the need for increased participation by resource users in fisheries management and greater localized control over access to the resource can be seen in a wide range of policies and programs throughout the Southeast Asian region (FAO 1993) (Figure 4). Community-based resource management has reemerged as a way to involve resource users and to utilize indigenous institutional arrangements and knowledge in fisheries management. In virtually all cases, however, the future of community-based resource management seems to lie in a form of co-management, a sharing of responsibility and authority for resource management between the government and the community of local resource users.

This chapter discusses current approaches of community-based resource management (CBRM) and co-management for the sustainable governance of coastal fisheries in Southeast Asia and Bangladesh (note that the focus of this chapter is Southeast Asia although approaches to co-management in Bangladesh will be discussed). Opportunities and problems for revitalizing community-based fisheries management systems and integrating these systems into contemporary fisheries management are discussed including the role of co-management. Specific approaches taken in a number of Southeast Asian countries to develop and implement community-based resource management and co-management systems and systems of fisheries rights are discussed.

## Revitalizing Community-based Fisheries Management Institutions in Southeast Asia

A strong "traditional base" for revitalization of community-based fisheries management systems does not widely exist in Southeast Asia. While traditional or local community-based management systems have a long history of existence in Southeast Asia, the majority of these systems have been weakened or disappeared, due partly to institutional restructuring under colonial administrations, technological modernization, the rise of the nation-state, and socioeconomic stratification and unequal concentration of power and wealth within coastal communities.

Only a few localized long enduring community-based management systems still exist in the region (Ruddle 1994). While many fishing communities still maintain some level of informal or traditional management system, by-and-large fisheries management is a governmental function. Many would argue that there is no effective fisheries management at all, since government efforts in fisheries management in many Southeast Asian countries has been poor (Pauly 1989). In most countries, there is often little or no role for fishers or fisher organizations to participate in the planning and management process.

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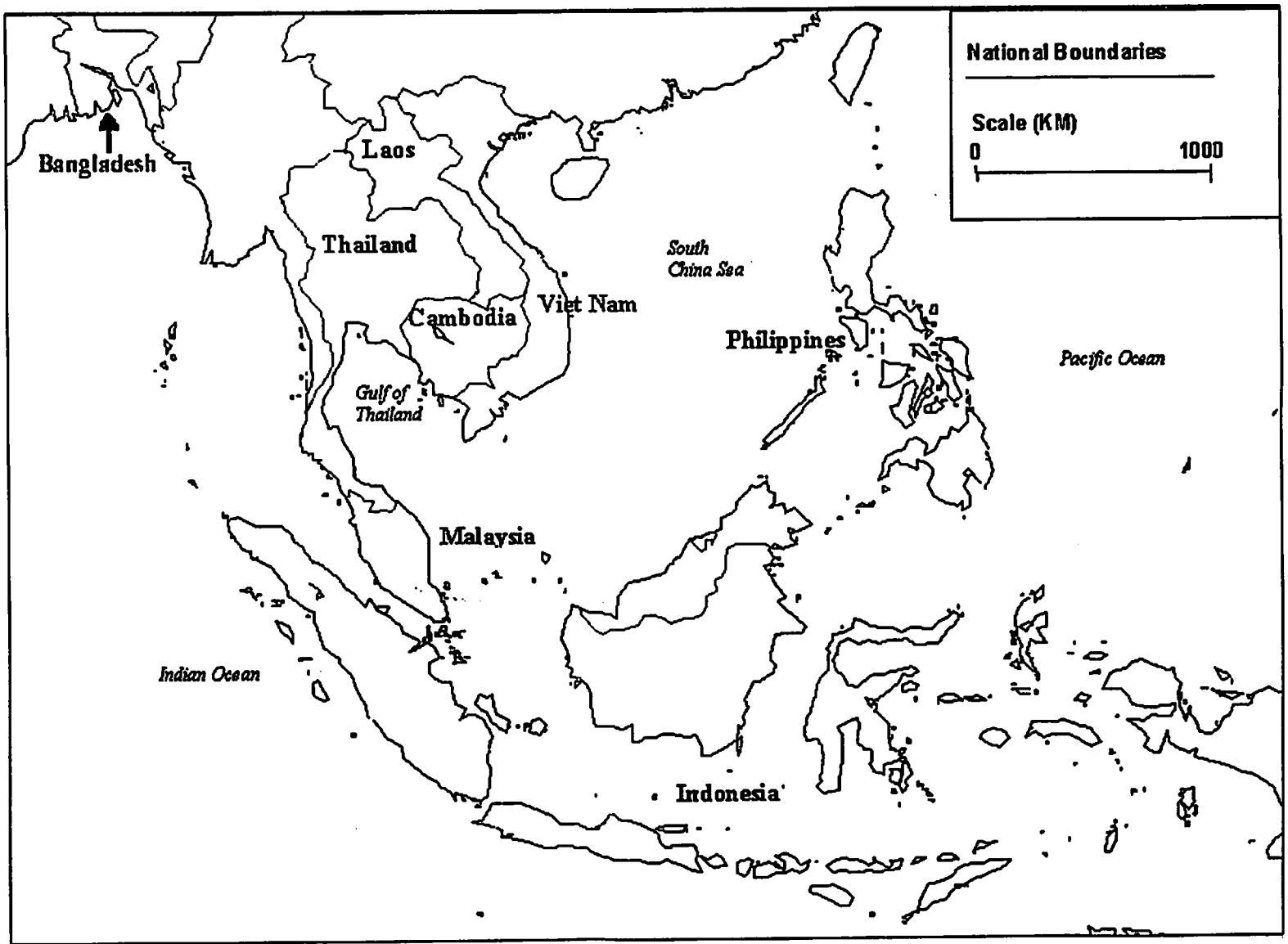


Figure 4. Map of Southeast Asia.

In certain areas of the region, such as specific locations in Indonesia, traditional community-based resource management systems have endured, seem to perform well and are being supported by the government for expansion. In most areas, however, revitalization involves the establishment of new community-based resource management organizations and systems. These new initiatives are being undertaken by government and/or non-governmental organizations (NGO). The implementation of these new systems will require the development of new legal, administrative and institutional arrangements to complement contemporary fisheries management and contemporary political, economic, social and cultural structures.

The revitalization of community-based resource management systems in Southeast Asia will not be easy and must be viewed in the context of several factors, which are unique to the region. First, Southeast Asia is one of the most politically and economically dynamic regions of the world. Political and economic restructuring can be expected to have significant implications for community-based resource management (Hirsch 1992).

Processes of restructuring that include those integrating local production more fully into broader economic structures, intensified capitalization of rural production and attendant commodification of the rural economy, national financial crisis, programs of decollectivization, and external influences on the local resource base are all crucial in shaping local resource management options. While it is important to understand the potential of community-based resource management as the basis for resource management initiatives, it is also vital to understand the implications of broader political and economic processes.

A second factor is that resource management in Southeast Asia is based on the need to obtain maximum sustainable rent, yet ensure equitable distribution of the rent and intergenerational equity. Governments are seeking ways to maximize economic benefits from the resource, while protecting the interests of small-scale producers (Byron and Waugh 1988). Community-based management systems and associated fisheries rights and tenure arrangements have been shown to provide an efficient and equitable system for extracting and distributing resource rents.

A third factor is that among many policy-makers and development specialists in Southeast Asia, community-based resource management and community participation are not seen only as a way to improve resource management but as ways to alleviate poverty. It is felt that only an empowered community can address both the need for economic development and conservation of natural resources.

Fourth, the role of NGOs in facilitating the revitalization of community-based resource management is important in the region, especially in the Philippines and Bangladesh. The NGOs have taken over many of the service delivery functions of government and serve as a countervailing force to the power structures of society and government. The number of NGOs in a country, however, does not correlate directly with success in governance. Success of NGOs at the micro-level needs to be translated into success at larger levels, and this has not happened largely because of the lack of orientation, resources and existing capabilities.

Fifth, sustainable food security is an increasing concern of governments in Southeast Asia. It is not achieved through any single, simple solution but needs stable, sustainable and predictable supply and access to food. The capture fisheries supply in the region is static at best but demand continues to rise. To improve this situation, the resource base for production of living aquatic resources must be kept in

healthy, functioning order through improved management. In addition, food security requires access to the means of food production and/or purchasing power through adequate income. Community-based management can provide a means for government to allocate and protect access rights, empower fishers by giving them a greater level of organization, and give greater say in the way the resources are managed to achieve sustainable food security (Williams 1994).

Sixth, the overall political system under which revitalization occurs is critical for success. Local action in countries where the national government has not devolved its powers makes it almost impossible for local bodies to undertake separate initiatives. In Malaysia, this situation has prevailed since the cancellation of local elections in the 1970s. Certain laws and regulations, such as the National Security Act, militate against popular participation, whether in political matters or in issues of resource management. Freedom of assembly, regarded as indispensable to authentic participation, is highly constrained in Malaysia (Kuperan and Mustapha 1994). Thus, community-based resource management becomes a matter of political resolution.

Seventh, there is an increasing emphasis in Southeast Asia on more integrated resource management strategies; a comprehensive, multi-sectoral and strategic approach linking resolution of multiple resource use conflicts and economic development. This approach, of which community-based resource management is seen as an element, recognizes that solutions to the current problems in the fisheries sector rest outside its traditional realm. The solutions lie in creating an economic and institutional environment in which the problems will be solved by people acting in what they perceive to be their own best interest (Fallon and Chua 1990).

Eighth, revitalization will be dependent on two inter-related factors related to the problems of decentralization: (1) the establishment of local and government respected fisher organizations, and (2) clear commitment on the part of the government to a program of decentralized community-based resource management. Increasingly, government policies and programs stress the development of local organizations to handle some aspect of local resource management. Seldom, however, is adequate attention given to the development of an administrative and institutional framework that defines the legal status, rights and authorities essential to the local organization's effective performance. This has resulted in the formation of numerous officially recognized but ineffective organizations. The many "on paper only" fishers organizations are but one example (Pollnac 1987). While in the past the institutional framework for the operation of an organization was determined by local custom and authority, currently that framework is increasingly determined by national law and administrative policies.

Initiatives in community-based resource management in Asia are not new. On the contrary, community management programs and policies have been popular throughout most of this century under different names. David Korten (1986) provides a valuable perspective on what he refers to as "past experiments with government-led local development". Beginning in the 1920s in India, community development programs were introduced throughout the region until they were largely abandoned in the mid-1960s for a number of reasons. These reasons included centrally based rather than people-based program formulation and limited local self-help organizational development. In the late-1960s and early-1970s, popular participation attempted to make development more participatory. Centrally planned and implemented, and utilizing blueprinted project designs, the popular participation strategy led in reality to limited actual participation (Kurien 1994). Decentralization of administrative functions has been attempted throughout Asia under a number of programs. However, central control and local dependence of central funding has not led to self-managed local communities.

Korten (1986) states that, "None of these approaches to stimulating local initiatives provided a fundamental challenge to the idea that the government does development for the people, who are expected to respond with grateful acceptance of whatever guidance and assistance government chooses to offer. None challenged the nature of the government's role or the appropriateness of the structures and procedures through which government conducts its business. None confronted basic issues of local social structures and resource control (p.10)."

If new fisheries community-based resource management initiatives are to be successful, these basic issues of government policy to establish a supportive legal rights and authority framework must be recognized. Effective community-based resource management is dependent upon the strength of the local organization and its ability to command respect from its members and enforce institutional arrangements. Success is often simply due to the leadership of the local organization. One important question for revitalization of community-based resource management systems is whether leadership qualities can be transferred to other locations, individuals and organizations.

While governments may be willing to call for more community involvement and fisher participation, they must also establish commensurate rights and authorities and devolve some of their own powers. The delegation of significant authority to manage the fisheries may be one of the most difficult tasks in revitalizing community-based management systems. Fisheries administrators may be reluctant to relinquish their authority or parts of it. They may fear infringement by local fishers and their representatives upon what they consider their professional and scientific turf.

The issues are not easily resolved. Each policy bearing on decentralization and community-based management is embedded in a broader network of laws, policies and administrative procedures, at both national and local government levels, and consequently will be difficult to change. Government administrative and institutional structures and fisheries laws and policies will, in most cases, require restructuring to support these initiatives.

Community-based resource management systems cannot be revitalized in isolation. As mentioned above, successful revitalization in Southeast Asia will require the development of legal, administrative and institutional arrangements for defining legal status, rights and authorities. While governments may be willing to call for more community involvement, they must also establish commensurate rights and authorities and devolve some of their own powers. Thus a more dynamic partnership is needed using the capacities and interests of the local fishers and community, complemented by the ability of the state to provide enabling legislation, enforcement and other assistance; specifically co-management (Pinkerton 1989, Jentoft 1989, Berkes, George and Preston 1991, Pomeroy and Williams 1994). The actual form of co-management will depend upon the form of government and the political will for decentralization. If the need is recognized, and a strong case can be made for a strengthening of local authority, a gradual process of change can be instituted (F. Korten 1986). In many Southeast Asian countries this process of change is now underway.

## Current Approaches to Community-Based Resource Management and Co-management of Coastal Fisheries in Southeast Asia

Several countries in Southeast Asia and Bangladesh are now recognizing the important potential role that community-based resource management and co-management systems can play in contemporary fisheries management. Each country is taking a different approach to the revitalization of these systems. In this section, the approaches being taken in the Philippines, Thailand, Malaysia, Indonesia, Laos, Cambodia, Bangladesh and Vietnam will be discussed.

**Philippines**. The Philippines has a long history of traditional fisheries rights and allocation (Kalagayan 1991, Lopez 1983). However, under both the Spanish and American colonization of the country, community authority and rights were superseded by municipal government control of local fishing grounds. This administrative structure of municipal authority remains in place today.

Thus, for centuries, natural resource management in the Philippines has been strongly centrally determined, top-down and non-participatory (Sajise 1995). This applies to forestry, fisheries, mining and irrigation sectors. However, gradually it was realized that with the increasing deterioration of natural resources in the country that there was no way the country could pursue a pathway of sustainable development. Starting in the 1960s, alternative methods of resource use and management were explored in an attempt to reverse these negative trends. Consequently, there has been a shift to forward-looking policies and strategies that advocate resource management and conservation over a use orientation through community-based initiatives to rehabilitate, conserve and protect natural resources based on use and enhancement of local knowledge, skills, responsibility and accountability. The irrigation sector was the first to evolve an institutional development scheme for mobilizing the active participation of water users in 1968. People-oriented programs in the forestry sector started in the early 1970s (Sajise 1995). Community-based coastal resource management (CBCRM) started in the early 1980s. To date, well over 180 CBCRM projects have been implemented by government, NGOs, fishing communities, and academic and research institutions. No country in the world has the range of experience with CBCRM and co-management as exists in the Philippines (Pomeroy and Carlos 1997).

Since 1975, fisheries management in the Philippines has been guided by Presidential Decree (PD) 704, otherwise known as the Fisheries Act of 1975. Under PD 704, fisheries management is the responsibility of the government, both national and municipal. The management measures (mainly through regulatory instruments) undertaken by the government during this time, however, have been ineffective in promoting the sustainable development and management of the country's fisheries. The first marine protected area implemented with the participation of the resource users in the country was established in 1974 at Sumilon Island in the Central Philippines.

The Aquino administration provided some impetus for community-based resource management when in 1989 a Presidential Commission on Anti-Illegal Fishing and Marine Conservation or the Bantay Dagat committee, was created. The Commission called for increased coordination among government agencies in enforcement of fisheries laws and increased participation of fishers in management (Kalagayan 1991). In 1991, the government recognized the need to increase participation in management and to devolve control over resource access to local levels through policy and institutional reforms. Through several initiatives, the government now actively promotes community-based resource management to conserve the coastal resources and diversify the income sources of the low-income small-scale fishers. The 1993-1998 Medium-Term Philippine Development Plan (MTPDP) has among its strategies: to implement a community-based fishery management strategy; to regulate fishing effort within maximum sustainable yields; to promote territorial use rights for small fishers; to intensify aquaculture and the optimal utilization of offshore, deep sea resources, and to provide diversified occupational opportunities among marginal fishers (NEDA 1993). The core program for fisheries development implemented under the Plan was the Fisheries Sector Program (FSP) from 1990 to 1995. Among the policy and institutional reforms instituted through the FSP are: (1) decentralization of authority and simplification of procedures for clearance of local fisheries management ordinances subject to national laws and/or policies; (2) strengthen the enforcement of fisheries laws through

municipal-based inter-agency law enforcement teams; (3) promote community-based initiatives to rehabilitate, conserve and protect the coastal resources and to diversify the sources of income of small-scale fishers; (4) NGOs will be engaged to assist and undertake community organizing; and (5) shift to limited access in concerned fishing areas. At the core of the resource and rehabilitation thrust of the FSP is coastal resource management. Fishers, local government units and other concerned agencies in the area are given the opportunity to determine the specific problems in their areas and to identify the management strategies to counteract these problems. There are plans for a second phase of the FSP to begin in 1999.

Another initiative is the Local Government Code of 1991 (LGC). The basic tenet of the LGC is decentralization. A general operative principle is a provision that the local government units (LGU) may group themselves, consolidate or coordinate their efforts, services and resources for purposes commonly beneficial to them. Section 35 specifically states that LGUs may enter into joint ventures and such other cooperative arrangements with people's organizations (PO) and NGOs to engage in the delivery of certain basic services, capability building and livelihood projects, and to develop local enterprises designed to diversify fisheries, among others. The LGUs and local communities are also given certain privileges and/or preferential rights. Municipalities shall have the exclusive authority to grant fishery privileges in municipal waters, up to 15km from shore, and impose rentals, fees or charges. In terms of fishery rights, the organizations or cooperatives of marginal fishers shall have preferential rights to fishery privileges within the municipal waters such as the erection of fish corrals and gathering of fish fry free of any rental, fee or charge (de Sagan 1992, Tabunda and Galang 1992).

In 1998, Republic Act No. 8550 or the Philippine Fisheries Code was signed into law. Under the Fisheries Code, several sections of the LGC were supported such as the devolution of the function of fisheries management to local government; the designation of municipal waters up to 15 km from shore, and the granting of preferential rights to fishing privileges in municipal waters to registered fisher organizations and cooperatives. In addition, the Fisheries Code endorsed the establishment of Fisheries and Aquatic Resources Management Councils (FARMC) at the national and municipal levels. The FARMCs are mandated to carry out a number of management advisory functions in close collaboration with the LGU. These functions include assisting in the preparation of Municipal Fishery Development Plans, recommending the enactments of fishing ordinances, assisting in enforcement, and advising the LGU on fishery matters. The FARMCs are formed by fisher organizations and cooperatives and NGOs with assistance from the LGU.

Thailand. Hinton (1985) speculates that traditional community-based aquatic resource management systems once existed in Thailand but no firm evidence exists. Since Thais historically exploited freshwater and not marine waters, it is possible that CBCRM systems may have existed for Thai freshwater fisheries. On the other hand, there existed traditional village justice systems through which people settled conflicts. These justice systems were, however, not considered legitimate by the ruling class (Bangkok Post, 27 August 1998).

A centralized fisheries management system currently exists in Thailand and this system has, in general, not been effective in addressing problems of fisheries overexploitation, low incomes of small-scale fishers, and conflicts between small-scale and commercial fishers (Juntarashote 1994). A DOF review of past experiences in the fisheries sector revealed that government development programs alone cannot achieve the long term objectives as long as the fisheries is left as an open access resource and the enforcement of fisheries regulations is ineffective. Recognizing the benefits of "bottom-up" rather than "top-down" fisheries planning and management, the Thai government has initiated a new program

which advocates the involvement of the fisher in the planning, management and implementation process.

During the Sixth (1987-1991) and Seventh (1992-1996) National Economic and Social Development Plans, the strategies covered the reinforcement of various marine fisheries management measures, including the construction of artificial reefs in many coastal areas; fishery resource conservation; and the setting up of pilot projects on coastal area management with more active participation of small-scale fishing communities in the management of the fishery resources in waters adjacent to their villages to ensure sustainable yields. The Eighth National Economic and Social Development Plan (1997-2001) and the recent promulgation (1997) of a new constitution have brought about more changes in Thailand as to the fundamental basis for participation and community-based resource management. The Eighth plan has whole sections related to "popular participation in natural resource management" (Part VI), "popular governance" (Part VII), and incorporation of local knowledge in management. The new Thai Constitution also contains several provisions with regards to rights and participation of people. Chapter III, Section 46, states "... traditional community shall have the right to conserve and restore their custom. Local intellect, art or good culture of their community and the nation and participate in the management, maintenance, preservation and exploitation of natural resources and the environment in a balanced fashion and persistently as provided by law". From the perspective of resource management, the new Constitution is revolutionary as it requires government agencies to restructure their policies and practices to work directly as a local level and have people participation in planning and management.

Priority fisheries management strategies of the DOF include community-based resource management, fishing rights system, encouraging the formation of fisher associations, and encouraging better cooperation between resource managers and fishers. In 1993, the DOF, with the collaboration of the Department of Fisheries Management, Faculty of Fisheries, Kasetsart University, established a community-based fishery management program to evaluate development of a fishing rights system. In early 1994, the DOF set up several committees to establish the fishing rights system, pilot project preparation and draft a new fishery law. The fishing rights over specific areas will be granted by DOF at the community level. Local fishers organizations or cooperatives are awarded exclusive fishing rights over a designated sea area. The fishers who are members of the organization have a right to fish in the area. The members of the organization will establish rights and rules for operating in a designated fishing ground. The fishing rights program has had a slow start but implementation is continuing at selected sites in the country (Juntarashote 1994; Department of Fisheries 1994). Through the enactment of the new Constitution, there is now a legal basis for the implementation of the fishing rights system.

The present fishery law was enacted in 1947 with some minor amendments in the 1980s. The law, Fisheries Act, B.E. 2490, had been enacted on the basis of freshwater fisheries which was the leading fishery at that time. Several sections of the fisheries law can be employed as a legal basis for CBRM. For example, the exclusive user rights currently in use in Thailand for stationary gear and coastal aquaculture will provide a basis for the establishment of the fishing rights system. In principle, the fishing rights system must not conflict with the constitutional law. According to the Fisheries Act of B.E. 2490 of 1947, the country's basic fishery law, several sections are valid for the enactment of a law or a ministerial decree with regards to fishing rights (Lhaopadchan 1993, Piumsombun 1993, Tokrisna and Duangsawasdi 1993).

A number of CBRM projects have been undertaken in recent years, particularly in Southern Thailand, many with the support of NGOs. These projects have emphasized awareness creation among members of the community about sustainable management; building of local organizations and capacity for

conservation and rehabilitation of coastal resources; and encouraging coordination among resource users, government and NGOs (Tokrisna, Boonchuwongse and Janekarnkij 1997). In line with the new Constitution and the Eighth Development Plan, it has been recommended that the Sub-district Administration Authority (*Or-Bor-Tor*) be utilized as a core unit of CBRM. The Or-Bor-Tor, consisting of the sub-district head, village head and sub-district council, could serve to help organize fishers and manage conflicts.

Malaysia. The political and legal framework in Malaysia strongly favors central control of fisheries management. Since independence from Britan in 1957, the Malaysian government has pursued policies for managing the fisheries which are developed at the national level and implemented at the community level with minimal participation of fishers or industry. Participation of fishers occurs through local level consults where fisheries department staff meet with local fisher organizations (cooperatives, associations) to inform them about new policies and to solicit feedback on the policy. This structure has removed almost all forms of traditional community-based management that has any serious support from fishing communities. Bailey (1991) concluded that in fishing communities, moral economy values have long been relegated to the "cultural dust bin". He found that fishing communities did not have pre-existing organizational capacity around which to build cooperatives, which are often seen as an important institution for CBRM. Yahaya and Yamamoto (1988) conclude that Malaysian fishers in general, are not familiar with the self-management concept. Although generally supporting the fishing right principle, the fishers were not willing to accept the role of guardian of the fishery resources nor as the enforcer of laws and regulations.

Education of fishers is needed for fishers to accept self-management. Under the Malaysian fishery management policy, four fishing zones were established through a limited licensing scheme whereby rights and rules in each zone were designated for specific fishing method, class of vessel, species caught and ownership pattern (Majid 1992). Although the policy has produced progress towards meeting its stated objectives of achieving optimum yield, eliminating conflict between small-scale and commercial fishers, and a more equitable distribution of catches, enforcement problems still exist. In 1997, the government indicated a policy shift in fisheries management towards a more decentralized community-based management approach, with greater fisher participation in fisheries policy and management. Under one proposal, an alternative monitoring, control and surveillance (MCS) system would allow for sharing of responsibility with the community. Under the proposed MCS system, the community (fisher organizations and NGOs) would have increased responsibility for monitoring and surveillance and the federal government would maintain responsibility for control and enforcement (Sulaiman 1994).

Indonesia. Community-based management systems have a long history in Indonesia and are the most long-enduring in the region. These traditional systems are by-and-large localized practices found in geographical pockets throughout the country. The traditional fishing rights and community-based management systems are based on "restriction" which closely parallel the modern management concepts of closed areas and seasons. Like other such traditional systems around the world, they have adapted to change over time (Wahyono et al. 1992, Bailey and Zerner 1992, Nikijuluw and Naamin 1994).

Current national laws in Indonesia do not recognize local community-based resource management systems in coastal fisheries. Fisheries administration and governance is centralized through the Directorate General of Fisheries and provincial fisheries services. There is no policy that gives legal mandates to provincial and district governments to manage coastal and marine resources, with the exception of small-scale fisheries. Provincial governments are authorized to license vessels of less than 30 gross tons. The provincial governments are also expected to protect against any inappropriate practices that may threaten the interests of small-scale fishing and local communities. Traditional rules and norms potentially support the written laws in order to promote community participation in

managing fisheries. By law, the existence of traditional laws (unwritten laws) are recognized as complementary to the existing written laws and both national and local interests. Explicit recognition of local authority and the concepts of customary law and local territorial rights would require amendments to both the National Fisheries Law No. 9/1985 and the National Administrative Law No. 5/1979, the law which authorizes the structure of village government (Bailey and Zerner 1992). One reason for not adopting traditional laws into written laws is that such an action could cause disintegration of legal systems, particularly with regard to traditional village boundaries with new boundaries established by national law. It should be noted that in 1999 the Ministry of Home Affairs has proposed draft regulations (local government administrative law) as part of amendments to Law No. 5/1979. Those related to fishers management include: Chapter II, paragraph 3, mentioning that the Local Government Level I (province) be given authority for inland and sea territory up to 12 miles from shore; and Chapter IV, paragraph 9, states that the Provincial, Regency and Municipal governments in coastal regions be given authority to manage: exploration, exploitation, conservation and management of coastal fisheries.

There are positive signs for the effective development of community management institutions. The establishment of fisher organizations have allowed fishers to participate in fisheries management conducted by the Directorate General of Fisheries such as the Collective Management System (Pengelolaan Bersama) and the Forum of Coordination for Fisheries Resources Utilization (Forum Koordinasi Pengelolaan Pemanfaatan Sumberdaya) (FKPPS). This FKPPS consists of representatives of national and local governments, private sector and local fisher representatives. The main activity of the FKPPS is to organize fisheries exploitation for the interest of all stakeholders and monitor the implementation of action plan established by the FKPPS. Indonesia's long-term (25 year) development plan was completed in early 1994. Policy and strategy in the form of the State's Main Guidelines (Garis-Garis Besar Haluan Negara) for the first five-year development plan (1993-1998) was laid down by the People's Consultative Council. The State's development plan (Repelita) stresses the need to alleviate poverty and consider environmental protection in order to maintain sustainable development of coastal and marine resources. During the current Repelita, the government will stress regional development in order that the livelihood of fishers and their families will be improved through integrated coastal community development that will involve other economic sectors in the community. In 1994, a new program of poverty alleviation, called Inpres Desa Tertinggal (IDT) (Presidential Instruction on the Less Developed Village) was initiated. This program aims to promote economic growth in fishing and farming villages through decentralization and active participation of the local community. Existing social and economic institutions, such as cooperatives, at the village level will be utilized as vehicles for greater participation of target groups and the community. The program will focus on generation of income and employment opportunities and improvement in social structure. The program objectives stress a reformulation of the basic approaches to fisheries and agricultural development, from a production approach to one of enhancing fisher and farmer income and welfare. This will lead to more sustainable resource management (Cholik and Ilyas 1994). In addition to the government, a number of NGOs and communities have implemented CBRM activities. These initiatives have involved community organizing and conservation and rehabilitation activities. The current political and economic problems in Indonesia have stalled most CBRM initiatives, but interest still exists in this strategy.

Laos. The fisheries sector of Laos is dominated by capture fisheries from the Mekong River, its tributaries, flood plains, wetlands and reservoirs. Aquaculture in ponds and integrated aquaculture-agriculture farming systems are now on the increase to supplement harvests from capture fisheries. Fisheries management and development is the responsibility of the Ministry of Agriculture and Forestry, Department of Livestock and Fisheries (DLF) and its provincial offices. Recent policies of the DLF support the sustainable use and conservation of aquatic resources by the communities

(Sinkham Phonvisay 1997).

Laos has a history of informal community-based capture fisheries management. In some areas, closed and semi-closed wetland fisheries, fishponds and other waterbodies are managed through rules and regulations based on community-based management. In some communities, waterbodies are managed by community members for the purpose of community development including temple and school construction and other infrastructure projects. These communities have developed management plans and rules for catching fish and use of the catch (AIT Aqua Outreach-Lao PDR 1997). Recently, the Lao government has shown support for community-based management and co-management strategies for both capture and culture fisheries as a way to utilize traditional knowledge of the resource by fishers and to allow the resource users to establish conservation and management strategies. The DLF has a policy to use "bottom-up" approaches to policy formulation and implementation.

Torell (1998) has reported that, in principle, the Lao constitution supports community-based management initiatives. Article 8 states that "All ethnic groups have the right to protect, preserve and promote the fine customs and cultures of their own tribes and of the nation". Article 14 states that "collective and individual ownership" is recognized. Torell further states that there are, however, a number of articles which, if backed up by laws to that effect, could imply reduced rights for local communities and "top down" resource management. Again, if the laws and policies of the government are supportive than the constitution could also be supportive of community-based management and customary law.

Two recent fisheries projects in Southern Laos have utilized co-management. Since 1993, the Lao Community Fisheries and Dolphin Protection Project (LCFDPP) has been working to establish village-level aquatic resources conservation and management strategies in Khong District, Champasak Province in southern Laos Cunningham 1998). These strategies include the establishment of fish conservation areas and village-level rules governing the harvest of certain aquatic resources in the Mekong River. Originally started to protect the Irrawaddy dolphin, the project has also worked on community development, fisheries research, and environmental awareness activities (Baird 1996). As of 1998, 63 villages had developed aquatic resources management strategies. This includes established sets of rules designed to conserve and sustainably manage aquatic resources in the mainstream Mekong River, wetland areas, streams and seasonally irrigated and rainfed paddy rice fields adjacent to rural villages.

A recent evaluation of the LCFDPP found that "villagers regard the initiative to establish the conservation zones as their own" (AIT Aqua Outreach-Lao PDR 1997). The evaluation reported that the LCFDPP represented a good example of successful co-management. "In this case the local people are taking an active role in defining management practices and implementing them. The local government is supporting these activities by giving them official status. The national government has contributed by establishing policies that prioritize conservation and management of natural resources, with special emphasis given to fisheries."(AIT Aqua Outreach-Lao PDR 1997).

Over a two-year period beginning in February 1997, the Indigenous Fisheries Development and Management Project, funded by ACIAR and IDRC, ran in Champassak province. In addition to identifying indigenous fisheries management strategies for different fisheries and aquatic resource ecosystems, the project developed an interactive, participatory, study-based process of management and fishery enhancement involving the community, district and provincial officials, and the project team

(Hirsh 1998).

Cambodia. Community-based resource management systems do not exist in Cambodia. Fisheries, or rather "commercial" fisheries, are managed by the state through a "top-down" approach in which the Department of Fisheries and the provincial fisheries offices are the primary decision-making bodies (Ahmed and Tana 1996).
The sectoral policy for fisheries in Cambodia states that, "... the Government will strengthen the control, monitoring and surveillance on fisheries resource utilization to sustain the production by reducing overfishing in inland and marine waters. Strictly prohibiting the illegal fishing operation and the destruction of inundated forest that may affect to inland and marine fishery environment. Encouraging aquaculture and livestock investment."

Fisheries in Cambodia are divided into "commercial", "small-scale" and "family" fisheries. Family (subsistence) fishing is allowed in inland waterbodies at all times of the year, although restrictions are placed on effort (i.e., gear and mesh size). Middle scale (small-scale) and large scale (commercial) fishing are allowed only in the open season of October to June. Large-scale fishing takes place in leased fishing lots that are controlled by the rich and their agents, while subsistence and small-scale fishers have limited access to good fishing grounds. In contrast to the rules being applied to commercial and small-scale fisheries, family fishing is treated as open access, in spite of the fact that production figures from subsistence fishing are quite substantial (van Zalinge et al. 1998). Increasing commercialization of subsistence fishing and lack of an effective mechanism to distinguish it from small-scale fishing have resulted in a virtual uncontrolled situation in the small-scale freshwater capture fisheries of Cambodia.

The current fisheries legislation (the Fiat-Law on Fisheries Management and Administration of 1987 and its sub-laws) based on fisheries law and regulations designed during the French colonial period, emphasizes inland capture fisheries and revenue orientation. The manner in which the present fishery law is applied, conservation issues and fisher participation are not considered. However, applied in a different way, the fishery law (or revision thereof) could be one of the best existing instruments for sustainable fisheries management. In principle, the fisheries law gives a mandate to the Department of Fisheries to manage all wet and flooded areas (including mangroves, flooded forests, etc.) as fishing areas or "fisheries domains" for the purpose of sustaining the resource base for fisheries. This mandate is at present not being followed (Cambodia Working Group 1998). Fisheries management relies on an extensive regulatory regime that uses control and enforcement by the fishery department. There is no fisher participation in management nor are there any fisher organizations. The political and economic turmoil that has existed in Cambodia since the mid-1970s has been a deterrent for fishers to organize and engage in community-based resource management. This lack of participation and "top-down" management approach has brought about low compliance with regulations and has been a major factor in resource overexploitation and lack of recognition of the family fisheries (Ahmed and Tana 1996).

Torell (1998) points out that, in principle, the necessary elements are present in the Constitution of Cambodia to support community-based resource management. The Constitution states that "All persons, individually and collectively, shall have the right of ownership" (Article 44). Several new laws and regulations, such as the Royal Decree on the "Creation and Designation of Protected Areas" of 1993 and the Law on Environmental Protection and Natural Resource Management of 1996 are concerned with conservation of aquatic resources and the coastal environment. A number of international development and resource management projects and papers by Cambodian government officials have

emphasized the need for resource user participation in management and co-management (Cambodia Working Group 1998).

Viet Nam. Vietnam has centuries old traditions and customary practices for fisheries management. Many of these traditions and customary practices are intertwined with religious and other cultural activities. Many of these traditions were very active before 1945. Once Vietnam began establishing fishing cooperatives (from 1960 in the North and after 1975 in the South), many traditions and customs were lost. The government labeled some of the ceremonies as superstitious and banned them. As the role of the central government was increased, traditional communal activities were restricted or eliminated. With the beginning of *doi moi* (reform) policies in the late 1980's and as the control of the central government was loosened, some traditional practices began to reappear (Thong and Thieu 1998). One example is an association established by fishers called van, which is similar to those in agriculture, to preserve village or community social structure and to provide mutual assistance related to the fishing activity. These associations, headed by an elected fisher, performed several functions including conflict resolution, establishment of the method of sharing catch, and, to lesser extent, establishment of rules to manage the fishing activity. Like other organizations in Vietnam, the v_n was banned in the 1970s. It is now slowly reemerging in fishing communities throughout the country.

The Ministry of Fisheries (MOF) has overall responsibility for formulation of policies, planning and regulation for the sector, registration of large vessels, and foreign fishing activities. Provincial fisheries departments have responsibility related to capture and culture fisheries within their own jurisdiction including planning, collection of statistics, guidance of fishers on government policies, registration of smaller vessels, control and inspection of fisheries activities, protection of the resources, and control of local fisheries enterprises. Thus, the province is given a great deal of autonomy for management and development of fisheries. Provincial officials consult with district officials about planning, management and development (Ministry of Fisheries 1995a).

In light of recent political and economic reforms in Vietnam, the government is currently developing new policies for the fisheries sector. The recently completed Master Plan for Fisheries to the Year 2010 (Ministry of Fisheries 1997) sets out several programs and projects for the fisheries sector. There is recognition that coastal or nearshore fisheries are overexploited due to the high levels of fishing activity, destructive fishing practices, and lack of enforcement which occurs in these waters. Protecting the aquatic environment and preserving the fisheries resources of Vietnam will be undertaken through a program called "Using the Environment and Fisheries Resources". One of the four projects under this program is "Allocation of Resource User Rights and Obligations". The specific objectives of this project are to gradually, but firmly, move away from the "open access" nature of fisheries and aquatic resources to a managed approach to the allocation of resource user rights and user-obligations. A sub-project of this project is "Operationalizing Participatory Approaches to Resource Management". The specific objectives of this sub-project are to operationalize the new systems for resource use and management at the community level. This is expected to include the introduction of participatory approaches to both the management and use of habitats and aquatic resources. It is also expected to include systems for the valuation and the permanent distribution of resource user rights and user-obligations (Ministry of Fisheries 1997). The new policies will constrain fishing activities in nearshore waters and emphasize aquaculture as an alternative to nearshore fishing and encourage offshore fishing. The state enterprises and collectives through which fisheries were developed under the centrally planned economic system will be replaced with an emphasis on private business enterprises and the household and fishers organization. Coastal areas may be privatized, in essence a fishing right, and managed by the household or fisher organization for fishing and aquaculture (Ministry of Fisheries 1995a).

The Ministry of Fisheries has endorsed fisheries co-management as a strategy for managing nearshore and estuarine areas and the introduction of a regulatory system of resource user rights and obligations. Recognizing the diversity of the coastal zone and regions in the country and the difficulty for effective monitoring and enforcement, the Ministry will undertake a program to delegate resource management functions to local institutions, including fisher organizations. This program will be implemented in several steps beginning with pilot sites to develop models and gain practical experience in co-management. The lessons learned from these pilot sites will be integrated into national policies and laws to support co-management. Pilot site activities are currently underway (Thong 1995, Ministry of Fisheries 1995b).

A recent review of the legal framework for fisheries co-management in Vietnam found that the existing legal system does not prevent the introduction of co-management (Chircop and Torell 1997). It is possible to find a basis for co-management and customary law in the Constitution of Vietnam, although these provisions are not stated specifically. Fisheries law reform is needed to fully support co-management.

Bangladesh. Administrative arrangements for inland fisheries management in Bangladesh from 1950 to 1986 comprised only leasing of waterbodies. The Ministry of Lands (MOL) has, since 1950, managed state-owned inland openwater fisheries with the objective of raising revenues by dividing up the fisheries into jalmohals (fishing estates) and leasing fishing rights to these fisheries to the highest bidder for short-term (one to three years) periods. Despite measures in 1973 to restrict leasing to registered fisher cooperatives, this revenue-oriented strategy led to overfishing and exploitation of the poor by leaseholders and their intermediaries.

A combination of recommendations from the Land Reforms Committee, pressure from the Department of Fisheries (DOF), and lobbying from the National Fishers Association, resulted in the introduction of the New Fisheries Management Policy (NFMP) on an experimental basis in some 270 waterbodies (out of a total of over 10,000) in 1986. The main objectives of NFMP were: 1) to free the fishing people from exploitation by intermediaries, leaseholders and financers; 2) to redirect the major benefits of fisheries to genuine fishers; and 3) to ensure the conservation and propagation of fisheries resources (Aquero and Ahmed 1989; Ahmed, Capistrano and Hossain 1992). The strategy of NFMP was to abolish gradually the system of leasing rights in public waterbodies to middlemen and replace it with individual licenses for "genuine fishers". Management authority over NFMP-designated waterbodies was transferred from the MOL via the Ministry of Fisheries and Livestock to DOF for the duration of the experiment. It was expected that direct cooperation between government departments and fishing communities would be established - a co-management arrangement (Ahmed, Capistrano and Hossain 1997).

Under the NFMP, the DOF and a number of NGOs became involved in fisheries management and some gains in a more equitable distribution of fishing access were achieved (Aquero and Ahmed 1989). However, where there was no project or NGO support for the individual fishers, the ex-leaseholders often were able to retain control by advancing funds to pay license fees. No further waterbodies were handed over under NFMP, and government policy changed in 1995 when a MOL circular abolished revenue collection from open waters (meaning rivers) and was interpreted as ending NFMP (Farooque 1997). This has resulted in open access fishing in rivers (where before either leaseholders or licensing had limited effort to some extent), and reinforced the revenue oriented competitive leasing strategy in other "closed" waterbodies. Exceptions are the few waterbodies currently being managed by the DOF under various existing fisheries development projects, most of which follow licensing. Upon completion of the projects, these too will be leased out (Capistrano, Hossain and Ahmed 1997), except for about 20 oxbow lakes which have been handed over to DOF for group management by fishers (members

receive licenses) for 50 years (Apu et al. 1999).

Although this indicates a contradiction and dilemma in government policies, the DOF, NGOs and development agencies continue to utilize leasing and licensing mechanisms to develop co-management models for fisheries. While many fisheries have lacked any management arrangements since 1995, and many are leased to individuals, there are still many which are currently managed through a wide range of co-management arrangements between the government (DOF), NGOs and fishing/landless people. Ahmed, Capistrano and Hossain (1997) have identified three broad categories of co-management arrangements: 1) NGO-led strategy (fishery leased to NGO or its group); 2) Government-led strategy (government licenses fishers or leases to a fisher cooperative); and 3) Government and NGO partnership (support from government and NGOs either through licensing or a "community-based" or group approach). A number of international development and research projects have supported the co-management in inland waterbodies, and the most recent trend is for multi-stakeholder co-management bodies involving more than just target groups of fishers, and which involve other wetland users and government and are usually facilitated by NGOs (Thompson et al. 1998).

## Conclusions

Global-scale changes in the supply, demand, value, management and uses of fisheries resources could threaten progress towards sustainable food security and resource development in many parts of Southeast Asia, but they could also stimulate improved management and use of the resources. Decision-makers are searching for better ways of managing all fisheries. To prevent further degradation and overexploitation of fisheries resources, there is an imperative for better management. Many present fisheries resource management arrangements in Southeast Asia have failed to coordinate and restrain the many users, leading to depleted resources and conflict. Resource conflicts may be diminished, management better implemented and resources better managed when fishers and other resource stakeholders are more involved in the management of resources and access rights are distributed more effectively and equitably.

The idea of active participation of local resource users and communities in development and management is not a new one; it has been part of the development process in Southeast Asia since the 1960s. What is different is the increasing commitment of governments to policies and programs of decentralization and community-based resource management. This can be seen in a variety of policies and programs in the Philippines, Thailand, Malaysia, Indonesia, Laos, Vietnam and Bangladesh.

Community-based resource management systems cannot be revitalized in isolation. The planning and implementation of these systems will require the development of new legal, administrative and institutional arrangements to complement contemporary political, economic, social and cultural structures. Revitalization of community-based fisheries management will occur and is occurring in Southeast Asia in a form of co-management. This new management philosophy once again makes the fisher a part of the resource management team, balancing rights and responsibilities, and working in a cooperative, rather than antagonistic, mode with government managers. Such co-management is a rational extension of evolutionary trends in fisheries management over the past decades.

## References

Ahmed, M. and T.S. Tana. 1996. Management of Freshwater Capture Fisheries of Cambodia – Issues and Approaches. NAGA, the ICLARM Quarterly. 9(1):16-19.

Ahmed, M., D. Capistrano and M. Hossain. 1992. Redirecting benefits to genuine fishers: Bangladesh's openwater fisheries management policy. NAGA, the ICLARM Quarterly. 15(4):31-34.

Ahmed, M., D. Capistrano and M. Hossain. 1997. Experiences of partnership models for the co-management of Bangladesh Fisheries. Fisheries Management and Ecology. 4(3):233-248.

Apu, N.M., M.A. Sattar, D. Nathan, J.D. Balarin, and H.A.J. Middendorp. 1999. Fisheries co-management and sustainable common property regimes based on long-term security of tenure in oxbow lakes in Bangladesh. In. H.A.J.Middendorp, P.M. Thompson and R.S. Pomeroy (eds.) Sustainable inland fisheries management in Bangladesh. ICLARM Conf. Proc. 58.

Aquero, M. and M. Ahmed. 1989. Economic Rationalization of Fisheries Exploitation through management: experiences from the open-water fisheries management in Bangladesh. P.747-750. In R. Hirano and I. Hanyu (eds.) The Second Asian Fisheries Forum. Asian Fisheries Society, Manila, Philippines.

Asian Institute of Technology Aqua Outreach-Lao PDR. 1997. Participatory evaluation workshop of the LCFDPP. Unpublished report. Savannakhet, Lao PDR.

Bailey, C. 1991. Social relations of production in rural Malay society: comparative case studies in rice farming, rubber tapping and fishing communities. *In* J.J. Poggie and R.B. Pollnac (eds) Small scale fishery development: sociocultural perspectives. ICMRD, University of Rhode Island, Kingston.

Bailey, C. and C. Zerner. 1992. Community-based fisheries management institutions in Indonesia. MAST 5(1):1-17.

Baird, I. 1996. Inland Community Fisheries Management in Southern Laos. NAGA, the ICLARM Quarterly. January. P.13-15.

Berkes, F., P. George and R.J. Preston. 1991. Co-management: the evolution in theory and practice of the joint administration of living resources. Alternatives 18(2):12-18.

Byron, N. and G. Waugh. 1988. Forestry and Fisheries in the Asian-Pacific Region: Issues in Natural Resource Management. Asian-Pacific Economic Literature 2(1):46-80.

Cambodia Working Group. 1998. Draft Synthesis Report on Management of Fisheries, Coastal Resources and the Coastal Environment in Cambodia: Institutional, Legal and Policy Perspectives. Wetlands International, Phnom Penh.

Capistrano, D., M. Hossain and M. Ahmed. 1997. Poverty alleviation, empowerment, and sustainable resource use: experiences in inland fisheries management in Bangladesh. P.141-162. In F. Smith (ed.) Environmental Sustainability: Practical Global Implications. St. Lucie Press, Florida.

Chircop, A. and M. Torell. 1997. The legal framework for fisheries co-management in Vietnam. Unpublished Report Prepared for Vietnam-Canada Ocean Policy Project-II, Halifax, Nova Scotia, Canada.

Cholik, F. and S. Ilyas. 1994. The Role of Bottom-up Planning in Poverty Alleviation in Indonesia: The Agriculture Case. Paper Presented at the 7th Biennial Conference of the International Institute of Fisheries Economics and Trade. Taipei, Taiwan, 18-21 July 1994.

Cunningham, P.D. 1998. Extending A Co-management Network to Save the Mekong's Giants. Mekong Fish Catch and Culture. Mekong River Commission, Bangkok. 3(3):6-7.

Department of Fisheries. 1994. A proposed fisheries development and management law. Bangkok, Thailand.

de Sagan, R. 1992. The local government code and its provisions on fisheries. Bureau of Fisheries and Aquatic Resources, Quezon City, Philippines.

Fallon, L.A. and T.E. Chua. 1990. Towards strengthening policy and strategies orientation for fisheries resource management: the role of coastal area management. Tropical Coastal Area Management. 5(3):1-5. ICLARM, Manila

Farooque, M. 1997. Regulatory regime on inland fisheries in Bangladesh: issues and remedies. Bangladesh Environmental Lawyers Association, Dhaka.

FAO. 1993. FAO/Japan Expert Consultation on the Development of Community-Based Coastal Fisheries Management Systems for Asia and the Pacific. Kobe, Japan, 8-12 June 1992. FAO Fisheries Report No. 474. Rome.

Hinton, P. 1985. An approach to the study of traditional systems of coastal resource management in Thailand. *In* K. Ruddle and R.E. Johannes (eds.) The traditional knowledge and management of coastal systems in Asia and the Pacific. UNESCO, Jakarta.

Hirsch, P. 1992. Resource Development in Mainland Southeast Asia: Political and Environmental Considerations. RIAP Occasional Paper No.18, Research Institute for Asia and the Pacific, University of Sydney.

Hirsh, P. 1998. Holding and Managing Resources in Common Issues of Scale in Mekong Development. Paper Presented at the Seventh Common Property Conference of the International Association for the Study of Common Property. Vancouver, British Columbia. 10-14 June.

Jentoft, S. 1989. Fisheries Co-management: Delegating Government Responsibility to Fishermen's Organizations. Marine Policy. 13(2):137-154.

Juntarashote, K. 1994. Possible Development of Community-Based Coastal Fisheries Management in Thailand with the Advent of Fishing Rights System. Paper presented at the 7th Biennial Conference of the International Institute of Fisheries Economics and Trade, Taipei, Taiwan. 18-21 July 1994.

Kalagayan, B.N.V. 1991. Philippine initiatives in marine coastal conservation. Lundayan. II(1)2-7.

Korten, D.C. (ed.) 1986. Community Management: Asian experiences and perspectives. Kumarian Press, West Hartford, Connecticut.

Korten, F.F. 1986. The Policy Framework for Community Management. in D.C. Korten (ed.) Community Management: Asian Experiences and Perspectives. Kumarian Press, West Hartford, Connecticut.

Kuperan, K. and N. Mustapha. 1994. Small-Scale Coastal Fisheries and Co-management. Marine Policy. 18(4)306-313.

Kurien, J. 1994. Towards an Integrated Community Management of Coastal Fisheries. in R.S. Pomeroy (ed.) Proceedings of the Workshop on Community Management and Common Property of Coastal Fisheries and Upland Resources in Asia and the Pacific: Concepts, Methods and Experiences. ICLARM Conf. Proc. 45. Manila.

Lhaopadchan, P. 1993. The pilot project in territorial use rights in fisheries. Department of Fisheries, Bangkok, Thailand.

Lopez, M.D.G. 1983. Notes on traditional fisheries in the Philippines. *In* K. Ruddle and R.E. Johannes (eds.) The traditional knowledge and management of coastal systems in Asia and Pacific. UNESCO, Jakarta.

Majid, D.S. 1992. Coastal Fisheries Management in Malaysia. Department of Fisheries. Kuala Lumpur, Malaysia.

Ministry of Fisheries. 1995a. Fisheries Sector Strategy. Hanoi.

Ministry of Fisheries. 1995b. Co-management of living coastal resources in ASEAN: theory, practice and implications for Vietnam. Hanoi.

Ministry of Fisheries. 1997. Master Plan for Fisheries to the Year 2010. Hanoi.

NEDA (National Economic and Development Authority). 1993. Medium- term Philippine Development Plan. draft. Manila, Philippines.

Nikijuluw, V.P.H. and N. Naamin. 1994. Current and future community-based fishery management in Indonesia. Indonesian Agricultural Research and Development Journal. Vol. 16, No. 2, pp. 19-23.

Noraseng, P. 1998. National and local experiences with community-based fishery management: Policy and research perspectives from Lao PDR. Paper presented at the Seventh Common Property Conference of the International Association for the Study of Common Property. Vancouver,

British Columbia. 10-14 June.

Pauly, D. 1989. Fisheries resources management in Southeast Asia: why bother? in T.-E. Chua and D. Pauly (eds.) Coastal Area Management in Southeast Asia: Policies, management Strategies and Case Studies. ICLARM Conf. Proc. 19. Manila.

Pinkerton, E. 1989. Introduction: Attaining better fisheries management through co-management--prospects, problems and propositions, p. 3-33 *In* E. Pinkerton (ed.) Cooperative management of local fisheries. University of British Columbia Press, Vancouver.

Pollnac, R.B. 1987. Mystery of the Missing Cooperatives. Nearshore. (1)1:8-9.

Pomeroy, R.S. and M. B. Carlos. 1997. Community-based coastal resource management in the Philippines: a review and evaluation of programs and projects, 1984-1994. Marine Policy. 21(5):445-464.

Pomeroy, R.S. and M.J. Williams. 1994. Fisheries Co-management and Small-Scale Fisheries: A Policy Paper. ICLARM. Manila, Philippines.

Piumsombun, S. 1993. The socioeconomic feasibility of introducing fishery right system in the coastal waters of Thailand. Department of Fisheries. Bangkok.

Ruddle, K. 1994. Changing the focus of Coastal Fisheries Management, p.63-86. in R.S. Pomeroy (ed.) Community Management and Common Property of Coastal Fisheries in Asia and the Pacific: Concepts, Methods and Experiences. ICLARM Conf. Proc. 45. Manila, Philippines.

Sajise, P.G. 1995. Community-based resource management in the Philippines: perspectives and experiences. Paper presented during the training course in Co-management of Living Coastal Resources in ASEAN: Theory, Practice and Implications for Vietnam. Ministry of Fisheries, Hanoi, Vietnam.

Sinkham Phomvisay. 1997. Policies for Fisheries Management and Research in Laos. Ministry of Agriculture and Forestry, Department of Livestock and Fisheries. Vientiane.

Sulaiman, H. 1994. p. 160. in G. R. South et al. (eds.) Traditional Marine Tenure and Sustainable Management of Marine Resources in Asia and the Pacific. University of the South Pacific, Suva, Fiji.

Tabunda, M.S. and M.M. Galang. 1992. A guide to the local government code of 1991. Mary Jo Educational Supply, Manila.

Thompson, P.M., M.N. Islam, and M.M. Kadir. 1989. Impacts of government-NGO initiatives in community-based fisheries management in Bangladesh. Paper presented at Seventh conference of the International Association for the Study of Common Property, Vancouver 10-14 June 1998.

Thong, H.X. 1995. The problems facing small-scale coastal fishing in Vietnam. Institute of Fisheries Economics and Planning, Ministry of Fisheries, Hanoi.

Thong, H.X. and N.D. Thieu. 1998. Traditional Organizations in Fishing Communities of Small-scale Fisheries in Vietnam. Fisheries Co-management Project Working Paper. ICLARM, Manila.

Tillah, R.C. 1992. The Proposed Philippines fisheries code. *In* M.P. Garcia, Jr. (ed.) Policies and issues on Philippine fisheries and aquatic resources. Department of Science and Technology. Bicutan, Taguig, Metro Manila.

Tokrisna, R. and M. Duangsawasdi. 1993. Thailand experience in fisheries management in FAO/Japan expert consultation on the development of community-based coastal fishery management systems in Asia and the Pacific. FAO Fish. Rep. 474. FAO, Rome.

Tokrisna, R., P. Boonchuwong and P. Janekarnkij. 1997. A Review on Fisheries and Coastal Community-Based Management Regime in Thailand. Fisheries Co-management Project Working Paper 32. ICLARM, Manila.

Torell, M. 1998. Institutional, Legal and Policy Perspectives on the Management of Aquatic Resources (especially fisheries) and the Aquatic Environment in Wetlands, Floodplains, Lakes and Rivers in the Mekong River Basin. Paper presented at the Seventh Common Property Conference of the International Association for the Study of Common Property. Vancouver, British Columbia. 10-14 June.

Van Zalinge, N., N. Thouk and T.S. Tana. 1998. Where there is water, there is fish? Fisheries issues in the lower Mekong Basin from a Cambodian perspective. Paper presented at the Seventh Common Property Conference of the International Association for the Study of Common Property. Vancouver, British Columbia. 10-14 June.

Wahyono, U, and K.C. Chong, Suseno and R. Paklawo. 1992. Traditional community-based fisheries management practices in Indonesia. Directorate General of Fisheries, Ministry of Agriculture, Jakarta.

Williams, M.J. 1994. Transition in the Contribution of Living Aquatic Resources to Sustainable Food Security. ICLARM. Manila, Philippines.

Yahaya, J. and T. Yamamoto. 1988. A socioeconomic study of fisheries management and conservation with particular reference to two artisanal fishing villages in Penang, Peninsular Malaysia. College of Economics, Nihon Unievrsity, CENU International Publications Series No. 1.

Yamamoto, T. 1994. An overview on Fisheries Management at Global level with Particular Reference to Community-Based Fisheries Management Systems. Paper presented at the 7th Biennial Conference of the International Institute of Fisheries Economics and Trade. Taipei, Taiwan. 18-21 July 1994.

# Chapter Five
# The Role of Government in Fisheries Co-management[4]

## Introduction

The last decade has seen the proliferation of literature on CBCRM and co-management (e.g., Jentoft 1985; Pinkerton 1989; Berkes et al. 1991; Pomeroy 1994). Much of what has been written has focused on the community level regarding issues of local organization, community-based management process, and development interventions. Much less has been written, however, about the role and activities of government. Yet, it takes two parties to have co-management, and the government is a crucial partner. If co-management initiatives are to be successful, basic issues of government legislation and policy to establish supportive legal rights and authority frameworks must be addressed. The establishment of an appropriate government administrative structure and an enabling legal environment are critical in efforts to promote and sustain existing local-level fisheries management systems and/or to develop new co-management systems.

The purpose of this chapter is to discuss the role of government, primarily national government, in fisheries co-management. More specifically, this paper investigates the critical role of decentralization in a strategy for co-management. Following the typology generally used in the public administration literature (e.g., de Guzman 1991), vertical decentralization is considered to take four forms: deconcentration, delegation, devolution, and privatization. This chapter starts with a discussion of conditions for co-management, and an expansion of the notion of decentralization. It then deals with a number of international cases that provide examples of the four different kinds of decentralization, and ends with some concluding comments based on this international experience.

### The Establishment of Conditions for Co-management

Increasingly, government policies and programs stress the need for greater resource user participation and the development of local organizations to handle some aspect of resource management. In the area of fisheries, this trend is international in scope and can be observed in a number of countries in the Americas, Europe and Asia (Jentoft and McCay 1995; Pomeroy 1995; Sen and Raakjaer-Nielsen 1996). A review of the international experience shows that policies favoring co-management are a necessary but not sufficient condition for successful co-management. There are only two well documented cases of long-standing marine fishery co-management arrangements that work, in Norway (Jentoft 1985, 1989) and in Japan (Ruddle 1987; Lim et al. 1995), and both of them have a legal basis. This suggests that it may be insufficient for governments simply to call for more community involvement and fisher participation; they must also establish commensurate legal rights and authorities and devolve some of their powers. The delegation of authority and power sharing to manage the fisheries may be one of the most difficult tasks in establishing co-management. Government must not only foster conditions for fisher participation but sustain it.

As a first step, the government must establish conditions for (or at least not impede) co-management systems to originate and prosper. At a minimum, government must not challenge fishers rights to hold meetings to discuss problems and solutions and to develop organizations and institutional arrangements (rights and rules) for management. Fishers must feel safe to openly meet at their own initiative and

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discuss problems and solutions in public forums. They must not feel threatened if they criticize existing government policies and management methods. As a second step, fishers must be given access to government and government officials to express their concerns and ideas. Fishers should feel that government officials will listen to them. As a third step, fishers should be given the right to develop their own organizations and to form networks and coalitions for cooperation and coordination. Too often there has been the formation of government-sponsored organizations which are officially recognized but ineffective since they do not represent the fishers, but these may be the only type of organization a government may allow. Fishers must be free to develop organizations on their own initiative that meet their needs.

Fishers often develop their own rules for management in addition to those created by government. For example, fishers may establish rules defining who has access to a fishing ground and what fishing gear can be used. The fishers may be able to enforce the rules as long as there is at least a minimal recognition of the legitimacy of these rules by the government. This can be formal, as through a municipal ordinance, or informal, as through police patrols to back-stop the local enforcement arrangements. If government does not recognize the legitimacy of the rules, then it will be difficult for the fishers to maintain the rules in the long run (Ostrom 1994). Thus, the role of government in establishing conditions for co-management is the creation of legitimacy and accountability for the local organization and institutional arrangements. The government, through legislative and policy instruments, defines power sharing and decision-making arrangements. Only government can legally establish and defend user rights and security of tenure. One means of establishing these conditions is through decentralization.

## Decentralization and Co-management

Decentralization refers to the systematic and rational dispersal of power, authority and responsibility from the central government to lower or local level institutions - to states or provinces in the case of federal countries, for example, and then further down to regional and local governments, or even to community associations. The approach of decentralization is for the center to delegate some measure of its power to the lower levels or smaller units in the government system. Increasing local autonomy is a focal point in the decentralization process. Generally, power and authority are transferred or withdrawn by laws enacted in the center.

Co-management requires a clear commitment on the part of government to the sharing of power and authority with local government and local fisher and community organizations. In many countries, government programs and projects stress the development of local organizations and autonomy to handle some aspect of fisheries management. Seldom, however, is adequate attention given to the establishment of a administrative and policy structures that defines the legal status, rights and authorities essential for the effective performance of local organizations. Many attempts at decentralization have not delivered a real sharing of resource management power.

Initiatives in community-based resource management in Asia, for example, have been popular throughout most of this century under different names. However, as Korten (1986) explains it, "none of these approaches to stimulating local initiatives provided a fundamental challenge to the idea that the government does development for the people, who are expected to respond with grateful acceptance of whatever guidance and assistance government chooses to offer. None challenged the nature of the government's role or the appropriateness of the structures and procedures through which government conducts its business. None confronted basic issues of local social structures and resource control."

If new fisheries co-management initiatives are to be successful, these basic issues of government policy to establish supportive legislation, rights and authority structures must be recognized. The devolution of fishery management authority from the central government to local level governments and organizations is an issue that is not easily resolved. Legislation and policy for co-management are embedded in a broader network of laws, policies and administrative procedures, at both national and local government levels. Consequently they will be difficult to change. Government administrative and institutional structures, and fisheries laws and policies will, in most cases, require restructuring to support these initiatives.

In some cases, it may be more feasible and desirable to draw up completely new legislation, rather than to modify existing acts. A case in point is the establishment of Mafia Island Marine Park in Tanzania. The idea of a marine protected area developed in the course of an environmental assessment process regarding petroleum exploration. Local fishers were involved in the assessment process to provide information on resources. Initially, a reserve was set up to protect fishery resources; by 1991 it had evolved into a locally managed marine park. But it became obvious soon that the needs of the local people could not be met under the existing fisheries legislation. New legislation was developed with support from international conservation organizations and the FAO, and the Tanzania Marine Parks and Reserves Act came into being in 1994. This act provided for the formal inclusion of village council representatives on the technical committee for the Mafia Island Marine Park for co-management and for the sharing of benefits (M. Ngoile, IUCN, personal communication, July 1996; Ngoile et al. 1995).

As the Tanzania case illustrates, the actual form of co-management will depend upon the type of government and the political will for decentralization. In general, co-management is consistent with the aims of democratization and empowerment. In the first place, the goals of co-management include the greater participation of fishers in the fisheries management process, more self-reliance of local level institutions, and a more responsive decision-making process. The ultimate goal of decentralization is greater participation and efficiency by getting people at lower levels more involved in the decision-making processes and procedures that affect them. One assumption of decentralization is that the deployment of power and resources to the community will enhance community and economic development. Thus, the promise of decentralization is greater democratization and development of local communities. In this assumption, an important concern is the significance of intervening variables such as leadership, skills of fishers, resources, and capabilities of local institutions.

In detailing the specifics of the decentralization strategy, questions of implementation become crucial points of debate. What powers and functions, for instance, can be properly entrusted to local institutions? What are those that should be left to the central government? How is the sharing of resources to be administered? What should be the role of non-government organizations and people's organizations? What is the proper and appropriate mix of government and private sector participation? Will decentralization occur only for the fisheries bureaucracy, or will it be a government-wide initiative? This collection of issues impinges on decentralization strategies and drives the political debate associated with decentralization.

Decentralization may be operationalized in varying degrees and may take a number of forms, depending on to what extent and to whom power and authority are delegated. Vertical decentralization of government can itself take four forms (de Guzman 1991, Gasper 1991):

- Deconcentration is the transfer of authority and responsibility from the national government departments and agencies to regional, district and field offices of national government offices. This is referred to as administrative decentralization.

- Delegation is the passing of some authority and decision-making powers to local officials, but central government retains the right to overturn local decisions and can, at any time, take these powers back.

- Devolution is the transfer of power and responsibility for the performance of specified functions from the national to the local governments without reference back to central government. The nature of transfer is political (by legislation), in contrast to deconcentration's administrative; and the approach is territorial or geographical, in contrast to sectoral.

- Privatization is the transfer of responsibility for certain governmental functions to non-governmental organizations, voluntary organizations, community associations and private enterprises.

International experience in fisheries co-management at the national government level can be used to illustrate these four forms of decentralization, recognizing that examples do not always fall cleanly into any one category.

*Example of deconcentration*

United States

Under the Fishery Conservation and Management Act of 1977 (Magnuson Act) eight regional fishery management councils were created in the major fishing regions of the United States. The Magnuson Act has been identified as a co-management system since a part of the Federal Government's authority to manage fishery resources has been given to the regional councils. A power-sharing arrangement for resource conservation and management between government and fishers and resource stakeholders occurs through the councils. The regional councils have the primary functions to develop, monitor, and evaluate fishery management plans for various fisheries needing conservation and/or management within the council's area of responsibility. Plans must be approved by the federal government before implementation. Public hearings are held by the councils throughout the planning process to provide public input. The councils are composed of persons "knowledgeable concerning fisheries and the fishing industry." Members range from commercial and recreational fishers, to consumers, to seafood processors, to environmentalists. Members of the councils are appointed through a highly politicized process where they are nominated by the governors of the states within a council's area of responsibility and appointed by U.S. Secretary of Commerce (Fricke 1995). The Act has brought about the deconcentration of management authority previously under the central government, but this has not necessarily resulted in effective co-management. Resource management under the Act has received mixed reviews. A number of studies have examined the performance of the various councils. For example, Hanna (1996) reported on three cases of groundfish management within the Pacific Fishery Management Council, and concluded that the effect of user participation on management performance was mixed.

*Examples of delegation*

Zimbabwe

A decentralization process for the co-management of the inshore fishery of Lake Kariba Recreational Park has been occurring within a policy framework analogous to the CAMPFIRE (Communal Area Management Project for Indigenous Resources) program which sought to confer benefits and responsibilities of proprietorship over wildlife to the inhabitants of communal lands (Martin 1986, 1994). Under the Lake Kariba program, fishers are to receive proprietorship over inshore resources in defined "exclusive fishing zones." Fishing camps/communities will be empowered to take over the responsibilities of managing the fisheries resources and to develop and implement their own regulatory measures in these areas (Machena and Kwaramba 1995).

The 1975 Parks and Wildlife Act states that the legal ownership of wildlife is with the State. In 1982, the Parks and Wildlife Act was amended with the provision that the Ministry of Environment and Tourism could grant "appropriate authority" for wildlife on lands under the responsibility of rural district councils (Jackson 1995). Within the institutional structure proposed for managing Lake Kariba, the government can define and designate appropriate authority for waters and controlled fishing waters under section 95.1 of the Parks and Wildlife Act to rural district councils. National Parks and Wildlife Management plans to allocate this authority to communities below the rural district council (Jackson 1995). Management control of portions of Lake Kariba will be delegated from the State to the rural district councils. Based on existing fishery concessions and with some possible redefinition of boundaries, authority and proprietorship over "controlled waters" will be given to the rural district councils. The councils can further delegate authority to fishers in the fishing camps/communities (Jackson 1995).

Atlantic Canada

Another example of decentralization by delegation of powers comes from Canada's Atlantic coast fishery. Kearney (1984) showed that the involvement of fishers in decision-making can be traced to a Canadian government policy dated 1976. But in the years that followed, an "advisory model" of decision-making became dominant, one in which fishers and other stakeholders generated advice for the decision-makers but did not actually participate in decision-making. The self-determination model of decision-making was referred to as "co-management" as early as 1978 in a speech by Canada's Minister of Fisheries and Environment. As quoted by Kearney (1984), the speech offered fishers the opportunity to co-manage the fishery "so they could take over their fishery, own their boats, run their business, negotiate prices and working conditions, and become partners fully equal with those who buy, process and market fish".

The principles of co-management proposed by the Government of Canada were subsequently described in more detail in a government discussion paper in 1981. Co-management was designed to address two objectives: to delegate certain responsibilities to fishers, such as arbitrating and policing, and as a mechanism to tailor resource management measures according to local needs. But the discussion paper was ambiguous and did not make it clear whether co-management was merely a mechanism for consultation or involved the delegation of substantive areas of decision-making to fishers (Kearney 1984). In the years that followed, the Canadian government tried to open up the fisheries policy process as well. In the provinces of Eastern Canada, the principal approach was consultative: user groups were consulted about their concerns and opinions, but decisions were made by the Ministry. The consultative process, which began modestly in the 1970s with a handful of advisory committees, multiplied into tens of committees covering every sector and major marine resource species. In the Scotia Fundy region

alone, there were as many as 28 committees in the 1990s (Jentoft and McCay 1995). With this development came the delegation of decision-making powers to regional offices of the Ministry, even though there was no devolution of powers by legislation to lower levels of government and to organizations of fishers.

Examples of devolution

Canada

Successful cases of co-management in Canada are related to aboriginal peoples and land claims agreements, not because native groups and governments work particularly well together, but because land claims agreements provide legally defined management rights of local resource users - a feature missing in other kinds of co-management arrangements in Canada involving non-aboriginal fishers. Co-management in the North started with the 1975 James Bay and Northern Quebec Agreement which was the first of the modern comprehensive land claims agreements in Canada, followed by the Inuvialuit Final Agreement of 1984, the Nunavut Agreement of 1993, and others. Each of these agreements has a chapter (Section 24 in the case of the James Bay and Northern Quebec Agreement) specifying the sharing of jurisdiction for fisheries and wildlife management, and establishing an institutional structure (in the form of management boards and joint committees) to implement co-management. Each of these boards is empowered through legislation, which gives effect to the particular agreement.

Prior to these agreements, aboriginal people in Canada had no legislated rights except through the original treaties that were signed in the 1880s and the early 1900s. Many of these treaties were superceded by conservation legislation passed by the Canadian Federal Government and the provincial governments, leaving aboriginal people as "poachers on their own land" (Berkes 1989). With the new agreements, the rights of aboriginal fishers and hunters are established in law, although aboriginal resource rights continue to be an issue of major public debate (Usher 1987; Berkes and Henley 1997). Additional agreements are likely to be negotiated and enacted in the coming years, also through a process of devolution of powers from the Federal and Provincial Governments to regional governments representing aboriginal people (Bonin 1995).

Norway

Jentoft's (1985;1989) work provides a detailed description of what might be the earliest co-management arrangement in Europe that involves devolution, Norway's Lofoten Islands cod fishery. As with almost all cases of co-management, it started as a solution of last resort to a resource conflict case, but continued to survive for over a century. Located on cod migration routes and providing lucrative catches, Lofoten Islands in northwest Norway supported a major cod fishery since ancient times. Norway's most important cod fishery, the Lofoten fishery, takes place from early January until late April, and provides the main income source for many small-scale fishers.

In historical times, the high numbers of fishers attracted to the area caused crowding problems and conflict among fishers, especially among those using different kinds of gear. During the 19$^{th}$ century, various kinds of regulatory systems were tried, but none could resolve the problems of the fishery until co-management principles were introduced in the 1890s through the Lofoten Act. Under co-management, the Norwegian government formally gave the responsibility for regulation of the fishery to the fishers. Different gear group representatives formed special district committees, and made rules for allowable fishing times, type of gear allowed, and the amount of space allocated for the different gear types. There were elected fishers acting as inspectors, and a public agency was formed to oversee

enforcement. With a few changes in modern times, the system has evolved and continued to operate. Jentoft (1985) remarks that "this (devolution of management power to fishers) has been so successful that there has not been even a suggestion that the state should take over this role."

Japan

The Japanese coastal fishery is co-managed using a system, which provides regulatory authority at national and regional levels, and decision-making power mainly at the local level. Under the Fisheries Law of 1901 (which was updated in 1949), the hereditary fishing rights and privileges bestowed by feudal lords were converted into "exclusive fishing rights" or sea tenure (Yamamoto 1992). The fishing guild evolved into local village-based fishing cooperatives. All coastal waters except port areas and industrial zones are owned by fishing cooperative associations (FCA) or federations thereof. The FCAs control many aspects of the coastal fishing activity within their immediate jurisdiction by implementing and enforcing national fishery laws and regulations, supplemented or complemented by those made locally. For example, the national government establishes total allowable catch (TAC) for the offshore and coastal fishing areas. The division of the total quota for a particular FCA is done by the prefecture. The FCA then has the responsibility to allocate their specific fish quota. The FCA has close interaction with the national, prefecture and municipal governments on a number of fishing related matters including design and implementation of management plans, approval of regulations, fishery projects, and budgets, subsidies, and licenses and other rights (Lim et al 1995).

Examples of privatization

Netherlands

The Dutch use an individual quota management system, developed over the last 20 years, for managing different groups of fish species based on a national quota. In the early 1990s, the fisheries Directorate felt it had become too highly involved in the management of the fishery sector, and that there was a need to give fishers more responsibility for management. In 1992, a working group composed of representatives from government, fishers and the marketing and processing industry developed a co-management system in which responsibility for the management of the annual quota was devolved to "management groups" of fishers. The objective of the management groups is to control the quota of its members in a flexible and economically responsible way. Fishers work together to prepare a plan for allocation of the pooled quota which must be approved by the group management board. While fishers are now more involved in fisheries management, ultimate control still rests with the government. The government still has responsibility for controlling national quotas, implementing aspects of the common fisheries policy of the European Union, and establishing the conditions under which the management groups operate (Dubbink and van Vliet 1995; Hoefnagel and Smit 1995).

Bangladesh

Transferable quotas are not the only mechanism by which privatization can be implemented. The management system used in the inland openwater fisheries of Bangladesh provides an example of an alternative way in which the responsibility for certain government functions can be transferred to individuals and corporations. Some 10,000 fishing spots in Bangladesh's inland openwater fishery are allocated by leasing in an open auction, apparently a continuation of the revenue-generating system from the colonial times. Those who purchase the leases in the auction can then fish the area and manage the fishery, establishing their own security force to close access to other potential fishers.

The system has been criticized from an equity point of view because lease-holders tend to be middlemen-entrepreneurs who do not fish the area themselves but in turn sell fishing rights to others (Ahmed et al. 1992). This creates a situation in which the main beneficiaries of the fishery are not the fishers themselves but the middlemen. However, the system tends to perpetuate itself because the real fishers (who are typically poor) tend to owe money to middlemen and can never get out of a cycle of debt; they have little chance of buying fishing rights directly from the government. The Government of Bangladesh has tried a number of pilot projects in an effort to channel more of the fishing income to the genuine fishers, some aiming at institution building through the involvement of NGOs (Ahmed et al. 1992; Capistrano et al. 1994). Bangladesh is not the only country in which fishing spots are allocated by auction. A similar fishery takes place in the floodplain of the Mekong River in Cambodia, with auctioned fishing areas and similar problems of equity (Ahmed et al. 1996).

### A Case Study of Devolution: Philippines

The island settlers of what would become the Philippines had a long history of traditional fisheries rights and allocations before the archipelago was first colonized by Spain in the 17th century. The *barangay* (village) had jurisdiction over coastal resources and fishery limits were defined by them. The traditional property rights of barangays over fishing grounds were steadily eroded during the long Spanish colonial period, with community authority and rights superseded by state government control (Kalagayan 1991). Lopez (1983) reports that under Spanish rule, the barangays were eliminated as administrative entities and with them went the territorial fishing rights claimed by each village. Under Spanish law, the fisheries and other natural resources were declared to be held by the Crown. Under both the Spanish and the Americans, traditional authority and rights were superseded by municipal government control of local fishing grounds. This administrative structure of municipal authority remains in place in the country today. Despite the historical existence of traditional fishing rights and village-based management systems in the Philippines, for the most part these systems have disappeared in the country. This is not to say that traditional community-based resource management systems, and informal fisheries rights and rules systems do not exist, for localized examples can be found throughout the country (Ferrer 1989; Mangahas 1994).

After the second World War and the Philippines independence in 1945, the country struggled to build its economy and the fishing industry started to develop more rapidly with an increase in the number of commercial fishing vessels. In the 1960s, the Philippine government, aided by Japanese advisors, undertook intensive infrastructure, technology, extension and credit programs through the Fisheries Development Program to "develop" the industry (Heinan and Gonzales 1993). In the early 1970s, the country fell under Martial Law and the centralized government control of fisheries was further reinforced through Presidential Decree (PD) 704, otherwise known as the Fisheries Act of 1975. Under PD 704, fisheries management is the responsibility of the government, both national and municipal. The management measures (mainly through regulatory instruments) undertaken by the government during this time, however, have been ineffective in promoting the sustainable development and management of the country's fisheries. In the mid-1970s, in response to decreasing unit catch of small-scale fishers, the government embarked on fishery policies and development programs concentrated on "use orientation", that is, increasing production and exploitation of the resource base.

In the 1980s, the government continued to support the needs of the sector through the Expanded Fish Production Program (EFPP) from 1983-1987. In the small-scale fisheries sector, the strategy of the program was geared towards enabling the small fishers to venture into deeper waters by equipping them with more efficient boats and fishing gears. The underlying assumption was that the fishery could support increased fishing effort, despite expert opinion as early as 1980 that it could not. Ironically, it

was during this period (1984-1988), that there was a decreased rate in coastal fish production of 1.3 percent a year, compared to the increasing rate of 6.1 percent in the preceding five years from 1979-1983 (Agbayani 1993).

The problems in the fishery continued to worsen throughout the late 1980s and early 1990s. The management (mainly through regulatory instruments) and development (increased fishing effort) measures undertaken by the government have proven to be ineffective in promoting the sustainable management and development of the country's fisheries. Despite the extent and productive potential of the Philippine coastal waters, the coastal fishery continues to decline due to overfishing, compounded by the destruction of critical coastal habitats (coral reefs, mangroves, sea grass), siltation and pollution. Exacerbation of this condition is predicted to continue due to increasing population, weak administrative capacity, ineffective property rights arrangements and poverty.

As discussed, for centuries natural resource management in the country has been strongly centrally determined, top-down and non-participatory. This applies to forestry, fisheries, mines and the irrigation sectors. However gradually, it was realized that with the increasing rate of deterioration of natural resource systems in the Philippines, there was no way the country could pursue a pathway of sustainable development. Starting in the 1960s, alternative methods of resource use and management were explored in an attempt to reverse these negative trends. Consequently, there has been a shift to forward-looking policies and strategies that advocate "resource management" over a "use orientation" through community-based initiatives to rehabilitate, conserve and protect the resources based on use and enhancement of local knowledge, skills, responsibility and accountability (Sajise 1995). The irrigation sector was the first to evolve an institutional development scheme for mobilizing the active participation of water users in 1968. People-oriented programs in the forestry sector started in the early 1970s (Serna 1993). Community-based coastal resource management (CBCRM) started in the early 1980s.To date, well over 200 CBCRM projects have been implemented by government, NGOs, fishing communities, and academic and research institutions. No country in the world has the range of experience with CBCRM and co-management as exists in the Philippines (Carlos and Pomeroy 1996).

The current efforts in community-based coastal resource management and co-management in the Philippines emanate from the government, NGOs and international development agencies. The past administration provided some impetus when in 1989 President Aquino created a Presidential Commission on Anti-illegal Fishing and Marine Conservation or the Bantay Dagat Committee, which called for increased coordination among government agencies in enforcement of fisheries laws and increased participation of fishers in management (Kalagayan 1991). In 1991, the government recognized the need to increase participation in management and to devolve control over resource access to local levels through policy and institutional reforms. Through several initiatives, the government now actively promotes devolution and community-based resource management and co-management efforts to conserve the coastal resources and diversify the income sources of the low-income small-scale fishers. These initiatives for CBCRM are embodied in the 1993-1998 Medium-Term Philippine Development Plan (MTPDP). Among its strategies are to: implement a community-based fishery management strategy; regulate fishing effort within maximum sustainable yields; promote territorial use rights for small fishers; intensify aquaculture, optimal utilization of offshore, deep sea resources; and provide diversified occupational opportunities among marginal fishers. The core program for fisheries implemented under the plan was the Fisheries Sector Program (FSP) from 1990 to 1995. Among the policy and institutional reforms instituted through the FSP were: (1) decentralization of authority and simplification of procedures for clearance of local fisheries management ordinances subject to national laws and/or policies; (2) strengthen the enforcement of fisheries laws through municipal-based inter-agency law enforcement teams; (3) promotion community-based initiatives to rehabilitate, conserve and

protect the coastal resources and to diversify the sources of income of small-scale fishers; (4) NGOs will be engaged to assist and undertake community organizing; and (5) shift to limited access in concerned fishing areas. At the core of the resource and rehabilitation thrust of the FSP is coastal resource management. Fishers, local government units and other concerned agencies in the area were given the opportunity to determine the specific problems in their areas and to identify the management strategies to counteract these problems. There are plans for a second phase of the FSP.

In 1991, the Philippine government enacted into law the Local Government Code (LGC) which sought to decentralize government functions and operations to local governments. A general operative principle is a provision that the local government units (LGU) may group themselves, consolidate or coordinate their efforts, services and resources for purposes commonly beneficial to them. The LGC granted local governments (municipalities) with a number of powers including the management of municipal or nearshore waters. Under the LGC, municipal waters were defined as all waters within 15 kilometers of the coastline. A general operative principle is a provision that the local government units (LGU) may group themselves, consolidate or coordinate their efforts, services and resources for purposes commonly beneficial to them. Section 35 specifically states that LGUs may enter into joint ventures and such other cooperative arrangements with people's organizations and non-governmental organizations to engage in the delivery of certain basic services, capability building and livelihood projects, and to develop local enterprises designed to diversify fisheries, among others. The LGUs and local communities are also given certain privileges and/or preferential rights. Municipalities shall have the exclusive authority to grant fishery privileges in municipal waters and impose rentals, fees and charges. In terms of fishery rights, the organizations or cooperatives of marginal fishers shall have preferential rights to fishery privileges within the municipal waters such as the erection of fish corrals and gathering fish fry free of any rental, fee or charge (de Sagan 1992, Tabunda and Galang 1992).

In 1998, Republic Act No. 8550 or the Philippine Fisheries Code was signed into law. Under the Fisheries Code, several sections of the LGC were supported such as the designation of municipal waters up to 15km for shore and the granting of preferential rights to fishing privileges in municipal waters to registered fisher organizations and cooperatives. In addition, the Fisheries Code endorsed the establishment of Fisheries and Aquatic Resources Management Councils (FARMC) at national and municipal levels. The FARMCs are mandated to carry out a number of management advisory functions in close collaboration with the LGU. These functions include assisting in the preparation of Municipal Fishery Development Plans, recommending the enactments of fishing ordinances, assisting in enforcement, and advising the LGU on fishery matters. The FARMCs are formed by fisher organizations and cooperatives and NGOs with assistance from the LGU

It is a little too early to evaluate the impact of devolution on fisheries management in the Philippines. Local governments were not prepared for the devolution, limited resources were made available to them from the national government for the transition, and it has taken them awhile to adjust to the new authority that they now have. Many have not done anything, while some have actively engaged in supporting fisher organizations and local management measures. Overall, those involved in fisheries conservation and management in the country feels that devolution has been a positive step towards sustainable management of fisheries resources in the country (Tagarino 1995; Fellizar et al 1997).

## Discussion

International experience suggests that fisheries co-management does not come about automatically but requires some impetus. Most commonly, it is the recognition of a resource management problem that triggers co-management. Problem recognition may be related to resource deterioration (as in the case of the Philippines and the Tanzanian marine protected area), conflicts between stakeholders (e.g., Norway's Lofoten cod fishery and Philippines coastal fisheries), conflicts between management agencies and local fishers (e.g., Canada's Atlantic coast fishery), and governance problems in general (e.g., Philippines, the United States Fishery Conservation and Management Act, and northern aboriginal land claims in Canada). In this regard, the experience with fisheries co-management is similar to the international experience with the co-management of protected areas (McNeely 1995; Borrini-Feyerabend 1996), forests (Lynch and Talbott 1995), wildlife (Martin 1986), and other resources.

In each case, governments have turned to co-management as a means of responding to a management crisis, and sometimes to a management opportunity, as in the case of resource rehabilitation projects and perhaps also in some land claims agreements. Various types of decentralization can be used by governments to establish conditions conducive to co-management. Decentralization and co-management often go together, and there are a number of similarities between their goals. The strategies of decentralization and co-management not only respond to management crises, they also offer the promise of increased democratization, and empowerment and development of regional and local communities. The goals of both co-management and decentralization are the mobilization and strengthening of people's participation in government and more equitable distribution of power and resources to local-level groups of people and communities (de Guzman 1991).

The form and process of decentralization and co-management can be seen as a focus for user participation in management. Decentralization in a governmental context may proceed in the logical sequence of: (1) organizational and physical deconcentration; (2) administrative delegation; (3) political devolution; and (4) popular privatization (Gasper 1991). These modes of decentralization may occur separately or in a cumulative package. Thus, decentralization can be seen as a continuum ranging from deconcentration to privatization where more power and authority is delegated to local-level institutions as one moves along the continuum. Co-management can also be viewed as a continuum, similar to that of decentralization, based on the role(s) played by government and resource users ( Berkes 1994; Pomeroy and Williams 1994; Sen and Raakjaer-Nielsen 1996). In both decentralization and co-management, the central government acts to delegate power and authority to local-level institutions.

The form of decentralization will depend, like the form of co-management, on country-specific conditions. As can be seen from the examples above, there is no one "best" form of decentralization to support co-management, as there is no one "best" form of co-management. Decentralization can occur as a broad administrative mandate of which fisheries is included, as in the case of the Philippines, or it may occur for specific management functions, as is the case in Japan and Tanzania. Both co-management and decentralization should be viewed as an evolving process, which adjusts and matures over time. For example, the process of decentralization may proceed over time from deconcentration to devolution as more knowledge and experience is gained by the government, and as the political will for decentralization increases; this was the case in the Philippines (de Guzman 1991). In a similar fashion, co-management systems may evolve through experience through the delegation of more and more power and authority by the government, as in the case of the Lofoten fishery in Norway (Jentoft 1985; 1989).

The decentralization process, however, is laced with potential roadblocks and pitfalls. Politicians may be reluctant to allow greater democratization of the political system. Politicians and government agency administrators may be reluctant to relinquish their authority or portions of it in order to protect their power and positions of their own agencies. The local power and authority may fall into the hands of

leaders and groups who are not committed to its basic values and goals. An important concern for the success of both decentralization and co-management are variables such as leadership, skills, resources, and capabilities of local-level organizations and institutions.

The process of developing a co-management system will likely involve the restructuring of national laws and policies, as well as national fisheries agencies and bureaucracies. Existing national laws and policies usually do not include specific reference to such functions of co-management as the security of local-level tenure and property rights over coastal resources, people's participation, and the recognition and incorporation of local traditional/informal/folk management systems. New laws and policies may need to be developed and/or existing laws and policies amended or reinterpreted to authorize and legitimize these functions of co-management. Both the Philippines and Thailand, for example, are undertaking such a process (Pomeroy 1995). New laws and policies may need to be reviewed to identify compatability and inconsistency with laws and policies for resource management in other sectors and with overall administrative laws and policies. National fisheries agencies and bureaucracies may require restructuring to take on the new responsibilities and functions required of them under co-management and decentralization. Issues of coordination, communication and roles must be addressed. The government agencies must be shielded from short-term political pressures to change or dilute goals of the power-sharing arrangements under co-management.

The role of the government in co-management is to provide enabling legislation to authorize and legitimize the right to organize and to make and enforce institutional arrangements at the local level. In the case of protected marine area co-management in Tanzania, it is important to note that a series of enabling legislation was passed in the 1970s and the 1980s in support of decentralization. Although it is generally thought that the Tanzanian experiment in self-reliance and local democracy did not live up to its potential (Chambers 1985), this legislation nevertheless enabled districts and villages to manage their own affairs, and served as the basis of new legislation for marine parks and co-management.

In addition to its role in providing enabling legislation, the government may act to address problems and issues beyond the scope of local arrangements, and to provide assistance and services (administrative, technical and financial) to support the sustainability of the local organizations and institutional arrangements. More specifically, the role of government includes overseeing local arrangements and dealing with abuses of local authority, conflict management, appeal mechanism, backstopping local monitoring and enforcement mechanisms, and applying regulatory standards. Government may also serve a coordinating role to maintain a forum or formal administrative structure for various parties in the co-management system to interact. Within a co-management system, government and fishers jointly develop an agreement on the objectives of co-management including the aims, the form, and the means. A clear understanding of the long-term goals of power-sharing is established in which the differing interests and needs of government and fishers are reconciled.

The decision on what fisheries management functions should be handled at what level are best handled jointly by local-level organizations and national government fisheries agencies, and they will be location specific. The decision will be based on the capabilities of local-level organizations to handle certain management functions and the locus of user participation. It may be more appropriate to phase-in management functions over time as local-level organizations gain more experience and capability, rather than give them a defined set of functions. The phasing in will also depend on the form of both co-management and decentralization, but adaptive management or 'learning-by-doing' in the evolution of co-management, and feedback learning in general, is likely to be critically important (Lee 1993).

Ultimately, whatever form of decentralization arrangement for co-management is arrived at, the process is political, involving mobilized interests and struggle for power. The government, however, holds the final authority. Co-management will not work everywhere in a country. Co-management should be viewed by government as an alternative management strategy to the centralized management system which in many cases does not work effectively anyway. Governments may not want to develop laws and policies which completely shift away from the centralized form of fisheries management, as many areas and resources within a country may still require this type of management strategy. Governments may want to consider developing a general policy within the existing legal and policy framework of the country, which allows for the existence of co-management in areas and communities, which are capable of taking on the responsibility and authority for management. Laws and policies may then be developed under a framework of decentralization, which legitimizes and authorizes co-management. There is no blueprint formula for either co-management or decentralization. Each country will need to develop a strategy based on their own needs and conditions. Several decades of international experience provides some directions for developing a co-management strategy based on decentralization.

## References

Agbayani, R.F. 1993. An integrated approach to community-based fishery resource management: SEAFDEC/AQD experience in multi-disciplinary research. Out of the Shell: Coastal Rèsource Network newsletter. 3 June.

Ahmed, M., A.D. Capistrano and M. Hossain. 1992. Redirecting Benefits to Genuine Fishers: Bangladesh's New Fisheries Management Policy. Naga, the ICLARM Quarterly. 15(4):31-34.

Ahmed, M., A.D. Capistrano and M. Hossain. 1996. Experience of Partnership Models for the Co-management of Bangladesh Fisheries. Fisheries Management and Ecology. 13.

Baland, J.-M. and J.-P. Platteau 1996. Halting Degradation of Natural Resources. Is there a Role for Rural Communities? FAO/Clarendon Press, Oxford.

Berkes, F. 1986. Local-level management and the commons problem: A comparative study of Turkish coastal fisheries. Marine Policy 10: 215-229.

Berkes, F. 1989. Co-management and the James Bay Agreement. In: Co-operative Management of Local Fisheries (E. Pinkerton, ed.) University of British Columbia Press, Vancouver, pp. 189- 208.

Berkes, F. 1994. Co-management: Bridging the Two Solitudes. Northern Perspectives. 22(2-3):18-20.

Berkes, F., Folke, C. and Gadgil, M. 1995. Traditional ecological knowledge, biodiversity, resilience and sustainability. In: Perrings, C., Maler, K.G., Folke, C.S. and Jansson, B.-O. eds. Biodiversity Conservation: Policy Issues and Options. Kluwer Academic Publishers, Dordrecht.

Berkes, F., P.J. George and R.J. Preston 1991. Co-management: The evolution in theory and practice of the joint administration of living resources. Alternatives 18(2): 12-18.

Berkes, F. and T. Henley 1997. Co-management and traditional knowledge: Threat or opportunity? Policy Options (in press).

Bonin, R., chairman 1995. Co-Management. Report of the Standing Committee on Aboriginal Affairs and Northern Development. House of Commons, Government of Canada, Ottawa.

Borrini-Feyerabend, G. 1966. Collaborative management of protected areas: Tailoring the approach to the context. International Conservation Union (IUCN), Gland, Switzerland.

Bromley, D.W. 1992. The commons, property, and common-property regimes. In: Bromley, D.W. ed. Making the Commons Work: Theory, Practice, and Policy. Institute for Contemporary Studies, San Francisco.

Capistrano, D., M. Ahmed and H. Hossain. 1994. Ecological economics and common property issues in Bangladesh's openwater and floodplain fisheries. Paper presented at the Third Biennial

Meeting of the International Society for Ecological Economics. 24-28 October 1994, San Jose, Costa Rica.

Carlos, M.B. and R.S. Pomeroy. 1996. A review and evaluation of community-based coastal resource management programs and projects in the Philippines, 1989-1994. Research Report No. 6, Fisheries Co-management Project. ICLARM, Manila, Philippines.

Chambers, R. 1985. Managing Rural Development: Ideas and Experience from East Africa. Longman, London.

de Guzman, R.P. 1991. Decentralization for democracy and development. Local Government Bulletin. University of the Philippines. College of Public Administration, Diliman, Quezon City, Philippines.

de Sagan, R. 1992. The Local government code and its provisions on fisheries. Bureau of Fisheries and Aquatic Resources, Quezon City, Philippines.

Dubbink.W. and M. van Vliet. 1995. From ITQ to Co-management? Comparing the usefulness of markets and co-management illustrated by the Dutch flatfish sector. Erasmus University, Rotterdam, Netherlands.

Feeny, D., Berkes, F., McCay, B.J. and Acheson, J.M.1990. The tragedy of the commons: Twenty-two years later. Human Ecology 18: 1-19.

Fellizar, F.P., R.G. Bernardo and A. P.H. Stuart. 1997. Analysis of policies and policy instruments relevant to the management of fisheries/aquatic resources with emphasis on local level issues and concerns. SEAMEO Regional Center for Graduate Study and Research in Agriculture, Los Banos, College, Laguna, Philippines.

Ferrer, E. 1989. Prospects for territorial use rights in the Lingayen Gulf area. In: G. Silvestre, E. Miclat and T.E.Chua (eds.) Towards sustainable development of the coastal resources of Lingayen Gulf, Philippines. ICLARM Conf. Proc. 17. ICLARM, Manila, Philippines.

Freeman, M.M.R., Y. Matsuda and K. Ruddle (eds.). 1991. Adaptive Marine Resource Management Systems in the Pacific. Resource Management and Optimization, special issue, vol. 8, no.3-4.

Fricke, P.H. 1995. Co-management of commercial fisheries: concerns and issues. Paper presented at the International Association for the Study of Common Property Conference, Bodoe, Norway.

Gasper, D.R. 1991. Decentralization of planning and administration in Zimbabwe: International perspectives and 1980s experiences. *In* A.H.J. Helmsing et al. Limits to Decentralization in Zimbabwe. ISS, The Hague.

Gunderson, L.H., C.S. Holling and S.S. Lights, editors 1995. Barriers and Bridges for the Renewal of Ecosystems and Institutions. Columbia University Press, New York.

Hanna, S.S. 1995. User participation and fishery management performance within the pacific Fishery Management Council. Ocean and Coastal Management 28: 23-44.

Hanna, S.S., C. Folke and K.-G. Maler, editors. 1996. Rights to Nature. Beijer International Institute of Ecological Economics, Stockholm, and Island Press, Washington D.C.

Heinan, A. and N. Gonzales. 1993. Fisheries management and development in the Philippines: constraints and possibilities. Unpublished paper. Community Extension and Research Development, Quezon City, Philippines.

Hoefnagel, E. and W. Smit. 1995. Experiences in Dutch Co-management of Marine Fish Resources. Paper presented to the Tenth Session of the Ad Hoc Expert Group on Fisheries. Organization for Economic Cooperation and Development. Paris. 3-6 October 1995.

Jackson, J.C. 1995. Creating common pools in a lake. Centre for Applied Social Sciences, University of Zimbabwe, Harare, Zimbabwe.

Jentoft, S. 1985. Models of fishery development. The cooperative approach. Marine Policy 9: 322-331.

Jentoft, S. 1989. Fisheries co-management. Marine Policy 13: 137-154.

Jentoft, S. and McCay, B.J. 1995. User participation in fisheries management. Lessons drawn from international experiences. Marine Policy 19: 227-246

Johannes, R.E.1981. Words of the Lagoon. Fishing and Marine Lore in the Paulau District of Micronesia. University of California Press, Berkeley

Kalagayan, N.V. 1991. Philippine initiatives on marine coastal conservation. Paper presented during the International Conference on Exploitation of Resources in the Pacific. Port Moresby, Papua New Guinea. Lundayan. 2(1).

Kearney, J.F. 1984. The transformation of the Bay of Fundy herring fisheries 1976-1978: An experiment in fishermen-government co-management. In: Atlantic Fisheries and Coastal Communities: Fisheries Decision-Making Case Studies (C. Lamson and A.J. Hanson, eds) Dalhousie Ocean Studies Programme, Halifax, pp. 165-203.

Korten, D.C., editor 1986. Community Management: Asian Experience and Perspectives. Kumarian Press. West Hardford, Connecticut, USA.

Lee, K. 1993. The Compass and the Gyroscope. Island Press. Washington D.C.

Lim, C.P., Y, Matsuda and Y. Shigemi. 1995. Co-management in marine fisheries: the Japanese experience. Coastal Management Vol. 23, No. 3, pp. 195-222.

Lopez, M.D. 1985. Notes on traditional fisheries in the Philippines. In: K. Ruddle and R.E. Johannes (eds.) The Traditional Knowledge and Management of the Coastal Systems in Asia and the Pacific. UNESCO-ROSTEA, Jakarta, Indonesia.

Lynch, O.J. and K. Talbott 1995. Balancing Acts: Community-Based Forest Management and National Law in Asia and the Pacific. World Resources Institute, Washington, D.C.

Machena, C.R. and R. Kwaramba. 1995. The creation of property rights to promote sustainable development in the lake Kariba inshore fishery in Zimbabwe. Lake Kariba Inshore Fishery in Zimbabwe. Lake Kariba Fisheries Research Institute, Kariba, Zimbabwe.

Mangahas, M. 1994. Traditional marine tenure and management in ASEAN. In: G.R. South et al. (eds.). Traditional Marine Tenure and Sustainable Management of Marine Resources in Asia and the Pacific: Proceedings of the International Workshop Held at the University of the South Pacific, Suva, Fiji.

Martin, R.B. 1986. Communal areas management program for indigenous resources (CAMPFIRE). Government of Zimbabwe, Department of National Parks and Wildlife Management, Branch of Terrestrial Ecology.

Martin, R.B. 1994. The Influence of Governance on Conservation and Wildlife Utilization. Paper presented at a conference - Conservation through Sustainable Use of Wildlife. University of Queensland, Brisbane. 8-11 February 1994.

McCay, B.J. 1995. Common and private concerns. Advances in Human Ecology 4:89-116.

McCay, B.J. and Jentoft, S. 1996. From the bottom up: Participatory issues in fisheries management. Society and Natural Resources 9 (3) in press.

McNeely, J.A., editor 1995. Expanding Partnerships in Conservation. Island Press, Washington, D.C.

Ngoile, M.N., IUCN, Gland, Switzerland, personal communication, July 1996.

Ngoile, M.N., O. Linden and C.A. Coughanowr 1995. Coastal zone management in Eastern Africa including the island states: A review of issues and initiatives. Ambio 24: 448-457.

North, D.C. 1990. Institutions, Institutional Change and Economic performance. Cambridge University Press, Cambridge.

Ostrom, E. 1990. Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge University Press, Cambridge.

Ostrom, E. 1994. Neither market nor state: Governance of common-pool resources in the twenty-first century. International Food Policy Research Institute, Washington, D.C.

Pinkerton, E. editor. 1989. Co-operative Management of Local Fisheries: New Directions for Improved Management and Community Development. University of British Columbia Press, Vancouver.

Pomeroy, R.S., editor 1994. Community management and common property of coastal fisheries in Asia and the Pacific: concepts, methods and experiences. ICLARM Conf. Proc. 45, ICLARM,'Manila, Philippines.

Pomeroy, R.S. 1995. Community-based and co-management institutions for sustainable coastal fisheries management in Southeast Asia. Ocean and Coastal Management Vol. 27, No. 3, pp. 143-162.

Pomeroy, R.S. and M.J. Wiliams. 1994. Fisheries co-management and small-scale fisheries: a policy brief. ICLARM, Manila, Philippines.

Ruddle, K. 1987. Administration and conflict management in Japanese coastal fisheries. FAO Fisheries Technical Paper No. 273. FAO, Rome.

Sajise, P.G. 1995. Community-based resource management in the Philippines: perspectives and experiences. Paper presented during the training course in Co-management of Living Coastal Resources in ASEAN: Theory, Practice and Implications for Vietnam. Ministry of Fisheries, Hanoi, Vietnam.

Sen, S. and J. Raakjaer-Nielsen. 1996. Fisheries Co-management: a comparative analysis. Marine Policy Vol. 20, No. 5, pp. 405-416.

Serna, C.B. 1993. Community-based resources management: perspectives, experiences and policy issues. In: F. Fellizar (ed.) Community-based resource management: Perspectives, Experiences and Policy issues. University of the Philippines, College, Laguna, Philippines.

Smith, A.H. and Berkes, F.1993. Community-based use of mangrove resources in St. Lucia. International Journal of Environmental Studies 43: 123-132.

Tabunda, M.S. and M.M. Galang. 1992. A guide to the local government code of 1991. Mary Jo Educational Supply, Manila, Philippines.

Tagarino, R.N. 1995. Local government initiatives in fishery resources management: its implications on sustainability. Center for Policy and Development Studies, University of the Philippines, Los Banos, College, Laguna, Philippines.

Usher, P.J. 1987. Indigenous management systems and the conservation of wildlife in the Canadian North. Alternatives 14 (1): 3-9.

Yamamoto, T. 1992. Fishery regulations adopted for coastal and off-shore fisheries in Japan. Paper presented to FAO/Japan expert consultation on the development of community-based coastal fishery management system for Asia and the Pacific. 8-12 June 1992. Kobe, Japan.

# Chapter Six
# Methods for Fisheries Co-Management

In implementing the fisheries co-management project, it became necessary to develop new research methods or to further refine existing methods. This chapter provides a summary and examples of methodologies developed by project staff and partners to assess and evaluate co-management practices and experiences in Asia. The methodologies highlighted in this chapter are: the Rapid Appraisal Approach to Evaluation of Community-Level Fisheries Management Systems (RAFMS), Process Documentation, Impact and Evaluation Analysis in Assessing Community-Based Resource Management Systems, and Measuring Success of Co-Management Projects.

## Rapid Appraisal Approach to Evaluation of Community-Level Fisheries Management Systems (RAFMS)[5]

*What is RAFMS?*

Information on local community based marine resource management systems exists in many countries. This information, however, often in anecdotal or written in narrative format. As such, it lacks the specifics needed about the system's institutional and organizational characteristics to provide a useful basis from which to analyze its operations. If effective fisheries management efforts are to succeed, it is essential that resource managers and policymakers have up-to-date information about these community based management systems and their socioeconomic, political, and ecological contexts. Studies need to be current, detailed, and location specific to provide a comprehensive knowledge base on the range of types, functions, and status of fisheries management systems in the country. There are compelling arguments to strengthen local management and responsibility, because few governments are able to manage their fishery resources effectively without the cooperation of the fishing community.

With limited funds, time and research personnel, it is not always possible to conduct a detailed, in-depth study of community based fisheries resource management systems at a specific site. A rapid appraisal methodology can be useful as a critical first step in documenting the existence of community management systems and in providing general information on their operation and impacts. The rapid appraisal method is no substitute for more detailed studies, but it can provide cost-effective information and a direction for further action. Hence, the RAFMS (see Pido et al., 1996) was developed for this purpose.

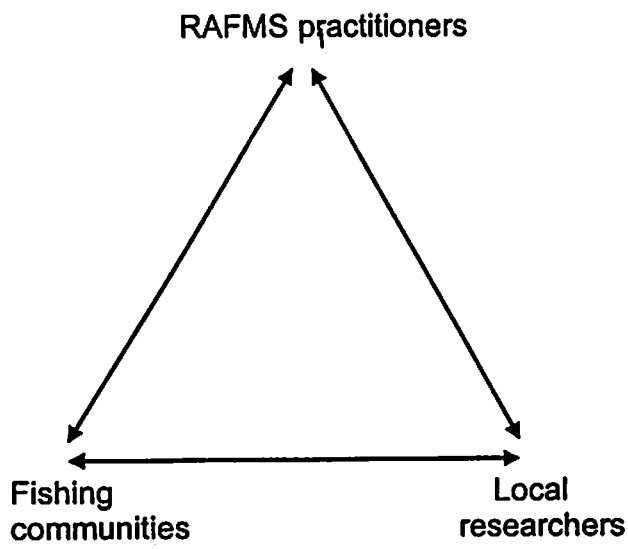
RAFMS is primarily a topical Rapid Rural Appraisal (RRA), which is aimed at documenting and evaluating the existing informal and traditional fisheries management system(s) in a coastal community and its relationship with the more formal fisheries management system administered by the government. As such, the RAFMS has been designed to identify the existence of informal fisheries management systems or to document conditions that may afford the opportunity for their creation. The RAFMS is partly a participatory tool, because the involvement of local researchers and members of the fishing community is imperative. The mode of participation in RAFMS is consultative, where the fishers interact in a two-way communication process during the conduct

[5] Methodology and conceptual framework condensed from an ICLARM publication written by Michael D. Pido, Robert S. Pomeroy, Len R. Garces and Melvin B. Carlos entitled " A Rapid Appraisal Approach to Evaluation of Community-Level Fisheries Management Systems: Framework and Field Application at Selected Coastal Fishing Villages in the Philippines and Indonesia".

of the research. It is also a research tool designed to extract pertinent information from fishers and other coastal stakeholders in a consultative mode in a relatively short period of time. The RAFMS, however, is not a tool to be used to empower the community. RAFMS intended audience are fisheries manager and development workers who need to gain an understanding of the fisheries management system at the community level, both informally and formally, in order to strengthen, legitimize, revise and, if needed, transfer the system.

The RAFMS is collectively undertaken by three groups of stakeholders: (1) RAFMS practitioners, (2) local researchers, and (3) the fishing community, as illustrated by Figure 5. The RAFMS practitioners who head the exercise are experts on RRA and Participatory Rural Appraisal (PRA) methods. RAFMS specialist are usually local or outside scientists, academicians or development specialists. Local researchers, on the other hand, are technicians or specialist based in or near the study area. The fishing community includes fishers or coastal stakeholders engaged in various fishing activities. Hence, the result of the RAFMS exercise is a synthesis or convergence of three viewpoints. It must be noted, however, that the conduct of RAFMS does not rely solely on the existence of outside experts since the long term goal of RAFMS is to increase the technical capability of local researchers in order for them to continue the activity on their own.

Fig 5. Relationship among the RAFMS practitioners, local researchers and the fishing communities.




Although RAFMS may be used to evaluate any fisheries based settings, it has several limitations. First, the variables or factors to be examined are concentrated on fisheries. Although the evaluation is nested within broader coastal resource management, the analysis deals only on a limited basis with the other dominant sectors of the coastal zone, such as industry, tourism, and agriculture. Second, it is suited to application at the village or community level, rather than a larger geographic or political area. Lastly, the success of RAFMS depends on the experience and knowledge of the researchers undertaking it, and active participation of the fishing community.

*The RAFMS Framework*

According to Pido et al. (1997), the RAFMS framework is subdivided into four components: (1) the conceptual base, (2) the contextual variables and their attributes, (3) the research or survey steps, and (4) the expected output.

RAFMS uses a method known as Institutional Analysis and Development (IAD) as its conceptual base. The institutional analysis research framework provides a structured approach to document and evaluate the origin, current status, operation, impact and performance of fisheries management institutions. Oakerson (1992) stated that such a "framework must be specific enough to offer guidance in the field, yet general enough to permit application to a widely variable situation". The research framework links contextual variables characterizing key attributes of the resource and resource user with the local fisheries management institutional arrangements (rights and rules) (For more information see ICLARM/IFM 1998).

The contextual variable component makes up the second component of the RAFMS framework. Six sets of contextual variables and 33 attributes or factors are relevant for the RAFMS framework (Table 11). These variables and their attributes form the context within which fishers and other resource stakeholders coordinate, cooperate, and contribute to establish organizations and institutions to manage the fishery resources. Fisher/community institutional and organizational arrangements (Group IV) is the focus of RAFMS.

The third component of the framework relates to the research and survey steps that should be taken. This four-step process, called "quadriangulation", includes: (1) secondary data analysis, (2) reconnaissance survey, (3) field data gathering, and (4) community validation. Figure 6 shows the data acquisition and verification scheme for RAFMS.

The fourth component refers to outputs generated at the end of the exercise. Such outputs will be the integration of the results generated from the secondary data (step 1) through community validation (step 4) to produce a technical report. The document should be able to describe the informal and formal management systems that govern utilization of fisheries resources at the local level, and how such system relates to the broader social, cultural, technical, economic, biophysical and institutional environment. The report should have three substantive sections which includes: (1) the basic profiles of fisheries/coastal environmental setting; (2) the institutional analysis of the fisheries management systems; and (3) the recommendations related to planning and policymaking, research and development.

The essence of RAFMS is the planning and policymaking agenda, which will provide the direction toward improved institutional and organizational arrangements. It includes the clarification of legal rights and responsibilities, particularly the traditional and informal use rights, as well as the clarification of organizational jurisdiction and responsibilities.

*Benefit of using RAFMS*

RAFMS is an interactive process of generating, analyzing, and validating attributes relevant to the study of the existing community level fisheries management system. It is one of the pioneering attempts to develop a rapid appraisal guide for coastal marine environments, and specifically, for understanding the system of fisheries management at the community level. Among its unique features is the adoption of institutional analysis as its main framework in combination with agroecosystem analysis (AEA) and other RRA techniques. The other innovations of RAFMS are: (1) the active roles of local researchers and members of the fishing

community, (2) the ability to generate some quantitative (interval or ratio scales) data, and (3) the use of quick biological assessment techniques.

Furthermore, the process of conducting RAFMS revealed two useful procedural insights. First, the local or indigenous ecological knowledge, which is a rich source of information, can be quickly generated and analyzed using a variety of RRA techniques. Second, the RAFMS can be used as a linking tool between the researchers (both local and outside) and the local community.

Table 11. Long List of Attributes (Variables)

Group I. Biological, physical and technical attributes (13)

IA. Physical Attributes (5)
- resource use
- climatic data
- physiography
- physical oceanography
- general water quality

IB. Biological and habitat attributes (3)
- seagrasses
- mangroves
- coral reefs

IC. Technical Attributes (5)
- Gear/fishing technology
- Species harvested
- Level of exploitation
- Resource use/harvesting conflict
- Conservation awareness

Group II. Market (Supply-Demand Attributes) (6)
- Supply of Marine Products
- Pricing scheme/system
- Market functions
- Market rules
- Stability of demand
- Market structure

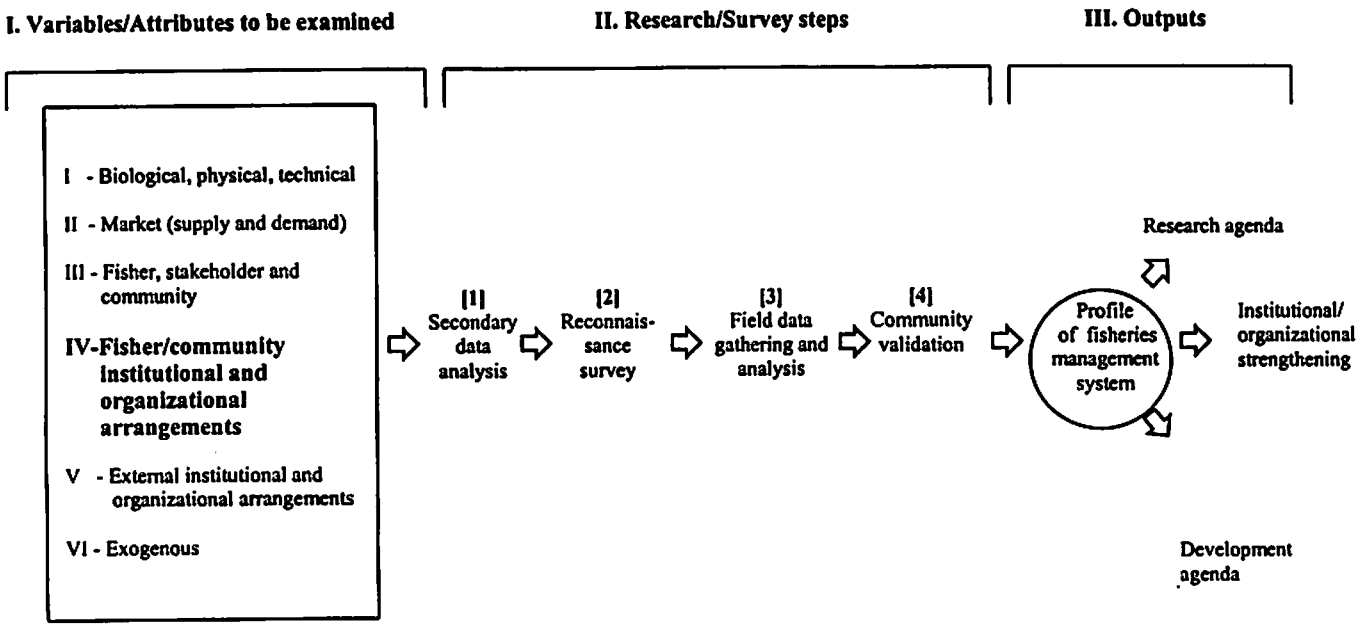
Group III. Characteristics of fisher/community stakeholders (6)
- Demography
- Tenurial status
- Economic status
- Culture
- Livelihood (Occupational structure)
- Attitudes and outlook of fishers

Group IV. Fisher or Community Institutional and Organizational Arrangements (2)
- Individual organizations
- Institutional arrangements

Group V. External institutional and organizational arrangements (2)
- Individual organizations
- Institutional arrangements

Group VI. Exogenous factors (2)
- Natural calamities
- Macroeconomic/political/socio-cultural

Fig. 6. Data acquisition/verification scheme for the rapid appraisal of fisheries management




***RAFMS Field Application: Ulugan and Binunsalian Bays, Palawan, Philippines***[6]

The field application and testing of the RAFMS was undertaken at two coastal fishing villages in Palawan, Philippines. Researchers from ICLARM took the lead as the RAFMS practitioners. In drafting the RAFMS handbook, informal agreements were made with research collaborators. Upon arrival on the site, a joint workshop between RAFMS practitioners and local researchers involving a discussion of elements of the RAFMS handbook was made. It was followed by the allocation of members into three technical groups namely; (1) institutional, (2) socio-economic, and (3) biophysical. The institutional group handled the contextual variables related to characteristics of fishers/community stakeholders and the institutional and organizational arrangements. The socioeconomic group evaluated the information on market and supply attributes, while the biophysical group investigated attributes relating to marine habitats, species harvested, and fishing technology

*Field Activities*

Field activities at Ulugan and Binunsalian bays followed similar routines. Between two and four days were spent at each village. There was a courtesy call at first to the village headman and other officers from the village council. This was followed by the reconnaissance survey, which allowed the team to familiarize themselves with important features in the field such as resource characteristics, make annotation between reported and real conditions, and settle administrative arrangements. Key informants (e.g., fishers, fisher's wives, moneylenders, fish traders,

[6] Condensed from an article by Michael D. Pido, Robert S. Pomeroy, Len R. Garces and Melvin B. Carlos entitled " A Rapid Appraisal Approach to Evaluation of Community-Level Fisheries Management Systems: Framework and Field Application at Selected Coastal Fishing Villages in the Philippines and Indonesia".

government officials) were identified or chosen during this activity. The third step was field data collection, which was the actual generation of the primary data based on the methodologies provided. Semi-structured interview (SSI) was the main tool used in interviewing the key informants to obtain institutional, socio-economic, and biophysical data. The SSI was administered either individually or in small groups. Other field data collection techniques included actual diving at the coral sites, resource mapping, and market visits. Fourth, each evening included a brainstorming on the day's work. The results of interviews and personal observations were reported and deliberated. These results were then synthesized into key tables, figures, and diagrams. The last step of the process was community validation.

*Results and Output*

Ulugan Bay is located on the midwestern coast of Palawan some 47 km from the capital city of Puerto Princesa. It is a traditional fishing ground with mangrove, coral reefs, sea grass beds, and small islands. Five villages (barangay) surround the bay, with a population of about 5,000 people in 1991. The majority of the workforce is engage in fishing and farming. Binunsalian Bay, on the other hand, is located some 20km south east of Puerto Princesa. The coastal stretch, with extensive corral reefs and mangroves, is bounded by two villages with a population of 1,550 individuals in 335 households. Since 1986, fishers have harvested fish, shellfish, and mangroves year-round in the area.

Through RAFMS, it was shown that there is a nested organizational/institutional arrangement structure that operates with regard to marine fisheries. Table 12 shows that in the small village of Binunsalian, there is a whole array of organizations from the national government agencies, local government units, non-governmental organizations, and people's organization that undertake activities which have a bearing on fisheries management.

The result of the RAFMS exercise also highlights the duality of fisheries management that exists in both villages. Binusalian and Ulugan Bays, as municipal fisheries, are legally under a state property regime. As such, the rights and rules systems with regard to the use or management of the fishery resources emanate from the national government and the municipal (city) government of Puerto Princesa. There is, however, an informal fisheries management system that exists, although it is not legally sanctioned by the city government. For example, conflict resolution in Ulugan Bay is solved either by informal or formal channels. When there is conflict between two fishers, the formal process is first to settle the conflict at the level of the subvillage president. There is an informal way, however, of settling the conflict through meditation of a respected community elder or senior fisher who is not a member of the village council. If the conflict is not settled at the subvillage level, it may be formally resolved through the village chief or informally resolved through other respected members of the community.

The RAFMS also identified unwritten rights and rules that govern the use of certain gears within the village of Manabore of Ulugan Bay. A gill-netter may set his net only 10 m or more away from the entrance of a fish corral. In the case of gill nets criss-crossing, the first one to remove the net is the topmost, and others must work down to the bottom of the nets. Hook and line fishers can fish near fish aggregating devises only if verbal concurrence is given by the owner. Again, the enforcement of the above rules is largely informal. There are also informal codes of conduct that exists among certain fishers groups in Binunsalian Bay. A verbal agreement exists among the 13 religious ministers in the area to continuously remind their congregation (fisher folks) against engaging in destructive fishing practices. Although there is a national law (Fisheries Code) and existing city ordinances that legally prohibit destructive fishing practices, their implementation is facilitated by informal sanctions at the community level. Many features of the informal fisheries

management system identified by RAFMS are not readily observable by government fisheries managers; some became apparent only during the community validation (Step 4) of the RAFMS process. Thus, the RAFMS exercise was able to inform fisheries managers of the importance of the informal system to the local fishers.

Table 12. Nested Organizational/Institutional Arrangements for Binunsalian Bay, Philipines

| ADMINISTRATIVE LEVEL | (A) LINE GOVERNMENT AGENCIES (LGAs) | | | | (B) LOCAL GOVERNMENT UNITS (LGUs) | (C) NON-GOVERNMENT ORGANIZATION (NGOs) | | (D) PEOPLE'S ORGANIZATION (POs) | (E) OTHERS |
|---|---|---|---|---|---|---|---|---|---|
| NATIONAL | o DENR | o DECS | o DAR | o DOJ (BOC) | o National Government | - | | - | - |
| PROVINCIAL | o PENRO | o DIVISION | o PARO | o IPPF | o Provincial Government | - | | - | - |
| MUNICIPAL | o CENRO | o DISTRICT | o MARO | o Sta. Lucia Sub-colony | o City Government (Bantay Puerto) | - | | - | - |
| VILLAGE | | o Elemntary/ High School | | | o Mangingisda Brgy. Council | o Ligaya ng Buhay Foundation | o BBFI | o Christian Multi-purpose Cooperative<br>o Brgy. Mangingisda Senior Citizen Association<br>o Charity Women's Association<br>o SAMANUCO<br>o LUZMA | - |
| PUROK | - | - | - | - | o Purrok Council (7)<br>- Putting Buhangin<br>- Rolling Hills<br>- Pantalang Bato<br>- Magsasaka<br>- Bagong Silang<br>- Paglaun<br>- Magtulungan | - | - | - | - |

Source: Cabrestante et al. (1995)

## Process Documentation Research Methodology (PDR)[7] [8]

*What is Process Documentation Research?*

Work on the development of process oriented research methodologies has made important contributions to the development of a more relevant and constructive social science. These methods are helpful in re-constructing inaccurate organizational myths, by-passing the information filters of bureaucracy, and providing insights into the intricacies of development program performance all essential to corrective change. Involving primarily disciplined observation, accurate recording, and common sense analysis, these seemingly simple methodologies are in fact important tools used for social science. Process documentation represents an important contribution of social scientists to develop a social science relevant to social reality and therefore be more effective in contributing to the improvement of human society.

Process documentation research is a tool to help development organizations guide the process of implementing new intervention strategies and learn from their own experience. The information generated by process documentation research is useful for determining the implementation methods as well as changes in the implementing agency's policies and strategies. It was originally developed by the Institute of Philippine Culture (IPC) to support a program of learning process intervention in the Philippine National Irrigation Authority, and has since come to be recognized as a basic tool of the learning process approach. The IPC of the Ateneo de Manila University has been at the forefront of the effort to develop the concepts and methods of the learning process approach and apply them within a variety of development agencies (Korten, 1989).

Process documentation research is one of the methodologies social scientist have developed to provide processes and contextual data required for agency capability building toward effective program implementation. PDR has since become an important tool for social learning as it highlights the dynamics and levels of agency and community decision making. PDR development was part of the social science's response to the need for field research data relevant to decision making within a learning process approach.

*Process Documentation Research Framework*

The learning process approach is usually applied in the development of capabilities to manage a particular development program. Application of some variation of the learning process approach seems to be almost essential if the program plan is to enable communities to be more involved in effectively managing its own resources.

Mobilization of community resources for project development presents a clear instance of a complex situation. The task calls for a continuous understanding of social relations, power structures, and conflicting interests in order to provide pertinent decision options regarding policies, procedures, and organizational support response. PDR intends to capture the unfolding of field processes and events and the knowledge on the dynamics of the relationships among

[7] Condensed from a SEAFDEC/AQD project report written by Renaro F. Agbayani and Alessandro S. Babol entitled "Institutional Arrangements in the Fisheries Co-Management on Malalison Island, Culasi, Antique: A Process Documentation Research Methodology".

[8] Summarized from a book edited by Cynthia C. Veneracion entitled "A Decade of Process Documentation Research: Reflections and Synthesis" Based on the Proceedings of a Seminar-Workshop on Process Documentation Research held on 21-24 January 1988 in Tagaytay City, Philippines.

participants. The intensive and continuous presence of PDR also allows for the collection on data on the often protracted and unforeseen nature of the participants' interactions and activities involved in a community based participatory program. At the same time, immediate utilization of PDR, in addition to other field data, enhances the understanding of the development of mechanisms and structures for dealing effectively with varying field conditions surrounding mobilization.

According to Korten (1989), there are several institutional learning functions that PDR has proven particularly useful in serving; these are:

(1) Reconstructing the organizational mythology. Existing organizational and social practice is commonly grounded in myths regarding the real nature of the organization, its role, and its performance.
(2) Bypassing information filters. Conventional bureaucratic organizations have built in mechanisms that systematically inhibit reality testing. Properly used PDR helps bypass any filtering process which may prevent, corrupt, withhold, and change information as it goes through the normal channels giving persons at all level a clear window into the rich detail of uncensored field experience.
(3) Answering the WHY questions. Conventional summative evaluation practice involving the use of before and after measurement results provides information on the outcomes of intervention. From a positivist perspective such measurement is all that is necessary, though such measurements tell us nothing about the process that connected the outputs to the inputs and therefore provides no insights into why a particular outcome was achieved.
(4) Limits of retrospective reconstruction. Simple retrospective analysis by project participants is seldom an adequate substitute for immediate onsite observation and documentation.
(5) The process documentor as key-informant. The key-informant is an important, though often overlooked, contribution of process documentation research is the development of the process documentor as a resource to the group responsible for managing the learning process. In many instance it is not the process documentation report itself that becomes the basis of action, but rather the discussions in which the process documentor or supervisor participates as a key-informant.

PDR seeks detailed, systematic, and timely data on the manner in which field level project implementation activities are undertaken. Another important PDR concern is data on the dynamics of group and individual interactions among participants, and the emergent issues and problems important to the program development and improvement. Data collection therefore takes a two pronged focus. One is the process of field level implementation such as the participant's activities, interactions, discussions, and negotiations; the other is the context of these processes. Thus, PDR data pertains to both technical and non-technical (institutional, organizing, or extension) aspects of project implementation, particularly the processes and context of decision making at the field level. It is, however, not a tool for any agency's site specific problem solving task nor a monitoring device which project implementors use for measuring the progress of field activities.

Process oriented research methodologies constitute the social scientist' response to the need for a link between development agencies and local communities. The social scientist conducting the research enhances the communication and interactions between the groups by discussing concerns and issues raised by the communities. Social scientist at the same time assists the agency in understanding the research results and their implication on the agency's work bringing

into the learning process not only the social science perspectives but also an advocacy role that favors local communities and groups.

*Process Documentation in Program Development*

There are two approaches to program development, the "blueprint" approach and the "learning process" approach. Each of the two takes a different approach to program development. The blueprint approach observes the following procedures. Planning of a project to implement a new intervention strategy focuses on the preparation of a planning document which specifies the goals, objectives, activities, timetable, and the expected outcomes of the project. Once this plan is prepared and approved, the project is deemed ready for implementation. Personnel responsible for implementation focus on complying with the plan because the evaluation of the project centers on the extent to which the implementation has followed or diverge from the plan. Thus, the blueprint approach assumes that the action agency knows how to implement the new intervention strategy because this is spelled out in the planning document.

In contrast, the learning process approach, of which process documentation is a component, focuses more on the outcomes of the project. With this approach, the implementing agency is unsure of the implementing strategies and therefore would require a more appropriate methodology of gathering important information about project implementation. The learning process approach would be appropriate for pilot projects where sites are considered as "laboratories" prior to implementation of bigger projects covering larger geographical areas. The learning process approach documents the interactions of project beneficiaries, the community organizer, and the staff of the implementing agency. It should reflect a factual recording of important events and activities in the community. As a learning process, PDR is unstructured, experiential and inductive (Armonia, 1997). PDR provides updated information for use in the decision making process by project beneficiaries and implementors. There is a need to know the specific decisions and actions and the participation of the beneficiaries in the decision making process and specific activities. The timely information that PDR provides contributes to better implementation of project activities and to prevent or minimize conflicts among beneficiaries or between the implementers and the beneficiaries.

In actual practice, PDR is both a learning process approach and a blueprint approach. The overall goals and objectives of a project such as a community-based coastal resource management provide the "blueprint' of the project. How to do it is the "learning" process component of the project. In a community-based resource management project, PDR records the development process focusing on the participatory model of the resource management strategy. The participatory model includes: (1) mass involvement in the decision making process through different consultation activities; (2) mass contribution in actual implementation of project activities; and (3) mass sharing of benefits from the project.

The PDR team is composed mostly of a field worker or the process documentor (PD) and the researcher. It is recommended that a full-time PD be detailed in the project site for effective documentation of events and activities. The PD should record as detailed as possible all-important events and discussions and should avoid interpreting the field data. Data interpretation and analysis is the responsibility of the senior researcher assigned to the project. The primary duty of the PD is to record and document and not to interpret and analyze the data gathered from the field. It is therefore important that the PD have an open mind, free of biases and prejudices. The PD should also be likable and trustworthy so that project beneficiaries will feel comfortable in providing critical information on the project activities.

The PD should always have a field notebook to record his/her observations. A tape recorder could be very useful especially in recording meetings and consultations. This would enable the PD to record the discussions verbatim. If the PD is acceptable in the community, the people will not mind having a tape recorder present to document the discussions, whether formal or informal.

Writing or inputting should be done at the end of each day but not later than the end of the week. This will update the PD, researchers, and project leaders of the status of the project and in the case of problems arising, it will give project implementors time to act promptly.

In asking questions, the six "Ws" (who, what, when, where, why, and how) are always useful. It is suggested that a PD should have sufficient field experience and good public relations. Data gathered must also be confirmed from other respondents without him/her knowing that you are verifying an information from another source.

*Process Documentation Research Output*

Like any other research undertaking PDR also includes the preparation of a final report. Such a report provides the summaries of the documented project activities and events, and a summary of the lessons learned from project experience. It may also contain discussion on field level implementation strategies and mechanisms already incorporated into the program. Because of its nature, PDR reports tend to be lengthy because of its narrative that serves as a repository of field experience. While the report may not be read in its entirety every month, its presence becomes very important when issues develop.

The PDR final report represents a more formal record of a particular phase of a program development. The report is not primarily written to address the agency's program development needs, which are the main concern of the monthly reports. Its intended readers are social scientist, planners and implementers of other development programs making the final report a contribution that can be added to the literature on development and program implementation. All in all PDR helps bring the social science perspective to bear upon the assessment of field level program implementation and the identification of the lessons learned from it for future improvement, application and expansion.

***PDR Case Study: Institutional Arrangements in the Fisheries Co-Management on Malalison Island, Philippines***[9]

In order to help fisherfolk rise above poverty and to regenerate and manage the marine and coastal resources, the Southeast Asian Fisheries Development Center Aquaculture Department (SEAFDEC/AQD) launched in 1991 the Community Fishery Resource Management (CFRM) Project on Malalison Island off western Panay, Philippines. The research project is development oriented and integrates various disciplines in biology, economics, sociology, public administration and engineering in its study of fishing communities and resources and in evolving interventions and strategies (Agbayani, 1995).

The overall objective of the project is to learn from the collaboration of community organizers, biologists, and social scientists in adapting recently developed aquaculture and fishery resource management techniques and to assess the potential replicability of the experience to other fishing

[9] Condensed from a SEAFDEC/AQD project report written by Renaro F. Agbayani and Alessandro S. Babol entitled "Institutional Arrangements in the Fisheries Co-Management on Malalison Island, Culasi, Antique: A Process Documentation Research Methodology".

communities. The framework of the project integrates the analysis of the socioeconomic condition of the fisherfolk population with the condition of the coastal resources, the types of fishing and aquaculture technologies, and the role of the institutions in setting up rules and rights in the use and management of coastal resources.

Process documentation research (PDR) was undertaken to test the usefulness of this methodology in documenting institutional arrangements of the fisheries co-management on Malalison Island. The specific objectives of the study were: 1) to document the institutional arrangements in the co-management of fishery resources of Malalison Island; and 2) to evaluate and analyze the institutional and management performance of community-based co-management practices.

The use of PDR methodology in this study adopted both the "blueprint" and the "learning process" approaches. A full time, site-based PD undertook the process documentation from January 1995 to November 1996. He was also the technical assistant of the CFRM project at the site since 1991. His familiarity with the place and the people was taken both an advantage and a disadvantage. It was an advantage in a sense that the PD knew the idiosyncrasies of most people, especially the key people such as the officials of the barangay, the local fisher organization (FAMI), and municipal officials. It was a disadvantage at the same time because he was married to a girl from the island who is associated to one of the more influential family thus making him a "suspect" because a number of people perceived him to be biased in documenting events related to the institutional arrangements. Aside from this small problem, he was generally accepted and well regarded in the community.

Most, if not all, activities, meetings, and consultations were tape-recorded. Informal talks or "encounters" with the village people were likewise recorded to supplement information from the meetings and consultations. It was noted that group discussions before and after meetings are more relevant than what actually transpired in the formal meetings. Moreover, some fishers were found to be too shy or are not used to articulating their opinions in formal meetings. Informally, however, they can express their honest opinions and perceptions concerning the projects.

A "blueprint" of the CFRM project plans and activities (research and development interventions) were already in place in 1993 during the stage 2 of the CFRM project. The PDR study was implemented during stage 3 of the project when fishery resource plans and strategies such as territorial use rights (TURF) and artificial reef (AR) deployment where the main issues. The CFRM project implemented several interventions starting in 1991 to the present. Development interventions focused on people empowerment through community organizing and capability building, implementation of livelihood activities, declaration of a fish sanctuary, and the deployment of artificial reefs (AR). By 1997, preliminary studies on sea ranching of suitable species in the surrounding waters of Malalison Island were started. Research activities were multidisciplinary including resource and ecological assessment (REA), acceptability of territorial use rights (TURFs), economic utilization of resources, and technological and economic analysis of seaweed farming.

Using a historical background review and PDR methodology, researchers from SEAFDEC/AQD where able to chronologically document milestone events that happened from 1990 to 1996. Milestone events that occurred prior to PDR activities in 1995-1996 where included in the report to "pave the way" for the subsequent events covered by PDR that led to the formulation of institutional arrangements in the fisheries co-management project on Malalison, Island.

Milestone events that occurred prior to PDR activities in 1995.

Prior to the deployment of a full time PD in Malalison island, historical records showed several important events contributing to the success of the CRM project in Malalison.

*(1) Passage of Culasi Municipal Ordinance 5-90 and 2-91 by the Sangguniang Bayan.* MO 5-90 designates the one square kilometer between Malalison and the mainland as a TURF protected area exclusively for the use of the fishermen's association (FAMI) in implementing sea-farming activities. MO 2-91prohibits incursions of illegal transient fishers and entry of big fishers on the TURF area.

*(2) Investigation on the Traditional Marine Boundaries and TURFs (1991-1992).* To: 1) verify the existence of traditional marine boundaries; 2) document existing sea tenure practices and territorial use rights in fisheries; and 3) make recommendations for granting of TURFs in Malalison.

*(3) Cross-visits to CVRP in Bohol by FAMI and Barangay Officials (1993).* In early 1993, as part of the capability building activities, FAMI and barangay officials visited the Central Visayas Regional Project (CVRP) project in Bohol to expose them to coastal resource management practices in other parts of the Visayas. The idea of creating a fish sanctuary was presented to the group during the trip since this is one of the strategies being implemented by the CVRP in their project site.

*(4) First Malalison Forum (mid 1993) and Second Malalison Forum (1994).* The first and second Malaison Forum initiated by the SEAFDEC CFRM team members in participation with officers and members of FAMI and residents of Malalison assessed the status of the project and prepared plans for the year. It is in this forum wherein the concept of possibly adopting a fish sanctuary in Malalison was discussed by all the parties involved.

*(5) Creation of Barangay Coastal Resource Management Council.* As an offshoot of the consultation processes, meetings, and forums regarding plans on institutionalizing the coastal resource management plans and policies of barangay Malalison, FAMI members and the Malalison barangay council decided to create a council that will initiate, coordinate, and oversee the consultation process, formulation, legitimization, and eventual implementation of rules and rights in the co-management of fishery resources.

Highlights of the PDR of Institutional Arrangements Activities (1995-96).

The presence of a full time process documentor in Malalison from January 1995 to November 1996 saw the documenting and recording of Stage 3 of the CFRM project. The following are the highlights of important events recorded first hand by the PD during his stay at Malalison.

The key institutions that played important roles in the institutional arrangements in fisheries co-management in Malaison Island are FAMI, Malalison Barangay FARMC, Malalison Barangay Council, Culasi Municipal FARMC, Culasi Sangguniang Bayan, Process Foundation, national government agencies such as the Department of Agriculture (DA), Department of Environment and Natural Resources (DENR) and the Department of Interior and Local Government (DILG), SEAFDEC and the local radio stations. A total of 45 meetings and consultations were documented from January 9, 1995 to November 17, 1996.

The main activities during the PDR study period (1995-96) are the implementation of TURFs and the construction and deployment of concrete ARs. The implementation of TURFs refers mainly to the planning and formulation of specific resource management strategies such as the creation of a fish sanctuary and the rules and rights embodied in the provisions of the policy in maintaining a fish sanctuary. Other important events that happened on Malalison Island that were captured by PDR includes:

*(1) Declaration of a Manifesto by FAMI on TURFs.* FAMI manifesto defines TURFs as the proper utilization, management and control by FAMI of the body of water surrounding Malalison Island as provided for by Municipal Ordinance 5-90. The two main components of TURFs are: 1) the creation of a fish sanctuary; and 2) the deployment of concrete ARs. In the enforcement of TURFs, FAMI agreed on a set of rules and guidelines regarding penalties that can be imposed on violators caught fishing inside the sanctuary.

*(2) Consultation Meetings with Neighboring Coastal Barangays of Culasi Regarding Coastal Resource Management* .In 1995, the Antique Integrated Area Development (ANIAD) Project, funded by the Netherlands government, implemented a CBCRM project in all Culasi coastal barangays except Malalison. ANIAD, with the assistance of SEAFDEC, did a resource and social assessment of the coastal barangays and at the same time held consultation meetings with barangay leaders and residents of the 16 barangays to discuss principles, methods and benefits of CBCRM.

*(3) Construction and Deployment of Concrete ARs.* The construction and deployment of ARs was a major intervention of the project to regenerate the natural corals destroyed over the years because of destructive fishing practices.

*(4) Third Malalison Forum (1995).* The holding of the annual forum in Malalison has been an effective venue to present assessments and evaluations of the CFRM project and discuss problems and issues affecting the success of the project.

*(5) Creation of Barangay Malalison FARMC.* As mentioned earlier Malalison FARMC was created on June 24, 1995 in compliance with Executive Order No. 240 of the President of the Philippines. There is, however, an already existing Barangay Coastal Resource Management Council created in 1994 for the purpose of planning, formulating and implementing rules and rights in the management of coastal resources.

*(6) Declaration of Giob reef as a Fish Sanctuary.* Ten days after the creation of Barangay Malalison FARMC, a series of meeting was held between the FARMC, the barangay council and the residents of Malalison was held to finalize the declaration of Giob reef as a fish sanctuary.

*(7) Lobbying for the Approval of the Barangay Malalison Resolution No.1 (Fish Sanctuary and Strict Prohibition on Fishing).* Malalison FARMC and barangay officials wasted no time in working for the approval of the Barangay Resolution by the Culasi Sangguniang Bayan. On July 14, 1995 the Malalison officials arranged a meeting with the Vice-Mayor acting as the Sangguniang Bayan Chair, municipal councilors, and a local radio announcer. Important issues discussed at the meeting were 1) penalties imposed on violators; and 2) consultation process with the Malalison residents. Succeeding lobbying activities were undertaken to speed up approval of the fish sanctuary resolution.

*(8) Need for Scientific Data to Support the Fish Sanctuary Ordinance.* In support of the Malalison Ordinance on the fish sanctuary, SEAFDEC provided the officials of the barangay and FAMI

with the bio-resource data of Giob reef. The information included: 1) number of fish families (27) and species (172) of reef fishes; 2) estimated and relative annual yield of reef fishes at Giob reef; 3) list of coral species; 4) average cover of benthic lifeforms; and 5) average frequency of benthic lifeforms. The value of scientific data for policy making has been demonstrated in the formulation of the fish sanctuary ordinance.

*(9) Approval of the Malalison Resolution on the Declaration of a Fish Sanctuary.* The Barangay Malalison Resolution No. 1 Series of 1995 on the declaration of a fish sanctuary was approved by the Sangguniang Bayan by default. Its passage into law came about by the failure of the Council to approve or disapprove the act within its mandated 30 days (statutory period).

*(10) Enforcement of the Barangay Ordinance on "No fishing" in the Fish sanctuary.* The enforcement of the provisions of the fish sanctuary ordinance requires physical, financial, and manpower resources. The first priority is to define the boundary by setting up markers. The second requirement is for mobility requiring a reliable boat for monitoring and surveillance work. Lastly, there is a need for disseminating information to fishers, residents of Malalison, and neighboring coastal barangays whom traditionally fish in the area.

*(11) Community-Initiated Survey on TURF.* As mentioned earlier, the Municipality of Culasi granted a TURF covering a 1 square km area located between Culasi mainland and Malalison Island to FAMI as early as 1990 before the start of the CFRM project. There were, however, no rules and rights defined in the use and management of the TURF areas. There was a need to gather information and know the perception of the fishers of the different coastal and island barangays regarding TURF and the rules and rights that go with it. A community initiated survey was done in 1995 to ascertain whether: 1) fishers agree to the concept of TURF; 2) the types of fishing gears that should be allowed in the TURF area; and 3) amount of fee that the fishers are willing to pay FAMI to defray operational expenses of overseeing the TURF area. The survey covered 146 respondents from Malalison and 6 coastal barangays facing Malalison.

*(12) Draft of the Policies on Excursionist and Visitors in Malalison.* In late 1996, Barangay Malalison officials drafted an ordinance to regulate the activities of excursionist and visitors in the island. Salient provisions on the draft ordinance includes designating a docking area, charging of an entrance fee to visitors of the island, cleanliness guidelines while on the island for visitors, and the regulation of length of stay of a visitor to the island.

Lessons Learned on PDR and Institutional Arrangements in Fishery Co-Management

*On Process Documentation Research.* 1) PDR as a methodology is a useful tool for development oriented projects for it provides current and useful information that will guide the project implementers. 2) Process documentors must be neutral all the time. Ideally, process documentors must not be involved in actual project activities to minimize bias, moreover, he or she must be a full time process documentor (PD). 3) Process documentation should be undertaken from the start to the end of the project. This, however, could be expensive especially for long term projects of three years or more.

*On Institutional Arrangements in Fishery Co-Management.* Several lessons have been learned from the Malalison PDR experience that contributes to the success CFRM. These are: 1) the important and effective role media (radio) can play in disseminating information and exposing violations in policies and laws regarding resource conservation; 2) the need for local legislators to undergo training in parliamentary procedures related to the Local Government Code; 3) the importance of scientific data in policy making; 4) linkages and networking as a cost effective

strategy in reducing the cost associated with fishery co-management; 5) the need for beneficiaries of the project to share the cost/burden of development; and 6) the need for holding annual forum to provide information to all stakeholders in the community about the project's status and problems.

In conclusion, process documentation research methodology is appropriate for development projects using community-based strategies such as the CFRM project in Malalison. PDR reflects the interactions and articulation of issues by the different players and stakeholders of a resource. It mirrors the activities and events as they happen, where they happen, how they happen, when they happens, and why they happens. It provides project implementers current data for decision making and flexibility to adapt to any changes in the project.

**Impact Evaluation of Community-Based Coastal Resource Management Projects[10]**

A quantitative evaluation of CBCRM projects in the Philippines was undertaken. The project was implemented because it was felt that a large number of CBCRM projects implemented in the country since 1984 represented a vast pool of untapped information which could be analyzed to gain increased knowledge about variables and conditions for successful planning and implementation of CBCRM.

The ultimate evaluation of a CBCRM project is its impact on the well being of the coastal ecosystem, including both human and non-human elements. Ideally, the evaluation would compare information collected prior to project implementation (baseline data) with that collected sometime after project completion. Also ideally, information collected during both time periods would employ identical instruments or operational definitions of variables (or indicators) being evaluated. Unfortunately, many factors associated with implementation of projects result in a situation where the ideal evaluation is difficult, if not impossible, to achieve. Baseline information is frequently unavailable or inadequate. Methods used in the baseline may be inadequately described, making it impossible to ensure comparability between time-one and time-two measurements. Finally, funding for post-evaluation may be inadequate to replicate baseline methodologies. Impact evaluation is further complicated by the fact that inadequacies and lack of baseline information as well as funding for post-evaluation may be differentially distributed across variables of interest. All these factors have a negative impact on the precision and comparability of impact analyses but they should not inhibit attempts to estimate impacts using alternative methods.

Since the primary goal of this research is to determine factors influencing the success and sustainability of CBCRM projects, the issue of cross-project comparability of evaluation methods is significant. It is necessary to have common operational definitions of CBCRM project success, as well as factors associated with success, to conduct this type of analysis. To accomplish this, a baseline-independent technique for impact assessment was developed and used. This resulted in a standardized methodology that could be applied to other CBCRM project impact assessments. Such comparability will facilitate quantitative analyses of variables impacting CBCRM project success.

"Well-being of the coastal ecosystem" is a fuzzy but intuitively understandable concept. Both human and natural communities are included in the coastal ecosystem, so we are concerned with the "well-being" of both. Ideally, aquatic ecosystem health would be assessed using indicators such as species richness and composition, trophic composition, and organism condition and abundance. Karr et al. developed a summary index based on a weighted summing of attributes of each of the indicators. Others (e.g. Rapport) have identified indicators of natural ecosystem stress, including evaluations of nutrient loss, primary productivity, diversity and size distribution, and system retrogression. Costanza suggests construction of an overall system health index composed of system vigor weighted by indices for system organization and resilience, each of these indices being constructed from other indicators. Clearly, assessment of "well-being" of the natural component of the ecosystem can be a complex, expensive process.

Assessment of human community "well-being" can likewise be a complex, expensive process. Variables often mentioned as indicators include income, health and nutrition status, housing, and

[10] Condensed from an article by R.S.Pomeroy, R.B.Pollnac, B.M.Katon and C.D.Predo entitled "Evaluating factors contributing to the success of community-based coastal resource management: the Central Visayas Regional Project-1, Philippines".

education. If some of these variables are available from baseline studies, there are frequently reasons to question the reliability of measures used. For example, health and nutrition status is notoriously difficult to assess in developing country contexts. There is mounting evidence to question the reliability of informant recall as a method to obtain such information,[1] and employment of biological anthropological techniques such as skin fold measurements would be both expensive and time consuming. Income information is also difficult to obtain, especially among fishers whose day-to-day catches vary so extensively that informant recall is highly unreliable. This results in the use of complicated techniques asking for income on good days, average days, and bad days, then trying to obtain information to calculate the approximate number of each type of day per fishing season, etc., then calculating and estimated income. More accurate information can be obtained from landing statistics, but they are rarely collected and frequently unreliable. Frequently the estimate is made based on an "average" (as variously understood by individual fishers) fishing trip, which tells us very little. Finally, estimates of income are further complicated by the occupational multiplicity that characterizes rural areas in developing countries. Education and housing are a bit easier to assess. Housing is frequently assessed using some type of material style of life scale composed of house construction and furnishing attributes.

Sometimes these highly interrelated variables are combined in some fashion and referred to as "quality of life". A traditional single-item indicator of quality of life is infant mortality rate. This is a fairly good measure of general nutrition and health care, indicators concerning satisfaction of some basic human needs as well as indicators related to income and education. Newland writes "no cold statistic expresses more eloquently the differences between a society of sufficiency and a society of deprivation that the infant mortality rate". Secondary sources might provide this information for the CBCRMP target area, but it is most likely aggregated for some larger area, hence inappropriate for estimating project impacts. Regional health services may have the disaggregated data which could be used to calculate an index for the CBCRMP context, but the population might be so small that an excessively long series of data would be required to arrive at a reliable infant mortality rate, suggesting that attempts to use the rate to evaluate changes over a period of several years would be inappropriate.

Clearly, the complexity and number of this set of variables appropriate for evaluating coastal ecosystem "well-being" indicate that the entire set will rarely be available in existing CBCRMP baseline, and if some are, there will probably be questions concerning reliability and/or cross-project comparability. Unfortunately, most CBCRMPs are not, and probably will not be, in a position to conduct adequate baselines and/or evaluations of the coastal ecosystem using such complex, expensive measures. Further, with respect to the human component of the ecosystem, the indicators, while extremely important, reflect for the most part material concerns (e.g. income, material style of life, etc.), food, and health. These are basic needs, basic to maintaining life, but humans have other needs – social and psychological needs such as family and community integration and self actualization which are important to the "well being" or "quality of life" of the human community. For example, satisfaction with one's occupation is based on fulfillment of basic as well as other social and psychological needs. CBCRMPs have the potential to impact these needs, and extensive research has related job satisfaction to a host of variables impacting "well-being", ranging from family violence and impaired social relations to psychosomatic illness and heart disease.

With respect to impact indicators, success and sustainability of a project are based in large part on participants reactions to the project. In turn, these reactions are based on user perceptions of impacts, which are not always in accord with objective, quantifiable evidence. Hence, if there is an interest in understanding the success and sustainability of CBCRM projects, it is essential to

understand perceptions of the present and possible future impacts of these projects. Perceptions of impacts may explain some of the variance in long term, as well as short-term, project success. Impact indicators used in this study are as follows:

1. Overall well-being of the household
2. Overall well-being of the resource
3. Local income
4. Access to resources
5. Control over resources
6. Ability to participate in community affairs
7. Ability to influence community affairs
8. Community conflict
9. Community compliance with resource management
10. Amount of traditionally harvested resource in the water

If the method is to be useful, it should be able to deal with variability in perceptions. It is clear that different individuals within a community will be differentially impacted by CBCRM projects, and this influences their perceptions of impacts and their reactions to the project. The ability to evaluate these differentially perceived impacts will permit analyses to determine sociocultural and socioeconomic factors influencing different perceptions. It will also facilitate analyses of distribution of perceived project benefits.

Ideally the method used will be able to take advantage of the human ability to make graded ordinal judgments concerning both subjective and objective phenomena. Human behavior is based on graded ordinal judgements, not simply a dichotomous judgment of present or absent. This refined level of measurement allows one to make more refined judgements concerning CBCRM project impacts, as well as permitting the use of more powerful statistical techniques to determine relationships between perceived impacts and potential predictor variables. The technique chosen for use in the study is a visual, self-anchoring, ladderlike scale which allows for making finer ordinal judgements, places less demand on informant memory, and can be administered more rapidly. Using this technique, the subject is shown a ladderlike diagram with 15 steps. The subject is told that the first step represents the worst possible situation. For example, with respect to coastal resources, the subject might be informed that the first step indicates an area with no fish or other resources, that the water is so foul nothing could live on it. The highest step could be described as rich, clean water, filled with fish and other wildlife. The subject would then be asked where the situation was before the CBCRM project, where it is today, and where he/she believes it will be 5 (or 10) years in the future. Perceived changes are only one aspect of the evaluation. It is also important to determine individual explanations for the changes. This was achieved by asking the subject why a given change has occurred. This open-ended type of question provided valuable insights related to individual and community perceptions of factors influencing perceived changes.

It is expected that there will be variability in perceptions of impact indicators and that these perceptions will vary together with both project experience and other sociocultural variables. A review of the literature was used to identify a number of these types of variables that have been implicated in project success. Nineteen independent variables including basic demographic, occupational, economic, resource, attitudinal, and project participation variables were identified as likely to be related to perceptions of project impacts. The variables are detailed in the section to follow.

**Impact Evaluation of Community-Based Coastal Resource Management Projects: the Central Visayas Regional Project-1, Philippines**[11]

The Central Visayas Regional Project-1 (CVRP-1) was a response to the continuing degradation of renewable resources and increasing poverty in rural communities. The CVRP-1 project is born out of a need by the central government to decentralize the management of coastal resources to local governments and resource users to increase the participation of resource users in management. It was the first major foreign assisted project in the Philippines to support regionalization. Early on, the CVRP-1 recognized the imperatives of devolving many decision-making powers from the central government to the regional level in order to address pressing resource management issues effectively. Designed around the principles of participatory resource management and the devolution of power, the project was meant to stabilize and improve the resource base.

From an overall perspective, the CVRP-1 sought to achieve a threefold objective, namely: (1) increase incomes and living standards of small-scale fishers, farmers, and forest occupants; (2) improve the management of the region's marine, upland, and forest resources in critical watershed areas; and (3) help increase the capacity for regionalization of decision making and program implementation. The nearshore fisheries component, in particular, addressed the following: (1) establishment and allocation of user's rights to an extensive system of artificial reefs in the waters adjacent to the four upland sites in the region; (2) establishment of effective coral reef management on all coral reefs at the four project sites; (3) replanting of mangroves in all suitable sites, management of existing mangrove timberlands by smallholders, and allocation of user's rights to the areas; (4) strengthening of participating government line agencies; (5) undertaking of special studies to support nearshore habitat management goals; and (6) conducting general surveys to provide the technical basis for project replication in other areas. Six villages in three municipalities of the provinces of Cebu and Negros Oriental were selected for the study. In consultation with former CVRP-1 staff, one "successful" and one "less successful" village were selected from each of the three municipalities.

*Analysis*

As a first step in the analysis, mean values for the difference between each impact indicator for today (t2) and pre-project time (t1) period were calculated, and a paired comparison t-test was calculated to determine whether the mean differences between the two time periods are statistically different (Table 13). The results of this analysis show a statistically significant increase in perceived levels of all indicators except for access. The sanctuaries, mangrove contracts, and exclusive access for members to artificial reef areas resulted in some perceived decreased access. Similar analyses were also conducted separately between association members and non-members reflecting statistically significant changes similar to those found in Table 13. Standard deviations in the analysis indicate that there is a fair amount of variability with respect to evaluation of indicators. Since people's behavior is based on their perceptions, it is important to determine the correlates of variability in perceptions to further our understanding of the factors that ultimately influence the sustainability of behaviors associated with CBCRM.

[11] Condensed from an article by R.S.Pomeroy, R.B.Pollnac, B.M.Katon and C.D.Predo entitled "Evaluating factors contributing to the success of community-based coastal resource management: the Central Visayas Regional Project-1, Philippines".

Table 13. Perceived pre-project to post-project changes in indicators.

| Impact Indicators | t2-t1 | s.d. | t-value | p |
|---|---|---|---|---|
| Access | -0.42 | 5.15 | 1.14 | >0.050 |
| Compliance | 3.67 | 3.87 | 13.39 | <0.001 |
| Conflict | 2.80 | 3.49 | 11.34 | <0.001 |
| Control | 2.64 | 4.61 | 8.08 | <0.001 |
| Harvest | 1.93 | 4.12 | 6.59 | <0.001 |
| Household | 2.33 | 2.83 | 11.61 | <0.001 |
| Income | 2.45 | 3.43 | 10.09 | <0.001 |
| Influence | 3.31 | 3.68 | 12.70 | <0.001 |
| Participation | 3.22 | 3.81 | 11.91 | <0.001 |
| Resource | 2.21 | 3.93 | 7.93 | <0.001 |

N=199; d.f.=198

As part of the process of achieving this goal, the next step in the analysis examines the relationship between ten indicators and the 19 independent variables identified as potentially influencing CBCRMP success.

The independent variables, listed in Tables 14 and 15, include basic social variables such as age, years of formal education, household size, and years the respondent lived in the community (*years resident in community*). Job related variables include years of fishing experience, whether or not the respondent had a job other than fishing in the past (*had occupation other than fishing*), and whether or not the respondent would change from fishing to another occupation that provided the same income if the opportunity is present (*willing to change occupation*). Income-related variables include whether or not the respondent had income other than fishing, whether fishing was the most important source among others. Another income variable was whether or not the household received income from someone living outside the household (e.g. remittances from abroad or relatives living in the city). Resource-related variables include whether or not the respondent evaluated the resource as being in bad condition in the pre-project period (*perceived pre-project resource crisis*) and an estimate of their ecological knowledge, based on the number of factors they cited as contributing to a healthy marine resource. Cooperation-related variables include the respondent's evaluation of the potential for community members and fishers to work together to solve common problems (*community can cooperate and fishers can cooperate, respectively*) as well as whether or not the respondent is a member of the project-sponsored association. Finally, project-related variables include whether or not the respondent felt he or she had an influence on project planning or post-implementation activities and whether the respondent attended project training activities.

Table 14. Correlation's between perceived changes in indicators and independent variables.

| | Indicators | | | | |
|---|---|---|---|---|---|
| *Independent variables* | **Access** | **Comply** | **Conflict** | **Control** | *Harvest* |
| Age | 0.01 | -0.01 | 0.13 | -0.06 | 0.04 |
| Education | -0.13 | 0.12 | 0.05 | 0.14* | 0.07 |
| Household size | -0.06 | 0.03 | -0.08 | -0.06 | 0.02 |
| Years resident in community | -0.14 | -0.09 | 0.03 | -0.05 | -0.08 |
| Years fishing experience | -0.08 | 0.09 | 0.03 | -0.06 | -0.04 |
| Had occupation other than fishing | -0.03 | 0.13 | 0.13 | 0.09 | 0.01 |
| Willing to change occupation | 0.07 | 0.02 | 0.05 | -0.06 | 0.10 |
| Income sources other than fishing | -0.01 | -0.10 | 0.00 | -0.05 | -0.13 |
| Fishing most important income source | 0.17* | -0.07 | -0.10 | -0.09 | -0.05 |
| Fishing provides over half the income | 0.07 | -0.04 | -0.15* | -0.12 | -0.08 |
| Income from outside the household | 0.01 | 0.13 | 0.15* | 0.07 | 0.03 |
| Perceived pre-project resource crisis | -0.05 | 0.00 | -0.02 | -0.19** | -0.22** |
| Ecological Knowledge | -0.10 | 0.02 | 0.06 | 0.08 | 0.08 |
| Community members can cooperate | 0.22** | 0.24** | 0.26** | 0.12 | 0.21** |
| Fishers can cooperate | 0.19** | 0.22** | 0.26** | 0.08 | 0.25** |
| Association member | 0.01 | -0.01 | -0.03 | 0.09 | 0.09 |
| Had influence on project planning | 0.04 | 0.13 | 0.04 | 0.22** | 0.13 |
| Had Post Implementation influence | 0.04 | 0.11 | 0.07 | 0.23** | 0.16* |
| Attended project training | 0.00 | -0.01 | -0.09 | 0.11 | 0.04 |

N=199; * $p<0.05$; ** $p<0.01$

Tables 14 and 15 indicate that 12 of the 19 independent variables manifest statistically significant correlation's with amount of perceived change in at least one of the indicators, and each of the indicators is significantly correlated with two to five of the independent variables. Attitudes toward community and fisher cooperation are positively related to perceived changes in nine of the ten indicators. Perceived pre-project resource crisis is negatively correlated with four indicators, indicating that those who noted that the resource was in bad shape before the project tend to see little change in the four indicators. Influence on project planning and post-implementation changes are positively related to perceived changes in three and two indicators, respectively. Education and income from outside the household are also positively related to two indicators. Age, importance of income from fishing, and attendance at project training is related to one indicator each.

Table 15. Correlation's between perceived changes in indicators and independent variables.

| *Independent variables* | House | Income | Indicators Influence | Participation | *Resource* |
|---|---|---|---|---|---|
| Age | 0.06 | 0.16* | 0.12 | 0.11 | 0.11 |
| Education | 0.14 | 0.06 | 0.19** | 0.14 | 0.06 |
| Household size | -0.06 | 0.01 | 0.04 | -0.08 | -0.04 |
| Years resident in community | 0.01 | 0.02 | 0.06 | 0.04 | 0.10 |
| Years fishing experience | 0.04 | 0.03 | 0.03 | 0.02 | 0.04 |
| Had occupation other than fishing | 0.05 | 0.00 | 0.07 | 0.00 | 0.04 |
| Willing to change occupation | -0.03 | 0.04 | -0.08 | -0.05 | -0.07 |
| Income sources other than fishing | -0.04 | -0.03 | -0.01 | -0.07 | -0.03 |
| Fishing most important income source | -0.02 | 0.04 | 0.00 | -0.02 | 0.03 |
| Fishing provides over half the income | -0.04 | -0.05 | -0.06 | -0.06 | -0.07 |
| Income from outside the household | -0.04 | 0.08 | 0.09 | 0.07 | 0.08 |
| Perceived pre-project resource crisis | -0.25** | -0.19** | -0.03 | -0.04 | -0.14* |
| Ecological Knowledge | 0.06 | -0.04 | 0.02 | 0.04 | 0.11 |
| Community members can cooperate | 0.18* | 0.28** | 0.22** | 0.25** | 0.28** |
| Fishers can cooperate | 0.14* | 0.31** | 0.23** | 0.20** | 0.23** |
| Association member | 0.15* | 0.10 | 0.11 | 0.12 | 0.13 |
| Had influence on project planning | 0.08 | 0.03 | 0.15* | 0.18* | 0.10 |
| Had Post Implementation influence | 0.08 | 0.06 | 0.12 | 0.09 | 0.11 |
| Attended project training | 0.08 | 0.04 | 0.15* | 0.14 | -0.04 |

N=199; * $p<0.05$; ** $p<0.01$

Although the detailed analysis provided above gives us important information concerning relationships between the independent and dependent variables, it is important to determine whether we can gain some insights by analyzing patterns of covariation within the set of indicator variables and relating this covariation to the independent, predictor variables. Hence, the next step in the analysis was to subject the ten indicators to a principal component analysis (PCA) (with varimax rotation) to determine whether relationships between the indicators were such that they could be reduced to fewer,composite indicators for further analysis (Table 16). The number of components of the PCA were selected based on a scree-test. The three rotated components explain 66% of the variance in the set of indicators.

Table 16. Principal Component analysis of impact indicators.

| | Component | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Compliance | 0.82 | 0.12 | 0.07 |
| Conflict | 0.78 | 0.03 | 0.18 |
| Participation | 0.77 | 0.13 | 0.29 |
| Influence | 0.75 | 0.22 | 0.34 |
| Control | 0.57 | 0.40 | 0.12 |
| Access | -0.25 | 0.72 | 0.17 |
| Harvest | 0.38 | 0.66 | 0.12 |
| Resource | 0.39 | 0.63 | 0.02 |
| Income | 0.34 | 0.51 | 0.55 |
| Household | 0.24 | 0.11 | 0.90 |
| Variance | 33 | 19 | 14 |

Indicators loading highest on component one are perceived changes in community compliance with resource regulations, community conflict, participation in community affairs, influence in community affairs, and control over the resource. Indicators loading highest on component two are perceptions in changes in access to the resource, amount of traditionally harvested speeies, and overall well being of the resource. Finally, indicators loading highest on component three are perceived changes in income and household well being. Impact indicators loading on component one are described as indicators dealing with behavior of community members. Indicators loading highest on component two are resource-related indicators. Finally, component three is described to be as household well-being related indicators.

The next step in the analysis was to determine the relationships between the new composite measures of the indicators (PCA) and the 19 independent variables listed in Tables 4 and 5. Independent variables related ($p < 0.10$) to any of the three components were selected using an interactive stepwise multiple regression analysis to determine the set of independent variables that explain that explain most of the variance in each of the three component. The stepwise regression used in the analysis is considered interactive in the sense that partial correlation's are examined at each step for indications of changes that could be the result of multicollinearity, the offending variable is not used in the regression analysis. Results of the stepwise regression analysis are found in Table 17.

The result of the three regression analyses is statistically significant. Years of formal education, a source of income from outside the household, and the attitude that community members can cooperate account for about 9% of the variation in the human behavior component. Two variables, perceived pre-project resource crisis and the attitude that community members can cooperate, account for 8% of the variance in the resource component, and only one variable, perceived pre-project resource crisis, was entered into the regression equation for the household well-being component.

As a final step in the regression analysis, scores for the three components were summed, resulting in an overall measure of perceived changes. This measure will be referred to as the total perceived impact measure. The correlation's of the total perceived impact measure with the 19 independent variables were calculated, and only variables manifesting significant correlation ($P < 0.05$) with dependent variable were selected to be used in the stepwise regression. Result of the analysis is highlighted in Table 17. This analysis indicates that four of the independent variables – perceived pre-project resource crisis, attitudes towards ability of both fishers and community members to cooperate with one another, and having influence on project planing – account for 17% of the variance in the total perceived impact measure.

Table 17. Regression analyses of impact components.

| | Std. Coeff | t-test | Prob. 2-tail |
|---|---|---|---|
| *Dependent variable: Component 1: Human Behavior* | | | |
| Education | 0.191 | 2.802 | 0.006 |
| Income from outside the HH | 0.153 | 2.247 | 0.026 |
| Community members can cooperate | 0.214 | 3.142 | 0.002 |
| $R=0.315$; $R^2=0.099$; Adj. $R^2=0.085$ | | | |
| $N=199$; $F=7.161$; d.f.=3.195; $p < 0.001$ | | | |
| *Dependent variable: Component 2: Resource* | | | |
| Perceived pre-project resource crisis | -0.157 | 2.294 | 0.023 |
| Community members can cooperate | 0.246 | 3.599 | 0.000 |
| $R=0.299$; $R^2=0.089$; Adj. $R^2=0.080$ | | | |
| $N=199$; $F=9.612$; d.f.=2.196; $p < 0.001$ | | | |
| *Dependent variable: Component 3: Household well-being* | | | |
| Perceived pre-project resource crisis | -0.198 | 2.828 | 0.005 |
| $R=0.198$; $R^2=0.039$; Adj. $R^2=0.034$ | | | |
| $N=199$; $F=8.000$; d.f.=1.197; $p < 0.005$ | | | |
| *Dependent variable: Total Perceived Impact* | | | |
| Perceived pre-project resource crisis | -0.165 | 2.487 | 0.014 |
| Fishers can cooperate | 0.143 | 1.718 | 0.087 |
| Community members can cooperate | 0.248 | 3.017 | 0.003 |
| Had influence on project planning | 0.132 | 2.020 | 0.045 |
| $R=0.432$; $R^2=0.187$; Adj. $R^2=0.170$ | | | |
| $N=199$; $F=11.128$; d.f.=4.194; $p < 0.001$ | | | |

*Discussion and Conclusion*

In general, analyses suggest that the community-based coastal resource management projects under CVRP-1 were successful despite partial or complete failure (destruction due to natural events) of some of its objectives (e.g. artificial reefs, fish aggregating devices, shellfish culture, etc.). This highlights the fact that fishers and project staff may have completely different perceptions of success. When CVRP-1 staff identified "successful" sites that were compared with "less successful" sites with respect to pre-project and post-project changes for the ten indicator variables, they differed only with respect to the perceived amount of increase in compliance with regulations, community conflict, influence in community affairs, and control over the resource. Nevertheless, it should be pointed out that both "less successful" and "successful" communities perceived increase in all four indicators.

The difference of means tests applied to the impact indicators indicates that project community members, association members as well as non-members, perceive positive and statistically significant improvement in all indicators except for access. The sanctuaries, mangrove contracts, and exclusive access for members to artificial reef areas resulted in some perceiving decreased access, thus resulting in overall perceptions of no significant change.

Correlation and regression analyses conducted to determine the relationships between changes in the ten indicator variables and 19 independent variables concerning factors influencing success of CBCRM projects revealed that the most important among the independent variable is the pair reflecting cultural attitudes toward cooperation. This variable was found to be related to nine of the ten indicators. The attitude that community members can cooperate was significant in the regression analyses of the human behavior and resource impact component as well as the total perceived impact measure. Other important predictor variables found was perception that the resource was in bad shape and influence on project planning which entered into the regression models.

In conclusion, several important lessons have been learned from the analyses. First, evaluations of project success by project staff and beneficiaries vary because they may use different criteria. Both may be valid in their own terms. It appears that project staff were focusing more on easily observable impacts of material interventions as a measure of success. Fishers on the other hand, defined "success" as being given more sense of empowerment, more access to information and better skills to make decision to improve their life, being more integrated into the economic and political mainstream, etc. Second, early and continuous participation of beneficiaries in project planning and implementation is related to positive evaluation of impacts. Not only does this type of involvement serve to adopt project activities to local needs, but participants also gains a better understanding of the problems involve and a sense of empowerment. Third, positive cultural attitudes toward the efficacy of collective action were consistently related to perceptions of positive change. The CVRP-1 training in organization and leadership enhanced these attitudes, as reflected in fisher's statements that they now know how to run meetings and get something accomplished. Fourth, project cooperators, as well as non-cooperators, perceived positive changes, with little difference between the two groups. This "spread effect" is probably the consequence of early, open involvement of all community members and subsequent face to face interactions in the small community settings where everyone knows what is going on. Fifth, the data indicate that fishers like their occupation and would not necessarily change to another job, suggesting that the development of supplemental, rather than alternative, occupation may be the most effective strategy on easing fishing pressure. These supplemental activities could be spread over a large number of fishers, reducing rather than eliminating their fishing activity, and probably having as great effect, or greater, as trying to attract (or force) fishers to some alternative form of employment.

## Measuring Project Success in Community-Based Coastal Resource Management Projects[12]

Community-based coastal resource management projects abound in South East Asia, especially in the Philippines. Between 1984 and 1994 more than 100 community-based coastal resource management projects (CBCRM) were undertaken. An evaluation by Pomeroy and Carlos (1997) revealed that less than 20% of these projects were identified as being successful in the sense that the community organization still existed and that at least a single project intervention was maintained after the project terminated. Why the majority of projects failed is not clear. It may have been that the project components were implemented at a time when the people were not ready for them, and/or it may have been that project components were not relevant for the people.

An earlier study by Pomeroy, Pollnac, Katon and Predo (1996) showed that while projects could be unsuccessful in the eyes of the implementers, the project participants did not necessarily perceive the projects as failures at all. The analysis suggested that the CBCRM projects evaluated were successful despite partial or complete failure (or destruction by natural events) of some project interventions (e.g. artificial reefs, fish aggregating devices, shellfish culture, etc.). From the study it appeared that project staff were focusing more on easily observable impacts, e.g. functioning fishers' organization, area of mangrove successfully replanted, etc., while the fishers felt a sense of empowerment. The fishers stated that they had more information with which to make decisions and improve their life, they had more skills, and they felt more integrated into the economic and political mainstream. Hence, evaluations by both project staff and beneficiaries are important, but it is also important to understand that they reveal different results based on different criteria of success or failure. It is, however, the evaluation by the community members themselves that will influence their subsequent behavior and thus the potential sustainability of the project.

### From development to people-centered resource management

Indicators commonly used to measure success of development projects were designed at a time when development focused on increasing (agricultural) production. Local people were merely recipients of advice, training and technology essential in increasing their harvests and therewith their well being; or so it was thought. The top-down, blueprint development approach, however, failed to stimulate people's affinity with such projects, and neither did it create a sense of responsibility or ownership concerning the output. Failure of many of these projects in the 1960's and 1970's led to a shift in development thinking. Attention shifted from a strictly production point of view to a farming systems research and extension focus. It was acknowledged that without the support, consent and participation of the target population, a project was likely to fail (Korten, 1986). Technology and production, however, were still regarded as keys to development.

Community-based management strives for more active people's participation in the planning and implementation of natural resources management (Pomeroy, 1994). CBCRM's central concern is the empowerment of groups and social actors and a sense of self-reliance. It starts from the basic premise that people have the innate capacity to understand and act on their own problems and CBCRM builds on this knowledge (Ferrer and Nozawa, 1997). However, the recognition that the state cannot be ignored in sustaining local actions, has led to co-management, a partnership between government and the community (Pomeroy, 1998).

[12] Condensed from Harkes, I (1998) "Project Success: Different Perspective, Different Measurements". A paper presented at a conference entitled "Participatory Natural Resource Management in Developing Countries", April 6-7th; Mansfield College, Oxford press (In Press).

**Shortcomings in evaluations**

The social preparation process in CBCRM is time-consuming. It was concluded that for a truly participatory project, the time required for people to master new skills for CBCRM would be at least 3-5 years or longer (Pomeroy et al, 1996). Many projects, however, even if they include a social preparation process, are planned for a shorter time span. The problem is that project activities are often carried out while the beneficiaries are still in the process of developing the skills needed to actually understand and implement the project interventions. As a result, the local community members are not prepared to carry out, or fully accomplish, the project interventions, let alone sustain them. Consequently, at the end of the project life, project interventions are not fully implemented and/or sustained. Thus, the project is deemed to be a failure.

A second shortcoming in the measurement of project success is that although community-based management is people-centered, project evaluation does not include the personal achievements of the participants. Evaluation has remained focused on material indicators of project success. The less tangible results of the project, i.e. the personal development of the beneficiaries; changes in attitudes, beliefs and values of the project participants; sense of empowerment, etc., are not measured.

The main reason why projects are often evaluated as being unsuccessful are: (1) the timing of the evaluation is usually wrong, and (2) the criteria used to measure success are those which the project implementers feel to be important, while overlooking those representing the experience of the participants. There is a need to re-evaluate measures of success and develop new criteria to measure success.

***"Emic and Etic"* Views of Success**

The disparity between what is actually measured and the people's perceived impacts of the project, can be explained through a theory used in Anthropology. Harris (1991), for example, writes: "The problem is that both thoughts and behavior of the project participants can be viewed from two perspectives: from that of the participants themselves and that of the observers. In both instances, scientific and objective accounts of the mental and the behavioral fields are possible. In the first instance, the observers employ concepts and distinctions that are meaningful and appropriate to the participants; in the second instance they employ concepts that are meaningful and appropriate to the observers. The first way of studying culture (or perceptions of success) is called *"emic"* and the second way is called *"etic'"*".

Borrowed from linguistics (Pike, 1954), phon*emic* refers to what a sound signifies in the minds of the users. Phon*etic*, on the other hand, refers to scientific descriptions of sound with no reference to meaning, i.e. from the outside. *Etic* categories are those that the researcher employs for the purposes of scientific classification, analysis, and understanding of human-environmental interactions (Lovelace, 1984). *Emic* is concerned with the elements, aspects, and interpretations of the belief system as perceived or conceived by the members of the culture or society under consideration (see also de Groot 1992 on the use of emic and etic in the perception of environmental problems).

The problem is that even though many projects claim to have a participatory approach, they do not make a distinction between the *emic* and *etic* project results. In many cases, the project staff defines and analyses project output in concrete, technical terms, which represent the *etic* indicators. Their evaluation thus focuses exclusively on *etic* observations.

However, evaluations also need to include a set of *emic* or normative indicators. Strictly *etic* assessments are inadequate for projects that have socio-cultural impacts. During the process phase it is meaningful to determine how the people perceive the natural environment, the local problems, the alternative solutions, and their abilities to intervene; but most importantly, their capabilities to do this collectively (Pomeroy and Carlos, 1996). In the absence of *emic* considerations, it is impossible to discover these local conceptions and perceptions.

This does not mean that *etic* measurements can not be used to measure success. The physical aspects (i.e., the *etic* environment connected to the values and views of the project implementers) need to be measured at a later phase. It is essential that the two types of project evaluation be measured at the appropriate time. Even though the social preparation process takes place in the implementation phase (when project activities are also carried out), this is the moment for *emic* considerations and not for a focus on material output. Only after the project phases out and when the community has carried out project interventions, is it adequate to measure the *etic* output. In order to measure success, it is crucial to acknowledge and evaluate the non-material results that make the project successful in the eyes of the people, and to measure them at the right time.

**What to measure and when?**

Important components of the social preparation phase are, amongst others, communication-mechanisms and participation. Communication mechanisms are used to clarify and define the roles of participants in the different phases of the project. Exercises can help people to understand principles of adult learning and community participation. Trainers and participants become aware of preconceptions about each other; they learn about group behavior and role perceptions (see for example the FAO Handbook for Participatory Evaluation, 1988; UNDP Toolbook 1993). These exercises and other tools enhance participation. They help to establish a working climate that stimulates involvement of various stakeholder groups and allows people to partake in decision-making. The communication-mechanisms thus provide the proper conditions for active participation and capacity building.

Several studies, guidelines and training manuals for a participatory approach provide possible indicators that represent community attributes, i.e., awareness, and capability (UNDP Toolbook 1993; Pretty 1994; Pomeroy et al, 1996; Borrini-Feyerabend, 1997; IIRR, 1998). It is important to distinguish accomplishments on two levels: the personal/individual level and the community level.

Possible indicators that represent project beneficiaries' personal achievements and benefits are listed below (Figure 3).

Figure 7. Individual indicators for project success

| ***Individual indicators for project success*** | |
|---|---|
| Involvement | in the project design<br>in decision-making<br>in management<br>in defining boundaries<br>in rule development |
| Capability | to express an opinion<br>to make decisions<br>to prioritise issues<br>to participate in a meeting<br>to write a proposal<br>to speak in public<br>to work in committees |
| Control | over the process<br>over resources<br>over people's own life |
| Access | to knowledge<br>to meetings<br>to resources |
| Skills | to repair and maintain technical equipment<br>to manage a project<br>to solve problems |
| Personal change | in awareness<br>in sense of responsibility<br>in self confidence<br>in initiative<br>in self respect<br>in generating new ideas<br>in willingness to deviate from customs and community values<br>in willingness to take risks |

For the community as a whole, other issues may be important. The community viewpoint is naturally concerned with general benefits and achievements. Sets of indicators to identify changes of the community level are listed below (Figure 8).

Figure 8. Community indicators for project success

| ***Community indicators for project success*** | |
|---|---|
| Communication | commitment of stakeholders<br>recognition of stakeholders<br>understanding between stakeholder groups<br>expression of different viewpoints<br>level of open disagreement |
| Representation | of various stakeholders<br>of various social groups<br>of women<br>of socially marginalised groups |
| Collaboration | between individuals<br>between neighborhood groups<br>between various social (differentiated) groups |
| Trust | between staff members<br>between staff and government<br>between staff and project beneficiaries |
| Support | of higher government levels<br>of the local leaders<br>of a NGO<br>of the project staff<br>of village based organizations |

It is assumed that a measurement of the individual and community indicators, right after the social preparation process or implementation phase, will lead to a positive assessment where people feel they have achieved something, and a negative outcome where this is not the case. This early *emic* evaluation has the advantage that it allows the project to adapt over time and thus prevent possible failures.

Since the social preparation process is part of the implementation phase, it is possible to include material and physical project indicators in the preliminary evaluation (Figure 5). This evaluation typically focuses on the process of project planning and development. It will show whether the project goals are appropriate, needs to be modified, adapted, or skipped altogether. The advantages of this early measurement of physical indicators are that it: (1) enhances the self-esteem and awareness of participants, and (2) reveals priorities of the project participants. Hence, it further stimulates internalization of project objectives, which makes it more likely that the selected activities are actually carried out.

The final *etic* evaluation of the project, in the technical sense, takes place in the post-implementation phase. Not only are the physical outputs of the project (i.e. the degree to which project goals have been achieved) measured in a quantitative way, but also the organizational (non-material) success factors are quantified, such as the intensity of group involvement and the functioning of the management system and enforcement mechanism (Figure 5).

Ideally, indicators are selected by the project participants during the implementation phase of the project. In reality, however, the indicators are predefined in a project proposal drafted by the implementing or funding agency. Even though this may be the case, it is still advisable to lead all project participants through a process in which the goals and objectives are discussed and prioritized. This is essential if project goals are to be internalized locally and, most importantly,

not *imposed on* the participants. Thus the definition of success for both the implementers and the participants is expected to be similar. This final evaluation will truly represent project success.

Figure 9. Project indicators of success

| ***Project indicators of success*** | |
|---|---|
| Success in terms of material output | size of yields<br>catches per unit effort<br>hectares of protected areas<br>hectares of mangroves/forests replanted<br>occurrence of destructive practices by local people |
| Success in terms of human involvement | number of people attending the training<br>numbers of participants in project<br>frequency of staff-meetings<br>size of the network |
| Success in terms of project benefits | division of benefits<br>economic opportunities<br>well-being in terms of health<br>well-being in terms of income<br>flow of investments<br>education level |
| Success in terms of management structure | management institution designed and active<br>management plan and regulations designed and implemented<br>enforcement structure in place<br>conflict solving mechanism in place<br>leadership |
| Success in terms of participation | type of participation<br>dimension of participation |

**Methodology**

The last question to be answered is "how to measure project success and by whom?" The *emic* and *etic* measurements require a standard methodology that is valid and allows comparison. There are various ways to measure project success and operationalize the indicators. The methodology to measure people's perceptions of success depends largely on whether the evaluation is action oriented or is part of an academic exercise. Anthropological fieldwork directed at the development of a set of indicators leads to scientifically valid outcomes. However, it can be time-consuming, especially when it involves a long list of indicators. Where time, funds and the availability of skilled researchers are limited, alternative methods need to be used, for example, participatory evaluation methods.

The core of the evaluation is people's perceptions. It is essential to use the correct method to measure these perceptions, especially since for a number of these indicators no base-line data is available. The measurement of people's perception is complex. Social science research is based on defining variables, looking for associations among them, and trying to understand whether one variable influences another (Bernard, 1994). Even though social scientists are recognized as important counterparts in projects, often economists are preferred over anthropologists and

Perceptions can not simply be measured by asking people "what they think", as happens in many studies. These kinds of questions do not reflect the complexity of people's thoughts and the subconscious. *Emic* indicators (e.g. perceptions, attitudes etc.) are non-material and qualitative yet quantifiable, and demand a certain approach in order to be measured (Bernard 1994). To measure perceptions, for example, requires the operationalization of a cognitive component (what do people know about the subject), an affective component (what do people feel towards the subject), and an action component (what is people's behavior towards the subject).

As part of a survey used in the ICLARM Fisheries Co-management Project in Indonesia (Novaczek and Harkes, 1998), fishers in Maluku province were asked questions on job-satisfaction (Pollnac and Poggie, 1988, Pomeroy et al, 1996). From the answers provided, it appeared that fishers have profound knowledge about the fishery in terms of decline, fish-species, marketing and prices (cognitive aspects). They expressed concern about the risk of fishing, while they also said they loved fishing because it 'was in their blood' (affective aspects). Generally, job-satisfaction seemed high (>80% were satisfied). But when asked if they would actually change their profession if they could, or if they would like their children to become fishers (action component), the responses were lower. If given the opportunity, 36% of the respondents would change their job, and less than 10% of the fishers actually wanted their children to become fishers (Novaczek and Harkes, 1998). So only the combination of the three components reflect the true perception of the fishers. Proper operationalization is thus required in order to carry out quantitative analyses and valid measurements.

Another example of a method to measure project impacts is a visual self-anchoring ladder scale also used by ICLARM (see this chapter). This base-line independent technique uses non-parametric statistical techniques and makes use of the human ability to make graded ordinal judgements. Fishers are asked to answer questions about the state of the resource, fish-catches, personal well being, income, occurrence of conflicts, and collective action. By using a picture of a ladder with ten rungs as a visual aid. The lowest rung represents the worst possible condition, the highest rung represents the best. In the study, fishers' perceptions were recorded of past conditions, current conditions, and degree of optimism for the future. The technique deals with variability in perceptions over time and facilitates analysis of the perceived project impacts.

This is only one example to illustrate the use of participatory techniques, scaling, and ranking systems, there are several other techniques (Figure 6). These techniques allow a great deal of input from participants and are very useful to quickly understand the local situation (Drijver, 1993; Mosse, 1994). Participatory research can also be conducted to collect and analyze baseline data on the community and its natural resources (Pomeroy, 1998). The techniques can easily be adapted to measure personal change and development accrued from the project and outcomes can be quantified and compared. For the easily quantifiable indicators of project success, a more straightforward method could be used, e.g. observations, enumeration (census) and surveys.

Figure 10. PRA techniques (adapted from Jinggins and de Zeeuw, 1992; Pido et al. 1996)

1. **Visual scoring and ranking systems** can be used to measure changes in wealth and well being, development of skills, representation of social group's etc.
2. **Time lines** can be used to represent significant changes in the village, but also on the individual level.
3. **Seasonal patterns** cannot only be used to show the relative magnitude workload, they can also illustrate project activities and extent of involvement in the project.
4. **Venn- and linkage diagrams** are useful to represent social relationships or the importance and influence of different individuals or institutions.
5. **Visual estimations and quantification** record such things as yields and prices, but can also be used to measure skills, initiative, commitment etc.

Post-implementation activities include evaluation of project activities and adjustment of plans and activities as needed. Every CBCRM project should have a schedule for the phase-out of outside assistance for the project. At this point, the CBCRM arrangements become truly self-sustaining (Pomeroy, 1998). After management authority is handed over to the people, and the project is terminated, sustained management efforts indicate that the project and project activities are really relevant to the people. As can be concluded from above, there are three points of attention: (1) the acknowledgment of a social preparation process, (2) the need to define project goals communally, and (3) intermediary measurements of various sets of project indicators. If these three aspects have become an integral part of CBCRM projects, it is more likely that management efforts are sustained over a longer period of time.

### Obstacles to measurement of *emic* success

Current development structures make no allowance for the extra set of indicators needed to evaluate project success on the *emic* level. Often, targets are set by those outside the community. Only in a few cases did the opinions of the participants play a major role in project design, implementation and evaluation. Furthermore, in many cases, projects are carried out in too short a time, without a clear or long enough social preparation process, and with material interventions started too early. Hence, it is not surprising that the material interventions are either not sustained or never implemented at all. Consequently, and this is crucial, the project fails to measure the non-material successes that are experienced by the participants.

Without *emic* assessments, the evaluation of a project is not complete. This measurements only possible when donors are prepared to change their approach away from predefined, entirely material project goals. The implications for donors are significant. It means a restructuring of project plans to include a redefinition of project goals, and possibly a longer implementation period. This has financial consequences, but more importantly, changing the approach would imply a drastic shift in authority and autonomy over the project. Numerous evaluations and studies of failed projects are a clear indicator that these changes are required to increase the likelihood of project success in the short term, and so ensure sustainable resource use in the longer term.

### Conclusions

Over the last decades development projects have shifted their approach from development to a people-oriented approach. CBRM and co-management's central concern is the empowerment of groups and social actors. The approach requires extensive participation and the development of local capability. Project participants develop the skills required to manage their resources.

However, the personal development of project participants is not evaluated and project evaluation remains focused on material outputs exclusively.

Apparently, project success depends largely on what is actually measured, when, and by whom. As a means of evaluating project success as perceived by both participants and implementers, we need to adapt the indicators used to evaluate the project. The personal development of the participants in terms of increased involvement, access, control, capability, skills, and personal change are reflected in an *emic* evaluation. These skills are largely acquired during the social preparation process and the appropriate moment to measure these non-material project impacts is right after the implementation phase (see Pomeroy 1998).

A main issue tackled in this chapter is the requirement from outside agencies and donors for quantifiable, objective measurements. Social anthropology is one source of methods to operationalise concepts such as 'perception' into measurable, quantifiable components. However, measuring people's perceptions as an academic exercise is time-consuming. If time is limited, people's perceptions and personal development can also be assessed through participatory techniques, such as ranking- and scaling techniques (Pomeroy *et al.* 1996; Blauert and Quintanar 1997). These methods allow non-material project results to become visual and numerical and allows statistical analysis. The fact that the material project goals are defined collectively with the assistance of government, NGOs and donor agencies, leads to internalization of these material project goals by both parties. Consequently, the *emic* perception of success coincides with the *etic* viewpoints, i.e. the project's perspective and the second measurement thus is objective and truly represents project success.

As said earlier, project success will prove itself in the long run. The early *emic* evaluation has the advantage that it allows the project to adapt strategies and adjust project goals, and thus prevent possible failures (see also Pollnac 1989). It also provides a picture of the performance of the project over time, which will result in a more accurate assessment of what the project has achieved. In this way the chances of project success will not only increase, but it is also more likely that after the project terminates, the participants will continue the project activities.

This however is only possible when donors are prepared to change their approach away from easily quantifiable, physical project goals. It is essential that projects include a clear process phase, intermediary measurements and an open agenda. This requires more time and money, as well as reallocation of authority over the project to local people, i.e. the new managers in the field.

## LITERATURE CITED

Agbayani, R.F., and A.S. Babol. 1998. Institutional arrangements for fisheries co-management on Malaison Island, Culasi, Antique: A process documentation research methodology. SEAFDEC/AQD report submitted to the Fisheries Co-Management Project. ICLARM-DANIDA Project. 210 pp.

Amonia, R.C.,Epe K.C., and Trangia, R.C. 1997. Partnerships in Coastal Resource Management (LISD-PDR Project Synthesis). International Institute of Rural Reconstruction, Silang, Cavite, Philippines. 46pp.

Bernard, H.R. (1994) Research Methods in Anthropology. Qualitative and quantitative approach. Sage Publications. London, UK.

Blauert, J. and E. Quintanar (1997) Seeking Local Indicators: Participatory Stakeholder Evaluation of Farmer-to-Farmer Projects (Mexico). Paper presented at the International Workshop on PM*and*E: Experiences and Lessons. November 24-29, IIRR Campus, Silang, Cavite, Philippines.

Borrini-Feyerabend, G. (1997) Beyond Fences. Seeking Social Sustainability in Conservation. IUCN, Gland, Switserland.

Costanza, R. 1992. Toward an operational definition of ecosystem health. In Ecosystem Health: New Goals for Environmental Management, ed. R. Costanza, B.G. Norton and B.D. Haskell. Island Press, Washington, pp.239-256.

Drijver, C.A. (1993) Participatory Rural Appraisal: A Challenge for People and Protected Areas. *In*: CML Coursebook III, 1994-1995, pp 235-243. Centre of Environmental Science, Leiden, the Netherlands.

FAO (1988) Participatory Monitoring and Evaluation. Handbook for training fieldworkers. Regional Office for Asia and the Pacific, Bangkok, Thailand.

Ferrer, E. and C. Nozawa (1997) Comunity-based Coastal Resource Management in the Philipines: key concepts, Methods and Lessons Learned. A paper presented at the International Development Research Centre Planning Workshop on Community-based Natural Resource Management, 12-16 May, Hué, Vietnam.

Groot, de W.T. (1992) Environmental Science Theory: Concepts and Methods in a One-World, Problem Oriented Paradigm, Par 3.7. Elsevier Science Publishers, Amsterdam, the Netherlands.

Harkes, I. 1998. Project Success: Different Perspective, Different Measurements. Paper presented at a conference entitled "Participatory Natural Resource Management in Developing Countries", April 6-7, Mansfield College, Oxford Press (in Press)

Harris, M. (1991). Cultural Anthropology (3rd Edition). New York: Harper Collins Publishers Inc.

IIRR (1998) Particiaptory Methods in Community-based Coastal Resource Management. 3 vols. International Institute for Rural Reconstruction, Silang, Cavite, Philippines.

Jiggins, J. and H. de Zeeuw (1992) Participatory Technology Development in Practice: Process and Methods. *In:* C. Reijntjes, B. Haverkort, and A. Waters-Bayer (*Eds.*) Farming for the Future: an Introduction to Low-External-Input and Sustainable Agriculture, pp 135-162. ILEIA, Leusden, the Netherlands.

Karr, J.R., Fausch, K.D., Angermeier, P.L., Yant, P.R. and Schlosser, I.J. 1986. Assessing Biological Integrity in Running Waters: A Method and Its rationale. Illinois Natural History Survey Special Publications 5.

Korten, D.C. *Ed.* (1986) Community Management. Asian Experience and perspective. Kumarian Press, West Hartford, Connecticut, U.S.A.

Korten, D. C., Frances F., and R. Siy (eds) 1989. Transforming a Bureaucracy: The experience of the Philippine National Irrigation Administration. Quezon City: Ateneo de Manila University Press.

Lovelace, G.W. (1984) Cultural Beliefs and the Management of Agro-ecosystems. *In*: A.T. Rambo and P.E. Sajise (*Eds.*) An Introduction to Human Ecology Research on Agricultural Systems in Southeast Asia, pp 194-205. Los Baños University, Philippines.

Mosse, D. (1994) Authority, Gender and Knowledge: Theoretical Reflections on the Practice of Participatory Rural Appraisal. *In*: Development and Change, vol. 25 (3). Blackwell Publishers, The Hague , The Netherlands.

Newland, K. 1981. Infant Mortality and the Health of Societies. Worldwatch Institute, Washington.

Novaczek, I. and I. Harkes (1998) Fisheries Co-management Project Indonesia: Inventory and Institutional Analysis of Sasi in Central Maluku. Working Paper No. 39. Fisheries Co-Management Project. ICLARM, Manila, Philippines.

Oakerson, R.J. 1992. Analyzing the commons: A framework. In making the commons work: Theory, practice and policy, ed D.W Bromley, 41-59. San Francisco: Institute for Contemporary Studies.

Pido, M.D., R.S. Pomeroy, M.B. Carlos, and L.R. Garces (1996) A Handbook for Rapid Appraisal of Fisheries Management Systems (version 1). ICLARM, Manila, Philippines.

Pido, M.D., R.S. Pomeroy, M.B. Carlos, and L.R. Garces. 1997. A Rapid Appraisal Approach to Evaluation of Community-Level Fisheries Management Systems: Framework and Field Application at Selected Coastal Fishing Villages in the Philippines and Indonesia. Coastal Management, 25:183-204.

Pike, K. (1954) Language in Relation to a Unified Theory of the Structure of Human Behavior. Vol. 1. Glendale: Summer Institute of Linguistics.

Pollnac, R.B. & Poggie, J.J. (1988) The Structure of Job Satisfaction among New England Fishermen and its Application to Fisheries Management Policy. *In*: American Anthropologist 90: 888-901.

Pollnac. R.B. (1989) Monitoring and Evaluating the Impacts of Small-scale Fishery Projects. ICMRD, Rhode Island, U.S.A.

Pomeroy, R.S and M.B. Carlos (1996) A Review and Evaluation of Community-based Coastal Resources Management Projects in the Philippines, 1984-1994. RR No. 6. ICLARM, Manila, Phillippines.

Pomeroy, R.S., R.B. Pollnac, C.D. Predo, and B.M. Katon (1996) Impact Evaluation of Community-based Coastal Resource Management Projects in the Philippines. RR No. 3, ICLARM, Manila, Philippines.

Pomeroy, R.S., Pollnac, R.B., Katon, B.M. and C.D. Predo. 1997. Evaluating factors contributing to the success of community-based coastal resource management: the Central Visayas Regional Project-1, Philippines. Ocean and Coastal Management. Vol. 36, Nos 1-3,pp. 97-120.

Pomeroy, R.S. and M.B. Carlos (1997) Community-based Coastal Resource Management in the Philippines: a Review and Evaluation of Programs and Projects, 1984-1994. *In*: Marine Policy, Vol 21, No. 2, 1997.

Pomeroy, R.S. (1998) A Process for Community-based Fisheries Co-management. *In*: NAGA, ICLARM Quarterly, January-March 1998, Manila, Philippines.

Pretty, J. (1994) Alternative systems of inquiry for a sustainable agriculture. Paper for the lecture st the Department of Communication and Innovation Studies. University of Wageningen, the Netherlands.

Rapport, D. 1984. The interface of economics and ecology. In Integration of Economy and Ecology – An Outlook for the Eighties, ed. A.M. Jansson. University of Stockholm, Stockolm.

UNDP (1993) Tools for Community Participation. A Manual for Training Trainers in Participatory Techniques. PROWWESS/UNDP-World Bank Water and Sanitation Program, Washington, U.S.A.

Veneracion C.C. (ed.) 1989. A Decade of Process Documentation Research: Reflection and Synthesis. Institute of Philippine Culture. Ateneo De Manila University. 129pp.

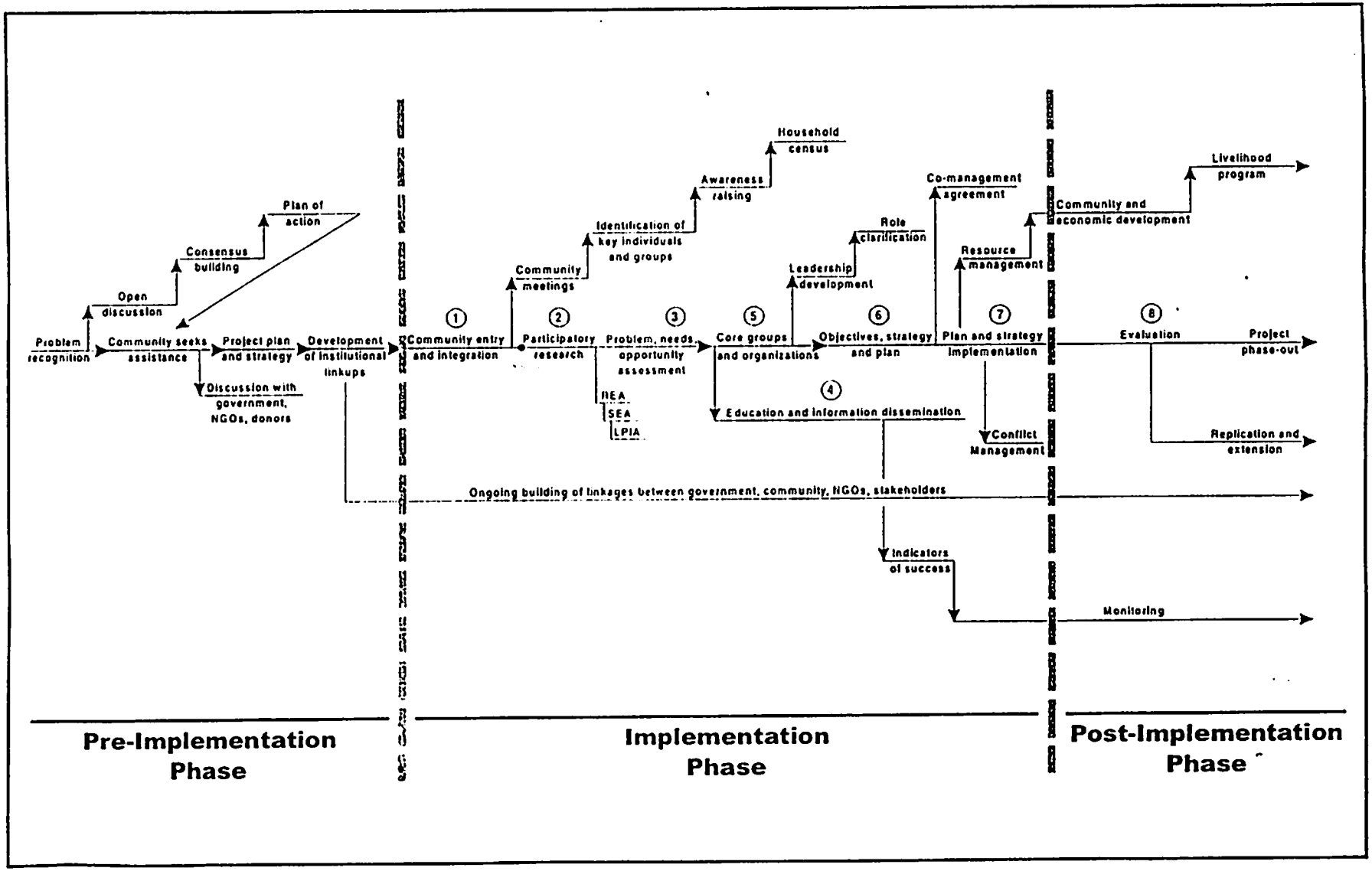
## Chapter Seven
## A Process for Community-based Fisheries Co-management

In most cases, community-based fisheries co-management is implemented through a defined process by an external agent to the community such as a non-governmental organization (NGOs) or an academic or research institution. In the Philippines, for example, several development NGOs specializing in fisheries and coastal resources have developed their own community-based resource management (CBRM) process. The Tambuyog Development Center has the Sustainable Coastal Area Development (SCAD) program (Gutierrez et al.1995), the Community Extension for Research and Development (CERD) has the Fishery Integrated Resource Management for Economic Development (FIRMED) program (Magpayo 1995), and the Philippine Partnership for the Development of Human Resources for Rural Areas (PHILDHRRA) has the Tripartite Partnership in Marine and Aquatic Resource Management and Rural Development (TriMARRD) program (PHILDHRRA no date). The steps involved in the implementation of the CBRM process of each of the NGO's is essentially the same, although emphasis is put on different steps and components.

Taking lessons from the community-based management programs of NGOs and other institutions from around the Asian region, a process for community-based fisheries co-management has been developed. It should be noted that this is only one possible process of implementing community-based fisheries co-management. It should be noted that there is no "right" process to develop co-management. It is presented as more or less a generic process. It should be adapted to meet the specific conditions and needs of a particular situation. It should also be noted that the process described in this chapter is a community initiated activity that is implemented with the assistance of an external agent and/or government agency. Another approach, not presented in this chapter, can be described as an externally initiated activity where the external agent or government agency identifies a problem(s) and then establishes a community-based co-management project in partnership with the community.

The implementation of community-based fisheries co-management can be viewed as having three phases: pre-implementation, implementation, and post-implementation (Figure 11). The pre-implementation phase of co-management usually starts with a recognition by the resource users and stakeholders that there is a problem with the resource(s) and that their livelihood may be threatened. This is especially true if the resource users are highly dependent on a resource(s), when availability of the resource(s) is uncertain or limited, and when the resource users are highly identified with their fishing area. If the resource(s) problem is repeatedly experienced, such as low or no catch; if it exists within a single community of resource users; and if the resource users are unable or unwilling to move to another fishing area, the resource users are more likely to begin to take action to deal with the problem. Open discussion among resource users about the problem will occur, often leading to consensus building and the development of an agreement on a plan of action. At this early time, an enthusiastic individual(s) may step forward as the prime mover(s) of the co-management process. The resource users may seek assistance from the government or external agents on possible solutions or courses of action to deal with the problem. These outside (of the community) institutions may enter at this point to assist the community, through the organizing of meetings and provision of information, in preparing a preliminary project plan and strategy. A proposal for outside funding of the project may be prepared. Initial approvals for the project may be obtained from different levels of government and local leaders. At this point, linkages are established and strengthened between resource users and government so that a partnership is developed. A formal or informal agreement for cooperation may be established at this time.

Figure 11. A Process for Community-Based Fisheries Co-Management



The development and strengthening of these linkages and networking, at institutional, group and personal levels, is a continuous process throughout the life of the co-management activities. (It should be noted that many of the process activities described in this chapter are continuous and overlapping, especially during the implementation phase. The process is not linear but is very dynamic, oftentimes being cyclic as it evolves. The flow diagram in Figure 11 is a simple representation of a complex process.) The pre-implementation phase actually merges with the implementation phase.

Implementation of co-management has four components: resource management, community and economic development, capability building, and institutional support. The resource management component is aimed at activities to manage, protect, conserve, rehabilitate, regulate, and enhance the marine and coastal resources. The community and economic development component aims to raise income, improve living standards and generate employment through alternative and supplemental livelihood development, community social services and infrastructure development, enterprise development, and regional economic development including industrialization. The capability building component aims at individuals and groups and involves people empowerment and participation, education, training, and leadership and organization development. The institutional support component involves conflict management mechanisms, individual and organizational linkages, interactive learning, legal support, policy development, advocacy and networking, forums for knowledge sharing, power sharing and decision-making, and institution building and strengthening. Gender, cultural and ethnic issues are emphasized throughout the implementation phase.

Community entry and integration are usually the first steps in implementation. Field workers and community organizers from the external agent begin to identify the main stakeholders, those groups and individuals with an interest in co-management. It is often difficult to determine who is and who is not a legitimate stakeholder and at what level in the co-management partnership that they should be involved. They establish initial relationships and credibility with community members, target project participants and local leaders at this time. They identify and study the communication and participation structures in the community including local social structures and power relations, forums for discussion and conflict management, communication barriers by gender and class, and participation in decision-making. A series of meetings and discussions are held with resource users, stakeholders and government officials to share the concept and process of community-based co-management, to begin to develop a consensus on their interests and concerns, and for awareness building about resource protection, management and rehabilitation. Other activities include identifying key individuals and groups to be involved in co-management, answering questions about the project, awareness raising about issues, the process and the project, and participating in community activities such as fishing and events. It is at this point useful to conduct a feasibility analysis to determine whether or not a co-management arrangement is feasible. Questions on the legal, political, institutional, economic and socio-cultural feasibility need to be considered (Borrini-Feyerabend 1996). A general household census may be conducted to collect some basic socio-economic data on the community and initial identification of problems, needs, and opportunities. Community integration of field workers and community organizers can be a long process. The individual field workers and community workers must have the skills and personality to be able to listen, share and work with, on an equal basis, the people of the community.

Participatory research is conducted as a second step to collect and analyze baseline data on the community, its people and its natural resources and to generate new knowledge. The baseline data is used in the preparation of development and management plans and strategies, for monitoring and evaluation, and for

process documentation. A participatory research process involves the people of the community, working with the researchers, in the collection, analysis and validation of the output. The participatory research process can also serve as a means to raise awareness and educate community members about their community and natural resources and to begin to formulate potential solutions. Participatory research is conducted using a mix of scientific and rapid appraisal methods and includes traditional and indigenous knowledge. Participatory research can have three components: (1) resource and ecological assessment (REA), (2) socio-economic assessment (SEA), and (3) legal, policy and institutional assessment (LPIA). A REA is conducted to provide a scientific and technical information base on the coastal and marine resources of the area. Three interrelated parts are usually included in the REA, capture fisheries assessment, coastal habitat assessment (coral reef, mangrove, sea grass), and water quality assessment. A SEA is conducted to provide baseline information and a profile on social, demographic, cultural and economic characteristics and conditions in the community. The SEA includes both stakeholder and conflict analyses. A LPIA is conducted to profile the institutional arrangements (formal and informal rights and rules), organizational arrangements, legislation, policies and programs, both internal and external to the community, for coastal resources management. The baseline data also serves as a basis for the future monitoring of the project and for the evaluation of success and impacts.

As a third step, a participatory opportunities, problems, and needs assessment is conducted by and with the stakeholders and community through a series of community meetings, key informant interviews, surveys, and one-on-one discussions. Community members have the opportunity to share with each other and with government and the external agents their ideas for the future of their community and their vision on how to achieve this future. The feasibility of developing a co-management agreement is assessed and discussed. The baseline data from the three research assessments serve as information for this process.

Education and training are integral and ongoing activities of the community-based co-management process. They are the main methods of capability building for community members. The external agent based on the assessments conducted earlier usually implements these activities. The education and training should recognize and build upon the existing experience and knowledge of community members. Nonformal and formal education methods are used including small groups, seminars, cross visits, role-playing, radio, video, and fisher-to-fisher sharing of local knowledge. Environmental education is a focus of these activities. A priority of the education and training activity is to build capability and confidence to insure that community members can make informed choices and decisions concerning problem articulation, management and development objectives, strategies and plans, and implementation.

Community core groups, organizations and leaders are needed to take on the responsibility and authority for management and development activities. Community organizing is the foundation for mobilizing the human resources of the community. They also serve as the focus for participation, representation and power sharing in the community. These groups, organizations and leaders may exist in the community, may emerge by themselves, or may be newly identified or established. The members of the group or organization must be willing to take on the responsibility. The existing groups, organizations and leaders in the community are identified through the stakeholder analysis and LPIA. A variety of core groups and organizations can be established including women's groups, cooperatives, and area-wide resource management councils. Organizations may be formed at different levels from the fisher to the village to the municipal/district to the province/state. Education and training can develop the skills and ability of and empower the core group, organization and leaders to take on management responsibility. Leadership development is an important part

of this step. Strong and dedicated leadership has been found to be a critical condition for the success of community-based co-management. Existing community leaders, such as elected officials and senior fishers, play an important role but may be to closely tied to the existing community power structure to allow for improved equity. New leaders, often individuals with the motivation but not the means to take on leadership, can invigorate the process and increase its legitimacy. Leader terms of office should be rotated on a regular basis to decrease the chances for corruption and power grabbing. It is critical that enough time be provided for the organizing and leadership development processes. Lack of social preparation is often a major cause of project failure. It is during this step that the delineation and clarification of the role and responsibilities of groups, organizations, leaders, and stakeholders are undertaken. Formal and informal forum(s) for discussion and debate should be established including place, time and rules. Advocacy by the core groups and organizations is undertaken to get support for local initiatives and policy and laws. Initial consultations and/or planning meetings are held among the partners to develop the co-management agreement.

As a sixth step, the core groups and organizations at the community level, working in partnership with other stakeholders and the government, develop a resource management and community development plan with specific objectives and strategies, including a co-management agreement. The formulation of the plan is done with the active participation of community members. The community members validate drafts of the plan. If external to the community funding is needed to implement all or part of the plan, it will be necessary at this time to identify a source and apply for the funding. An output of this planning is the co-management agreement. This may involve a series of meetings to reach a consensus on the structure of the agreement and to support negotiation, mediation or arbitration of conflicts. These meetings will involve identifying the key issues, and extensive bargaining and compromising to make decisions. The co-management agreement needs to be specific and include a definition of roles, responsibilities and authority; identification of forums for meetings; conflict management mechanisms; and rule making procedures. The agreement should be widely circulated to inform and obtain comments from relevant communities and stakeholders. A co-management management body may be established at the end of the process of developing the agreement that represents all the partners. The specification of who is to be represented, what is in the mandate, the appropriate level of the body, what are the tasks, and what authority it will have should be reached during the planning phase. Indicators for monitoring and evaluation of the plan are specified. This can be done through a logical framework analysis (LFA) where outputs, activities, verifiable indicators and means of verification are stated. Since conflicts will arise, there must be within the agreement itself, and within the institutions that participate in the management process, forms and mechanisms to address and resolve these conflicts. Conflict management is a process of dialogue and negotiation. The presence of a facilitator, mediator or arbiter may be needed to guide the process toward constructive results. The conflict management mechanism should be multi-level so that an appeal process is possible. The financial resources to implement the co-management plan should be identified early in the process and made available before implementation.

It should be noted again that the strengthening of linkages and partnerships and networking between resource users, stakeholders, government and the external agent is an ongoing and continuous process that extends beyond the implementation phase. The roles and responsibilities of the partners will change and adjust as the community-based co-management system matures.

The activities and interventions of the community-based co-management plan are implemented through specific sub-projects. These sub-projects may be resource management such as a marine reserve or sanctuary, mangrove reforestation, erosion management or fishing gear restrictions; community development

such as a water well or a road; livelihood development such as agriculture, aquaculture or small business enterprise; and/or institutional support such as formal recognition of the community organization or passage of a government ordinance legitimizing local institutional arrangements (rights and rules).

Monitoring and evaluation should be central elements of the overall implementation process (although evaluation may be conducted during the post-implementation phase). The indicators specified above are used in monitoring and evaluation. Both monitoring and evaluation are done in a participatory mode. Participatory monitoring allows for interactive learning and a feedback system of success and failure while the project is being implemented. It provides information during the life of the project to the community and external agents to assess whether activities are progressing as planned and whether of not adjustments and/or modifications are needed. Participatory evaluation allows both those internal and external to the community to evaluate project objectives against project results. It allows for planning for the future based on past experience. The baseline information collected earlier in the project can be used in the evaluation. Monitoring the co-management agreement is also carried out on an on-going basis and the results reviewed by the partners. Performance indicators may be used to measure progress of the co-management agreement, process and implementation. As needed, the responsibilities and rights of partners are clarified, conflicts are managed, and the agreement is enforced. This may result in changes in the agreement or the development of a new agreement (Maine et al, 1996).

It is really at this point where the project, with assistance from an external agent and external funding, is fully taken over by the community and becomes truly self-sustaining. A post-implementation phase begins at this time. The external agents work through a planned phase-out with the community and the other co-management partners. It is important to note that the phase-out should be planned and well understood by all so that there are no surprises and problems are minimized. Where possible and feasible, replication and extension of results of the project are undertaken by community members in other communities. Fisher-to-fisher training and cross-visits can be a useful method to train people from other communities. Project replication and extension can also serve as a means to enhance the credibility of the community-based co-management system in the eyes of the community and the co-management partners since success oftentimes breeds success (White et al. 1994).

## References

Borrini-Feyerabend, G. 1996. Collaborative Management of Protected Areas: Tailoring the Approach to the Context. IUCN, Gland, Switzerland.

Guttierrez, J.S., R.A. Rivera and Q.L. Dela Cruz. 1995. Sustainable Coastal Area Development (SCAD) Program: Barili, Cebu. In Foltz, C., R.S. Pomeroy and C.V. Barber (eds.) Proceedings of the Visayas-Wide Conference on Community-Based Coastal Resources Management and Fisheries Co-management. Fisheries Co-management Project Working Paper 4. ICLARM, Manila.

Maine, R.A., B. Cam and D. Davis-Case. 1996. Participatory analysis, monitoring and evaluation for fishing communities: a manual. FAO Fisheries Technical paper no. 364. Rome, FAO.

Magpayo, N. 1995. Fishery Integrated Resource Management for Economic Development (FIRMED): An Integrated Approach to Community-Based Coastal Resource Management. In Foltz, C., R.S. Pomeroy and C.V. Barber (eds.) Proceedings of the Visayas-Wide Conference on Community-Based Coastal Resources Management and Fisheries Co-management. Fisheries Co-management Project Working Paper 4. ICLARM, Manila.

Tripartite Partnership in Marine and Aquatic Resources Management and Rural Development Program. No date. Philippine partnership for the Development of Human Resources for Rural Areas. Quezon City, Philippines.

White, A. L., L. Hale, Y. Renard and I. Cortesi (eds.) 1994. Collaborative and Community-based Management of Coral Reefs. West Hartford, Connecticut:Kumarian Press.

# Chapter Eight
# Empirical Studies in Fisheries Co-Management

A number of hypotheses exist concerning the advantages of co-management, especially as co-management compares to centralized management systems. Several of these hypotheses were empirically tested during Phase 1 including: (1) whether regulatory compliance levels under fisheries co-management are higher than under centralized management; (2) whether or not transactions costs associated with fisheries co-management are lower compared to centralized management costs in the long run; and (3) how adaptive and resilient are community-based coastal resource management institutions and how capable are they to responding to and managing change. This chapter presents research results from four different studies supported by the project.

## Enforcement and Compliance

This section highlights the theoretical and empirical dimensions of enforcement and compliance in three Asian countries. It summarizes research undertaken by K. Kuperan, N. Mustapha, I. Susilowati, I. Siason and C. Ticao (1997) entitled "Enforcement and Compliance with Fisheries Regulations in Malaysia, Indonesia and the Philippines", and I. Susilowati (1998) entitled "Economics of Regulatory Compliance in the Fisheries of Indonesia, Malaysia and the Philippines".

### *Compliance Problem*

Fisheries are regulated to mitigate over-exploitation and conflicts among user groups. Often, the overfishing resulting from open access to the fishery is addressed with regulation that restrict gear and vessel, set minimum fish size limits, time and area closures and quotas, and require licenses to fish. User conflicts are often addressed with gear prohibitions or restrictions and zones to separate user groups. Fishers, like most regulated economic agents, typically are controlled through monitoring, surveillance and enforcement. Frequently, the most costly element of fisheries management programs is enforcement, which accounts for a quarter to over a half of all expenditures. Compliance with regulations is usually far from complete, seriously jeopardizing the effectiveness of management. This raises questions on whether there are ways to improve the cost- effectiveness of traditional enforcement and whether there are ways to secure compliance without heavy reliance on costly enforcement.

Most modern analysis of compliance behavior centers on deterring rational individuals from violating rules. Individuals acting in the pursuit of self-interest can impose harm on others. It has been argued that social harmony can be realized only by controlling aspects of human nature. The basic deterrence model assumes that the threat of sanctions is the only policy mechanism available to improve compliance with regulations.

This deterrence model, however, has at least two important shortcomings. First, the model does not explain the available evidence very well. Second, the policy prescriptions are impractical. The model assumes self-interested individuals weigh the potential illegal gains against severity and certainty of sanctions when deciding whether to comply. If the illegal gains are greater than the gains from legal fishing, the expected penalty should be large enough to offset the difference between legal and illegal gains. Since enforcement is costly, the probability of detection and conviction should be kept low and penalties high. The probability is usually low in practice. The typical odds of being caught violating a fishery regulation are below one percent. Penalties, on the other hand, generally are not large relative to illegal gains.

Raising penalties to the point where the expected penalty offsets illegal gains generally is not feasible. The courts are not willing to mete out sanctions that fit the crime, as measured by the illegal gains realized or the social harm caused by the detected and proven violation. The basic deterrence model predicts that the generally modest sanctions will not be an adequate deterrent to illegal fishing. Despite this apparent weakness, however, most fishers normally comply with regulations. Data show that 34 percent, 81 percent and 30 percent of fishers in Malaysia, Indonesia and the Philippines comply with the zoning regulation.

When asked why they persist to comply when illegal gains are much larger than the expected penalties, many fishers expressed a sense of obligation to obey a set of rules. This moral obligation may be a significant motivation that explains much of the evidence on compliance behavior. Other factors determining compliance are severity and certainty of sanctions, individuals' perceptions of the fairness and appropriateness of the law and its institutions, and social environmental factors. Compliance is linked to both the internal capacities of the individual and external influences of his environment.

Fisheries law enforcement activities by and large determine the extent of compliance with its laws and regulations. In line with that, compliance is directly related to the effectiveness of fisheries enforcement. Therefore, enforcement activities really have to be done in order to achieve the goal of fisheries management. To provide for enforcement is costly.

In summary, the literature identifies the following factors determining compliance: potential illegal gain, severity and certainty of sanctions, individual's moral development and their standard of personal morality, individual's perception of how just and moral are rules being enforced, and social environment.

### *Enforcement and Compliance Models*

In an attempt to overcome the shortcomings of the basic deterrence model, this study tests an extended model of compliance behavior (Figure 12) in which rational individuals are driven by intrinsic and extrinsic motivations. The model integrates economic theory with theories from psychology and sociology to account for both tangible and intangible motivations influencing individuals' decision whether to comply with a given set of regulations. Specifically the model accounts for morality, legitimacy, and social influence in addition to the conventional costs and revenues associated with illegal behavior.

#### *Econometric Framework*

The general econometric model used to test the relationship between illegal activity and a set of specific intrinsic and extrinsic conditions is simply:

$$Y_i = \beta x_i + \varepsilon \qquad [1]$$

Where $Y_i$ measures the $i^{th}$ individual's noncompliance with the zoning regulation, and $x_i$ is a vector of conditions reflecting the individual's perceived potential illegal gains and risk of detection and arrest, and measures of moral development, institutional legitimacy, and social influence.

Equation [1] can be derived from a model in which a utility maximizing individual decides whether and how frequently to violate a regulation. The individual's utility is a function of the net income from fishing (legal and illegal), his personal moral standing and his social standing. The individual's personal moral standing is assumed to depend on whether and how much he violates the regulation in conjunction with his moral development and the legitimacy he accords the regulatory institution. The individual's social standing on the other hand depends on how much he violates the regulation in conjunction with the values and behavior of his peers.

With intrinsic and extrinsic motivations in the model, the total and marginal conditions for utility maximizing behavior are differentiated to generate a set of testable hypotheses. The following hypotheses are derived from the total condition (i.e., an individual will violate if and only if his expected utility from the violation exceeds the utility from not violating) and are stated in the context of a random utility framework.

The probability of an individual violating a regulation is less, the:

(1) higher the probability of detection and sanction (or greater the enforcement inputs),
(2) greater the penalty if sanctioned,
(3) less profitable violating is compared to complying,
(4) higher the moral development of the individual,
(5) more legitimate the regulation as perceived by the individual, and,
(6) more legitimate the regulation as perceived by the community at large.

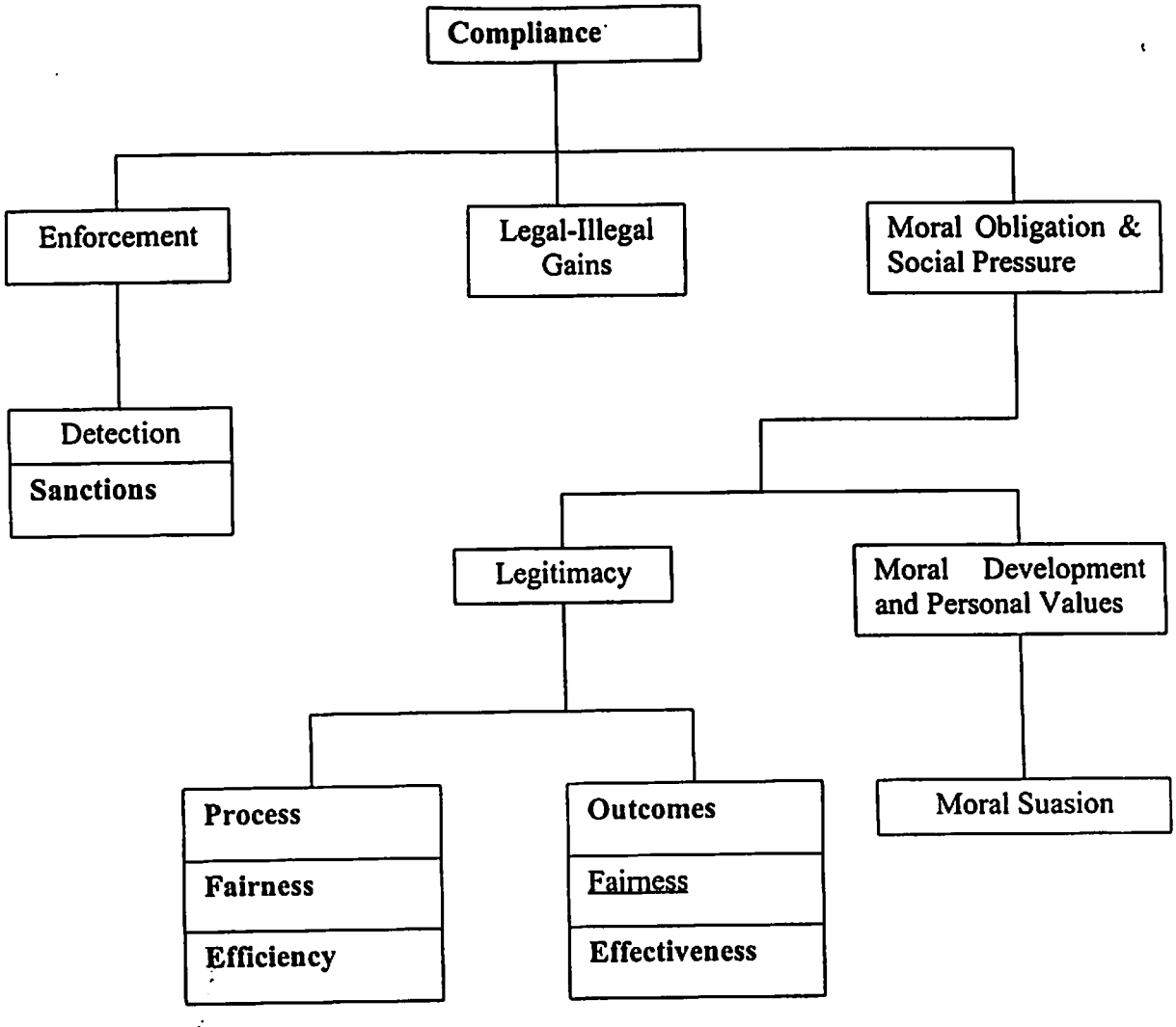



**Figure 12. Determinants of Compliance** (Kuperan, et al., 1997)

Key dependent variables in this study are the violation decision variable (VIOLT), and the number of days a fisherman has fished in the prohibited zone (NFINS). The violation decision is estimated using a Probit model while the number of days fished inshore (NFINS) is estimated using a Tobit model.

*The Basic Deterrence Model*

A fisherman's decision to violate is modeled as a function of factors that affect his utility from fishing in the prohibited zone (inshore areas). The equation for estimating the violation decision in the basic deterrence model is:

$$VIOLT = f(CONSTANT, CPUEO, CPUEI, OPROB) \quad [3]$$

Where VIOLT : equals one for a fishermen who fishes at least once inshore during the year and zero otherwise.
CONSTANT : the intercept in the equation.
CPUEI : the catch per unit effort in the offshore area.
OPROB : the overall probability of detection, arrest and conviction if caught violating.

*Estimated Probabilities*

The overall probability of detection and conviction is expected to be a function of enforcement and evasion inputs. The subjective probabilities of each fishermen may have on his own expenditures on capital inputs (such as larger engines and faster boats, detection evasion equipment, etc.), as well as his assessment of enforcement inputs. The perceived enforcement inputs include the number of patrol boats a respondent thinks are operating in his area, the number of time he has seen enforcement personnel at sea as well as the number of times he has had actual contact with enforcement personnel in terms of boarding or checks by enforcement personnel. The estimated overall probability of detection and conviction is modeled as:

$$HOPROB_i = f(NPBOATS_i, NENFOR_i, EXPEVA_i, HP_i) \quad [4]$$

Where,

$HOPROB_i$ : the estimated overall subjective probability of detection and conviction for fishermen i
$NPBOATS_i$ : number of patrol boats fishermen i believes is in operation in his area
$NENFOR_i$ : number of times fishermen i has seen enforcement personnel at sea
$EXPEVA_i$ : expenditure on evasion activity by fishermen i
$HP_i$ : horse power rating of engine in the i th fishermen's boat

*The Extended Compliance Model*

The compliance model is extended to include the effects of moral obligation and social influence on compliance behavior. The moral obligation to comply is assumed to depend on the individual's moral development and on the perceived legitimacy of the regulatory institution. Kohlberg's Standard Issue Moral Judgement Interview and Scoring System (Colby and Kohlberg et al., 1987) is used to rank fishermen according to their level of moral development.

Legitimacy accorded to the regulatory authorities by fishermen is measured by 12 variables reflecting the individual fishermen's assessment of the outcomes and procedures associated with regulation. The outcome variables are CONSERVE (zoning regulation is to conserve and protect the fishery resource), CONFLICT (zoning regulation is to avoid conflict between inshore and offshore fishermen), JUST (zoning regulation is a just regulation), EVERYONE (zoning regulation improves long term well being of fishers), INSHORE (zoning regulation well being of inshore fishers) and OFFSHORE (zoning regulation improves well being of offshore fishers). For each of these variables the respondent ranked his level of agreement with each statement (Table 18) on a scale of one to five, where score indicates stronger agreement. The theory is that individuals that agree with these outcome variables are also likely to accord a higher level of

legitimacy for the enforcement agency and thus exhibit greater compliance with the regulations. The six process variables are RIGHT (government is doing the right thing in imposing regulation), VIEWS (views of fishers are taken into account in formulating fisheries regulation), NONCONST (zoning regulation is not enforced consistently), NODETECT (many trawler fishermen who fish inshore are getting away), PENALIFT (penalties given to trawler fishermen caught violating the zoning regulation fit the offense) and ENFORADQ (enforcement in the inshore fishing areas is adequate). These variables represent legitimacy toward the enforcement and regulatory authorities as perceived by the individual fisher. Usually people tend to legitimize and to obey the institutions that produce positive benefits to them. The response for legitimacy questions is in the form of ordinal scale with five ranks of agreement and disagreement.

Other variables used in the analysis include PERTVIOL and CPUEI. PERTVIOL indicates the percent of fishermen perceived to be violating the regulation. CPUEI reflects the differential income potential from fishing offshore and inshore fishing. Figure 12 presents the complete conceptual framework for the extended model.

Table 18. Probit estimation of the Extended Compliance Model.

| Variable | Malaysia | | Indonesia | Philippines |
|---|---|---|---|---|
| | 1991 | 1995 | | |
| CPUEO | -0.00440*** | 0.0002099 | 0.00004276 | -0.00040 |
| | (-2.757) | (1.4066) | (0.53779) | (1.57460) |
| CPUEI | 0.00896*** | -0.00032118* | | 0.06013*** |
| | (6.698) | (1.7079) | | (7.4783) |
| HPROBD | 4.650*** | 1.8822 | 0.000000010 | 0.0000012 |
| | (6.710) | (0.65179) | (0.12270) | (1.1262) |
| MCODE | 0.781*** | -0.31462 | -1.1092*** | -0.32150** |
| | (-4.992) | (-0.73898) | (-4.1945) | (-2.1785) |
| PERTVIOL | 0.0122*** | 0.58233 | 0.015708*** | 0.00537* |
| | (2.286) | (1.2809) | (2.9489) | (1.7032) |
| CONSERVE 1 | 0.0475 | -0.031223 | 0.11196 | 0.28555 |
| | (0.376) | (0.28559) | (0.55126) | (1.20930) |
| CONFLICT 1 | -0.305*** | 0.42076 | 0.19321 | -0.37020 |
| | (-2.328) | (0.37882) | (0.65182) | (-1.27030) |
| JUST 1 | 0.212** | 0.032939 | -0.22436 | -0.06008 |
| | (1.758) | (0.27089) | (-0.81140) | (-0.41782) |
| EVERYONE 1 | -0.405*** | 0.14076 | -0.23644 | 0.48175*** |
| | (-2.630) | (1.0330) | (-0.78247) | (2.6700) |
| INSHORE 1 | -0.947 | -0.20401 | 0.40735 | 0.08162 |
| | (-0.748) | (-1.5163) | (1.5652) | (0.40982) |
| OFFSHORE 1 | -0.191 | 0.1278 | 0.16478 | -0.16248 |
| | (-1.568) | (0.90822) | (0.73762) | (-1.00160) |
| RIGHT 2 | 0.139 | 0.15694 | -0.032829 | 0.06508 |
| | (1.150) | (1.2143) | (-0.10976) | (-0.00447) |
| VIEW 2 | -0.146 | -0.12554 | 0.17106 | -0.00447 |
| | (-0.156) | (-1.0011) | (0.78112) | (-0.03910) |
| NONCONST 2 | 0.106 | -0.26006*** | -0.18141 | 0.10017 |
| | (1.353) | (-2.0238) | (-1.3921) | (0.93416) |
| PENALIFT 2 | 0.0785 | -0.07693 | 0.16076 | -0.26736* |
| | (0.822) | (-0.61089) | (1.2103) | (-1.9534) |
| ENFORADQ 2 | 0.0691 | 0.82910*** | 0.082951 | -0.00170 |
| | (0.764) | (4.5534) | (0.58502) | (-0.1157) |
| CONSTANT | 1.242 | -1.7114 | -1.0516 | 1.3000 |
| | (1.493) | (-1.4540) | (-0.79063) | (-1.35990) |
| Log-likelihood | -100.19 | -64.198 | -88.080 | -177.42 |
| Likelihood Ratio test | 160.52*** | 49.925* | 66.959* | 148.95** |
| McFaddens R2 | 0.412 | 0.279 | 0.275 | 0.4226 |
| N | 318 | 138 | 187 | 259 |

Note: t-ratios in ( )
* sig at 10%
** sig at 5%
*** sig at 1%

***Results and Policy Implications***

The problem examined in the study centers mostly on the high incidence of non-compliance with regulations by fishers under a condition of limited enforcement. Incomplete compliance affects the effectiveness of fisheries management. The study examined non-compliance behavior of fishers in Indonesia, Malaysia and the Philippines.

The results from the study provided some support for traditional enforcement policy. Results shows a higher rate of detection and conviction arising out of enforcement activities has the potential to discourage people from committing illegal activities. Similarly, more expensive penalties and fines imposed will make fishers comply with rules or regulations. In practice however probability of detection is low and violations are rarely detected especially for Indonesia and the Philippines given their limited resources and their geographical area. According to the theory, levels of compliance can be improved by increasing the probability of detection and conviction or penalty rate. However, this course is not very practical because of the large financial requirements needed to attain such goals. With this in view, it is recommended that government should pay more attention to enhancing enforcement resources and increase the penalty rate to deter violators. Adequate enforcement and severe penalties would be important in enhancing fishers regard for the law and law enforcement institutions. A number of respondents in the study perceived the penalties to be low and not sufficient to deter violation. It is therefore necessary to increase the burden of penalties and fines of violations to make it more costly for fishers who commit such acts.

According to the compliance theory, the willingness to comply stemming from moral obligations and social influence is based on the perceived legitimacy of the authorities charged with implementing the regulations. Other evidence suggests that a key determinant of perceived legitimacy is the fairness built into the procedures used to develop and implement regulatory policy. To the extent that this is valid, enforcement authorities should determine what policies and practices are judged fair by segments of the population subject to regulation. This may mean that civil penalties and other sanctions should be comparable in value to the larger harm done or gains realized. Policy makers and enforcement authorities therefore need to reveal to violating fishermen and the society at large the extent of damage the violations caused so that the procedural and outcomes (justice) aspect of the law and the penalties are clearer to the fishermen.

Although legitimacy is seen as one of the determinants of compliance, results from the study do not provide unanimous support for the theory. However, one of the legitimacy variables i.e. OFFSHORE was significant in the Probit estimation and VIEWS and NONCONST in the Tobit model. The weaker empirical support for the legitimacy variables could be due to the difficulty in measuring such variables which respondents may not have fully understood. The difficulty in understanding the concept of legitimacy may have contributed to the weaker performance of legitimacy variables. Other possible reason for the poor performance of the legitimacy variable is that other factors not captured in the model but is important enough to influence the normative factors of legitimacy may have been overlooked (factor such as institutional problems and enforcement weakness).

Overall, the results show that basic deterrence, moral development and social standing variables in all models are statistically significant in determining the violation behavior of fishers in the selected study area. The legitimacy variables were not all significant. The study found sufficient support to demonstrate that personal moral development plays a more important role than legitimacy variable in securing compliance. Under the Tobit model, process variable representing the legitimacy parameter were found to be more important in explaining compliance as compared

to the outcome variables. Such conclusion is consistent with Tyler's finding (1990) that process variables plays a more important role as compared to outcome variables.

Such result has important implications for co-management. It is often iterated in literature that co-management as an approach for governing fisheries resources is likely to receive greater legitimacy from fishing community as the communities are closely involved in the process and outcome aspects of governing the system. This will strengthen the moral obligation of individuals in the fishery to comply with regulations imposed on the fishery and thus reduce enforcement costs and the need for elaborate enforcement institutions and structures.

This finding thus supports the general belief in literature that co-management may lead to higher levels of compliance with fisheries regulation even with lower levels of enforcement. In a co-managed fishery there is a greater moral obligation on individuals to comply with rules and regulations. This greater moral obligation comes from the fact that fishers themselves are involved in formulating, rationalizing and imposing the rules and regulations for their overall well being.

**Transaction Cost in Fisheries Co-Management**

Fisheries co-management as an alternative to centralised command and control fisheries management is often suggested as the solution to the problems of fisheries resource use conflicts and overexploitation. With fisheries co-management there is a shift of costs from society to collective groups and individuals and also a shift in the magnitude of transaction costs of operating a different management system. By identifying the major components of transaction costs in this management system, fisheries managers can have a clearer idea of the total costs involved in implementing the management option. In doing so, the net benefits of the management option can then be accurately evaluated and compared with the existing management system. This section is a summary of two papers. The first is a journal article by N. Mustapha, K. Kuperan and R. S. Pomeroy entitled "Transaction Costs and Fisheries Co-management", Marine Resource Economics, Vol. 13, pp 103-114, 1998. The second is a paper by K. Kuperan, N. Mustapha, R. S. Pomeroy and E. Genio entitled "Measuring Transaction Costs of Fisheries Co-management" presented at the Seventh Common Property Conference of the International Association for the Study of Common Property, 10-14 June 1998, Vancouver, British Columbia, Canada.

*Transaction Costs Framework*

Ronald Coase (1937) first discussed transaction costs economics in the economic literature in his seminal paper "*The Nature of the Firm*". Coase proposed that the decision whether to have a transaction within a firm or in the market place will be determined by transaction costs (Coase, 1937). This theory suggests, if given a choice, individuals will choose the set of institutions, contracts or transactions that will minimize the (transaction) costs of doing business. Libecap (1991) points out; having lower transaction cost is a necessary rather than a sufficient condition for adoption. It is therefore appropriate to examine transaction costs when evaluating the potential of new institutions as alternatives to existing institutions.

Transactions costs are difficult to define precisely. A basic premise of economics is that individuals choose from options they have available to them to maximize their utility. Williamson (1973) makes the point that it is this opportunistic behaviour when combined with incomplete contracts that leads to transaction costs. Randall (1972) defines transaction costs to include the following: i) the cost of obtaining information, ii) establishing ones bargaining position, bargaining and arriving at a group decision and iii) enforcing the decision made. Dahlman (1979) separates transaction costs into: i) search and information costs, ii) bargaining and decision costs, and iii) policing and enforcement costs.

According to the transaction cost economics framework, the institutions with the lowest transaction costs will tend to displace those with higher cost. Before one evaluates the *transaction costs of a* fisheries co-management system vis-à-vis the centralized management system, one needs to identify some of the components of the transaction costs involved in instituting this new concept of co-management. This process is envisaged for future empirical work that will address the viability of the proposed fisheries co- management *system.*

*Transaction Costs in Fisheries Co-Management*

When multiple individuals are involved in environments where complex activities must be coordinated across space and over time, they may attempt to reduce the substantial uncertainties they face through various forms of implicit or explicit agreements. These contracts involve costly

activities expended in the processes of achieving agreements before and continuing to coordinate activities after an initial agreement is reached in an uncertain environment. Williamson (1985) identifies the costs associated with contracting activities as ex ante and ex post transaction costs. Using the generic of the Williamson's transaction cost economics, the transaction costs in fisheries co-management can therefore be broadly categorized into three major cost items: (1) information costs; (2) collective fisheries decision-making costs; and (3) collective operational costs. The first two categories are ex ante transaction cost while the latter is defined as the ex post transaction cost. This breakdown is largely based on anecdotal information and the schematic flow diagram of the transaction costs in fisheries co-management is shown in Figure 13. The transaction costs arise from the problems of information, coordination and control that stem primarily from the fact that fisheries resource management decisions involve multiple actors with different interest in long term, interdependent and uncertain processes.

One of the many challenges facing the fisheries co-management regime is how to get the fishers to reach some level of consensus on certain contract or collective actions with regards to resource management. The collective fisheries decision-making costs include dealing with fisher's problems, participating in meetings, making policies, *making* rules and regulations, communicating decisions to the community, and coordinating tasks with local and central fisheries authorities. As individual fishers have different sets of information and interests which seldom match, it will take a special effort just to bring them together, let alone reach an agreement on some uncertain processes. Even if they agree to meet, some actors will behave strategically or opportunistically so that they obtain maximum benefits from the proposed project. In the event that they manage to draw up "acceptable" rules and regulations to all resource users, they still have to communicate the decisions to their peers and some form of coordinating mechanism with local and central fisheries authorities has to be planned. Coordinating actions of diverse actors requires that considerable time and other resources be devoted to the process of gaining agreement, monitoring activities and evaluating performance. These are some of the transaction costs in the collective fisheries decision-making process.

The third major component of transaction costs is the collective fisheries operations costs. This component can in fact form the strongest counter-argument for the centralized resource management system. It is argued that if the resource is to be managed by both the central agency and the community, the operations costs can be quite substantial to ensure that rules are followed, conflicts among users are resolved and the reward system from the new institution is fair and equitable. There is validity to this reasoning. Operations cost can be quite significant in carrying out a management regime. Operations cost comes in three forms:

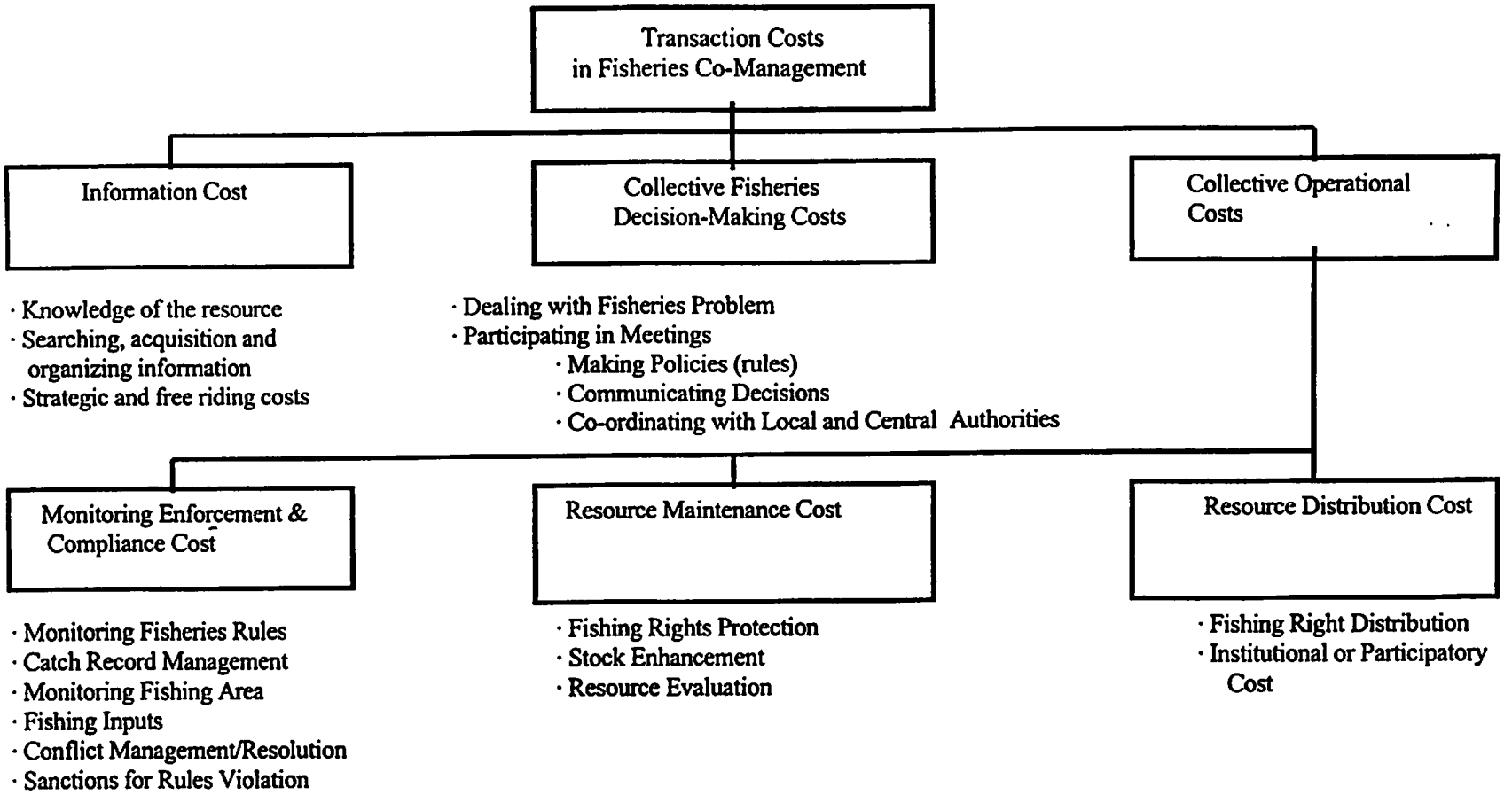



Figure 13: The Schematic Flow Diagram of the Transaction Costs in Fisheries Co Management

(a) Monitoring, enforcement and compliance costs,
(b) Resource maintenance costs, and
(c) Resource distribution cost

Monitoring, enforcement and compliance costs include the monitoring of fisheries rules, monitoring the fishing areas, catch record management, fishing inputs, conflict management and resolutions and sanctions for rule violations. In resource maintenance costs, the transaction costs result from fishing right protection, stock enhancement activities and resource assessment work to ensure that the stocks in the area are not over-exploited. Resource distribution costs include the cost of distributing the fishing rights to the appropriate stakeholders and costs of managing the participation of the stakeholders and administering the rights to the fishery.

It may be argued that under a co-management system the enforcement and compliance costs may be lower as there may be increased compliance realised from the increased legitimacy of the regulations and allocation procedures adopted by the community. But enforcement and monitoring requires substantial resources and there are likely to be economies of scale from the use of monitoring and enforcement vessels by a larger fishing community as represented by the centralised management system.

The co-management system therefore represents a shift in the burden of financing the costs of governance of common property resources from the central or public purse to *collective* groups or individuals involved in managing the resource. This shift in the costs from the central authorities to user groups has implication for overall management costs and the capability of user groups to bear such costs. The benefits from such a shift are obviously improved compliance and lower management costs. It is the ability of user groups, especially in over exploited fisheries, to bear the cost of governance from the minimal rents from such fisheries that is often questionable.

In many fisheries systems the costs of maintaining and enhancing the resource through material interventions involves large investments and long gestation periods to realise the benefits. These costs are often incurred by national agencies in most countries. A move towards co-management systems will call for the community to spend resources for such maintenance and replenishment interventions. Most communities will be reluctant to incur such costs as the benefits may often accrue to future generations and others since fish are migratory resources. Such investments are important for long term sustainability of the resources and may not have been considered in co-managed systems.

New institutions often require members to sacrifice time and effort to bring people together for decision making and enforcement. Since the benefits of such institutions flow to all members irrespective of participation, the free rider and public goods nature of institutions can pose problems for co-managed institutions. Unless some form of benefits is readily available to members who sacrifice their time, the durability of the institutions will be at stake. In addition, the equity and fairness aspects of the allocation of the benefits and costs of running the institutions will be affected. In overexploited fisheries the resource rents might be so low that fishers may not be able to maintain the institution.

The costs mentioned above may not be readily apparent but their identification is crucial in determining the sustainability of fisheries co-management systems. In centrally based management systems the funds for operating and maintaining the system most often come from the general tax revenue and the element of cross subsidies from other sectors of the economy may be in effect. In co-managed systems the costs often have to be borne by the resource users and the community and obtaining subsidies from another sector may be difficult. A thorough

examination of the often hidden transaction costs is necessary in an assessment of the feasibility of co-management as an alternative fisheries management approach.

*Measuring Transaction Costs*

An approach to measuring transaction costs of fisheries co-management systems is first to look at a co-management systems in terms of processes in both a static and dynamic sense. By process we mean looking at the details of the activities involved in the development of the co-management system over time (Figure 14). The activities involved in the process include, in a simplified sense: 1) recognition of need for new management regime, discussion and meetings, information collection, organizing and leadership, defining the management objectives and strategies, and development of institutional arrangements; 2) community education and adjustment of institutional arrangements; and 3) monitoring and enforcement, maintaining institutional arrangements, adjucating conflicts, sanctioning violators and adjustments in institutional arrangements. Some of these activities are one time, i.e, recognition, while others are continuous, i.e. information collection or adjustment. The sum of each of these activities will be the total transaction costs of initiating, implementing and maintaining the co-management system.

The process can be viewed in terms of a time frame in which we could look at three basic stages (see Figure 13). The first stage is the stage of devising, creating, obtaining information and decision making. The second stage could be the implementing stage which involves dissemination of information and explanation of how the community system will work. The third stage will be the maintaining, monitoring, enforcement, adjudicating and sanctioning activities, as well as the costs of making decisions within the current set of rules *and* the costs of making decisions to revise the rules themselves as conditions in the fishery changes.

In general, a co-management system can be evaluated in a two-step procedure - the static and dynamic analysis. The first step is a static analysis whereby costs and benefits are quantified on activities involved in stage 3 which represents the current stage (time t). This is the stage in many of the on-going fisheries co-management initiatives world-wide. The second step involves the dynamic analysis of costs and benefits in stages 1 and 2 which involves backtracking to time 0. Time 0 refers to the initiation of the process

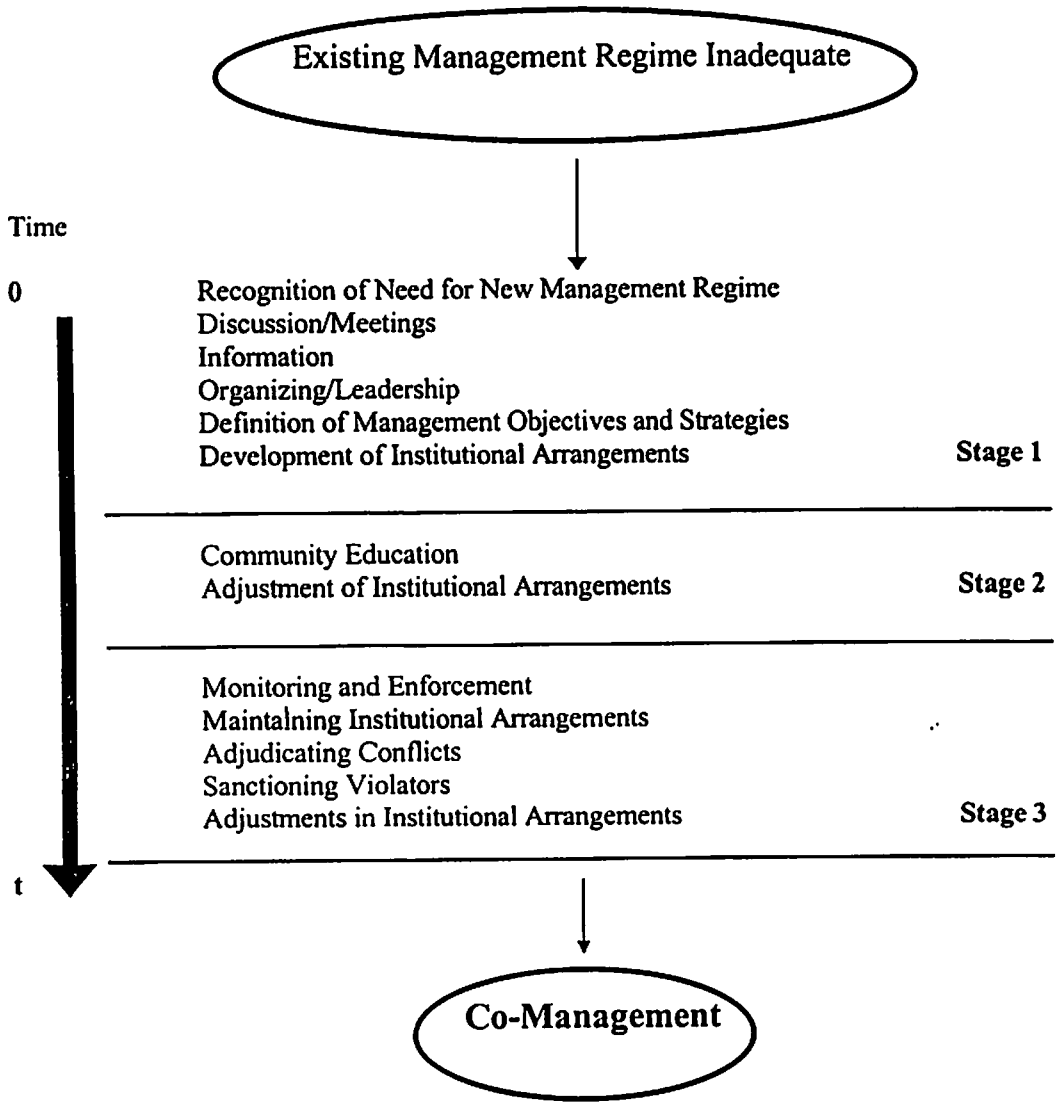



Figure 14. Process of Moving Towards Co-Management

Source: Modified from White et.al. (1994).

involved in getting the system off the ground. It, in some sense, is a dynamic process. The combined static and dynamic analyses will provide a "complete" picture of the transaction costs involved in the whole process of co-management.

As suggested by Feeny (1995) a standard cost-benefit framework can be used to evaluate the net benefits and net costs of a co-management system. The measurement process can be carried out as follows. The first step is qualification, that is the identification of the amount of resources or time used in each process activity. The second step is quantification; that is, the valuation of the time or resource. However there are some issues with regard to how the time spent should be valued. For example questions may arise as to whether all of the time spent in meetings by the stakeholders are necessarily for managing the *resource.* Time could be spent for producing more than one outcome, and fishers would also consider meetings as a consumption good that, for example, enhances their sharing of fellowship or exchange of gossip or ingesting of coffee, as suggested by Berkes (1992). This points to the fact that we may have to develop a more workable method for allocating time spent simultaneously on more than one production process. There are obviously many challenges in the development of appropriate measurement conventions and the appropriate wage rates that can be used for valuing time spend in organising, implementing and maintaining a fisheries co-management system.

## Measuring Transaction Cost of Fisheries Co-Management in San Salvador Island, Philippines [13]

One of the purported advantages of co-management compared to centralised management is that it will reduce transaction costs - the cost of gaining information about the resource and what users are doing with it, reaching agreements and co-ordinating with others in the group with respect to use of the resource, and enforcing agreements that have been reached. Hanna (1995) points out that a centralised approach is often associated with low program design costs but high implementation, monitoring and enforcement costs as the management regime may have little legitimacy with user groups. A co-management approach, on the other hand, is associated with high program design costs as effective participation is time-consuming and therefore costly. However, co-management is likely to lead to lower implementation, monitoring and enforcement costs as legitimacy of the regime is greater.

The objective of this paper is to provide some measurements of the transaction costs in a co-managed fishery. A comparison of the transaction costs with a centralised system of fisheries management is made and some implications for public policy on the choice of centrally versus co-managed systems are discussed.

### *Overview of the Fisheries Co-Management Experience of San Salvador*

San Salvador, an island *barangay* (village) of Masinloc municipality in the province of Zambales, is located on the western coast of Luzon in the Philippines. It does not have a well-defined tradition of fisheries management of its own, having been inhabited largely by farmers who came from the mainland of Zambales Province. Consequently, a strong indigenous tradition of fish stock management is virtually non-existent.

[13] Paper presented at the Seventh Common Property Conference of the International Association for the Study of Common Property (IASCP) Conference, 10-14 June, 1998, Vancouver, Canada.

Before World War II, fishers recalled that San Salvador was marked by abundant marine resources, use of non-destructive fishing methods, and a relatively homogeneous population. Consequently, there was no need for property rights and rules to govern fishing activities. Competition for resource use was not a problem, given the rich fishing grounds, a small population, and non-integration of the village economy into export markets. Thus, access to the fishery was unrestricted.

During World War II (early 1940s), Japanese troops occupied the island of San Salvador and sometimes used explosives to catch fish, marking the early beginnings of blast fishing in the area. After World War II and until the 1960s, most village fishers continued to use non-destructive, traditional fishing methods such as hook and line, improvised spear gun, and gill nets. Also used was *kunay*, a beach seine with a long scareline of coconut fronds for herding fish from the reef flat into a fine mesh net (5-cm net). Women often gleaned in shallow reefs. Local fisheries in the 1960s easily met the subsistence needs of the village residents. Farming provided additional livelihood for the island's residents.

The1970s ushered in an influx of Visayan migrants who were searching for better fishing grounds and who decided to settle in San Salvador, particularly in Cabangun (now Purok Maligaya) where they purchased a piece of land. Relatives soon joined the initial batch of Visayan migrants. The decade, moreover, saw a pronounced shift to non-traditional and destructive fishing operations such as blast fishing, aquarium fish collection using sodium cyanide, and spear fishing with air compressors, which eventually devastated San Salvador's fishing grounds. The increased deployment of fine mesh nets aggravated the indiscriminate harvest of large and small fish alike. The 1970s also marked the integration of San Salvador into an export-oriented market for aquarium fish via middlemen who visited the village. The Visayan migrants, in particular, were datching aquarium fish for a growing market in the United States and Europe. Historically, aquarium fish gatherers used sodium cyanide, which damages the reef.

The lack of knowledge of marine ecosystems and the long-term effects of destructive fishing methods could have led to irreversible damage were it not for the timely intervention of external catalysts. In March 1987, Patrick Christie arrived in San Salvador as a Peace Corps volunteer working with the Bureau of Fisheries and Aquatic Resources (BFAR). For about a year, he was instrumental in assessing the needs of San Salvador, the level of environmental awareness of village residents, and existing reef conditions. He initiated dialogues with village officials, the municipal mayor, non-government organizations, and the Bureau of Fisheries and Aquatic Resources under the Department of Agriculture (DA). In the process, he drummed up support for rehabilitating the fishery resources of San Salvador. Thus, the concept of a marine sanctuary emerged in 1988.

A project proposal on the Marine Conservation Project for San Salvador (MCPSS), prepared by Patrick Christie, was approved and funded by the Netherlands Embassy and the Jaime V. Ongpin Foundation from 1989 to 1991 for US$17,000. Additional financial support beyond the two-year period came from the World Wildlife Fund Debt-for-Nature Swap program until 1993. The Haribon Foundation, as the implementing non-government organization (NGO), provided personnel and logistical support to the project. Haribon was one of the first Philippine environment groups to recognize the role of the community in managing and sustaining resource management projects. The MCPSS may be regarded as a milestone, being the first marine sanctuary established in Luzon (a major geographical region in the northern part of the Philippines).

The subsequent passage of Municipal Ordinance No. 30, series of 1989, by the Municipal Government of Masinloc lent legitimacy to the effort to protect and rehabilitate San Salvador's remaining resources as well as apprehend violators. It also provided an opportunity for the municipal government and the village of San Salvador to cooperate in fisheries management.

From 1989 to 1993, the Haribon Foundation, Municipal Government of Masinloc, and the San Salvador community jointly implemented the MCPSS. In 1993, the Haribon Foundation turned over the project to the people's organization (PO) it helped establish, known as the *Samahang Pangkaunlaran ng San Salvador* (SPSS), in an emotional ceremony that ended four years of community organizing work. The SPSS, whose beginnings could be traced to the LTK, formally evolved from the core group established by Haribon and registered with the Securities and Exchange Commission in 1993. Despite the phase-out of the Haribon Foundation in 1993, project initiatives were sustained by the village and the municipal government, demonstrating that they could share responsibility for fisheries management. The MCPSS, which adopted a community-based approach to resource management, was a vital springboard for making co-management prosper in San Salvador.

*Methodology*

The data collection method has several steps and processes aimed at collecting cost and time-spent information in running the marine conservation project in San Salvador from its inception in the late 80's to the present. Time horizon for the marine conservation project of San Salvador was divided into three stages. Stage I, is defined to be the inception stage wherein people in San Salvador started conceptualizing and implementing the first phase of the marine conservation project (Year 1988-89). Stage II, is defined to be the stage wherein the local island organization (LTK/SPSS) in partnership with Haribon Foundation (Environmental NGO) went ahead with the full implementation of the project (Year 1990-93). Stage III, is the stage wherein management of the sanctuary has been completely turned over by the Haribon Foundation to the SPSS to be run autonomously by the local people's organization (1994-Present). Cost and time spent information and data from all stages were gathered through literature and key-informant interviews, surveys, and accessing files of government and municipal offices and NGOs involved in the project.

*Results*

The results obtained from San Salvador area for the period 1988-1996 as shown in Table 19 indicate that the difference in the total costs of fisheries management between centralised government management and co-management is not significant. However, there is significant difference in the costs at the different stages of management. In stages one and two, which are the stages of initiating a new management regime and community education, the cost are higher for the co-management approach compared to centralised government approach. The costs are however lower in the third stage for a co-managed approach when monitoring and enforcement and conflict resolution become important. These findings appear to be consistent with Hanna's (1995) view that the downstream or implementation costs are likely to be lowered for a co-managed approach (Table 20). This is because the cost of monitoring and enforcement are likely to be lowered as community members are more likely to comply with rules and regulation developed by the community as a whole, as opposed to regulations imposed by an external regulatory authority. This is important from a policy perspective, as the implementation costs are the cost encountered on a perpetual basis as management institutions are implemented. This could result in an overall lower cost of managing the fisheries resources for the society.

Table 19. Costs of alternative fisheries management in San Salvador (In Phil.Pesos)

| | Total (1988-96) | Stage 1 (1988-90) | Stage 2 (1991-92) | Stage 3 (1993-96) |
|---|---|---|---|---|
| Govt Mgt | | | | |
| National Govt | 3,351,330 | 438,575 | 450,902 | 2,461,853 |
| Local Govt | 393,954 | 8,320 | 16,640 | 368,994 |
| Total | 3,745.284 | 446,895 | 467,542 | 2,830,847 |
| Co-Mgt | | | | |
| Direct cash infusion | 1,430,522 | 737,272 | 573,250 | 120,000 |
| Counterpart labor | 2,430,000 | 810,000 | 540,000 | 1,080,000 |
| Total | 3,860,522 | 1,547,272 | 1,113,250 | 1,200,000 |

Table 20. Transaction costs in centralised and co-managed systems

| Resource Management Activities | Centralised Mgt | Co-Management |
|---|---|---|
| Information Seeking | Low | High |
| Decision making and Setting management objectives | Low | High |
| Resource distribution among users | High | Low |
| Resource distribution over time | High | Low |
| Monitoring, enforcement and compliance | High | Low |
| Resource maintenance | High | Low |

Break down of time spent on various activities in a co-management system (see full report) shows that monitoring takes up the bulk of the time as it is a continuous day to day activity and is crucial for the maintenance of the institution. The fact that monitoring takes up more than half of the total time of the fishers involved in co-management project indicates the importance of this activity and also helps to explain the lower cost for co-management in stage 2 and 3 as discussed previously. If the rules are well received by the members as in the case of co-management the resources spent on monitoring could be lower thus explaining the lower costs for co-management in stage 3 of the project as compared to government management. When seen in monetary terms, again the monitoring activity emerges as the activity responsible for more than fifty percent of the total costs of all the activities involved in co-management.

*Policy Implications*

The general theoretical argument that transaction costs may be lower under a co-managed system appears to have some support from the data used in this study. Although, direct comparisons between a co-managed and centrally managed systems are difficult to make as clear cut examples of that nature are hard to come by in the real world, in this study a small island in the Philippines that has experimented with the idea of co-management provides an opportunity for such comparisons. There are serious problems with comparisons of this nature as both the co-managed arrangement and the centralised government based management is present at the same time. The results from this study indicate that since monitoring costs is the major transaction costs and it is undertaken by the community, there is opportunity for these costs to decline over time as community acceptance of the rules and regulation for managing the common property is legitimized. Moreover, costs data (see full paper) shows that cost associated with managing common property is lower in the later years (e.g. fifth year onwards) under a co-managed regime than under a purely government management regime.

**Institutional Resilience and Fisheries Co-management**

This section is a summarized version of Chapter 17 in a research report by I. Novaczek and I. Harkes (1998) entitled, "An Institutional Analysis of Sasi Laut in Maluku, Indonesia".

*Introduction*

Co-management and community-based resource management systems have been heralded as important alternative resource management systems. Much has been written about the success of these systems in managing natural resources. The successful systems exhibit close linkages between social and ecological systems. Success of these systems seems also related to how adaptive and resilient are the institutions and how capable they are to responding to and managing change. A critical question in designing and implementing co-management systems becomes how can adaptiveness and resilience be built into institutions so that they are capable of staying operational over time.

This section will present the results of research on institutional resilience, with the focus on one community-based management system, the "sasi" system in Maluku Province, Indonesia. Even though sasi has survived for over 400 years in various parts of Maluku Province, it is in the process of dying out in many areas. This section presents an analysis of when sasi, or aspects of sasi, disappeared, which factors caused its decline, and which factors have made it survive. Understanding this process and the factors behind it will help to develop, maintain and revitalize sasi, and, hopefully, provide generalized principles which can be applied to building resiliency into co-management systems.

*Resilience*

Resilience is defined as "the ability of a system to cope with change without collapsing" or "the ability of a system to absorb perturbations by actively adapting to an ever changing environment" (Folke and Berkes 1995). Pollnac (1994) adds that the degree of adaptability depends on the specific circumstances of a system. Thus, it is important to understand not only the institution but also the social-ecological system in which it is nested. Reduction in resilience means vulnerability increases, with the risk that the whole system flips from one equilibrium state to another (Folke and Berkes 1995). In other words, where institutional resilience is low, the management system is

likely to collapse. To avoid such situations, there is a need to develop institutions with the ability to respond to and manage change and to cope with unexpected environmental occurrences.

Institutional resilience is evaluated here as structural adaptation, rule flexibility, and community structure. To be resilient, the management process must be adaptable to changes in various social, economic and political conditions. The process should lead to rules that are flexible enough to respond to changing conditions in the economy or resource. The process must accommodate changes in community social structure and individual motivations for resource use and management.

*Methods*

The study of institutional resilience is part of a larger study on the performance and impact of the sasi system, with particular focus on marine sasi (sasi laut), in the Moluccas (Novaczek and Harkes 1998). The overall study comprised four components: 1) identification of the extent and operation of marine sasi in Maluku Province; 2) a performance and impact analysis of the marine sasi system; 3) comparative institutional analysis of case study villages; and 4) policy recommendations.

The information for this study is based on an inventory of 61 villages in the Lease Islands, Ambon and a part of Seram. Additional key informant interviews covered questions on: 1) the objective of sasi; 2) the rules and regulations; 3) the role of traditional village institutions; 4) boundaries; 5) compliance and enforcement; and 6) external factors having an impact on the institution. The analysis describes the process of decline of sasi and the mechanisms behind this process.

*Sasi*

Based on traditional adat law, sasi rules regulate the use of natural resources, both terrestrial and marine. Adat is the Indonesian term that describes custom or customary law: "The rules, standards, concepts, and principles pertaining to all fields of social activity: to the construction, allocation and transmission of political power, to the right to make and change rules and to make decisions, to validate transactions, to acccess, distribute and transmit economic resources, to social arrangements like marriage and kinship..." (von Benda Beckmann 1992). One conspicuous manifestation of adat law in Maluku is sasi, described by Zerner (1994) as "a varied family of customary practices and laws (or rules) which establish limitation to access to individually or collectively controlled territory and/or resources."

To place sasi on an area means to put into effect a time-limited prohibition on entry and harvesting. Marine sasi (sasi laut) mediates access to coral reefs and inshore marine waters through demarcation of clan or community-managed fishing grounds, ritual closures, prohibitions on certain kinds of gear and behavior, regulation of the timing and manner of harvest, limits on the number of persons having access, and the size or amount of fish, shellfish or other marine products (e.g. sea cucumbers, mangroves, construction materials such as coral rock or sand, etc.) that can be taken (see also Nikijuluw 1995). When sasi is opened, a portion of the proceeds from the harvest are usually used as a source of village income, to finance costs of local government and development projects, or to be directly distributed amongs the villagers.

There are as many forms of adat in Indonesia as there are local cultures. However, a paramount value of adat is balance: between humans and nature, between individual and community,

between community and cosmos. Important "adat values" include consensus, reciprocity, service, and the "social function" of land, labor and resources. In Maluku, sasi forms a natural basis for resource management because it is based on the idea that people are a part of nature and that acts against nature will be punished. Acknowledgment and enforcement of the regulations is undertaken by local traditional institutions. In its present-day form, sasi combines the official authority of the village head (kepala desa) with the moral authority of religion and adat. It is therefore a logical institution for management and conservation, especially for inshore waters that lie within the village territory.

The origin of sasi is not clear, but it is said that sasi was invented to protect natural resources against outsiders during and before Dutch colonial rule in the 16th century (von Benda-Beckman et al. 1995). After an initial prohibition, the colonial powers used sasi as an instrument to control the local population and (spice) trade. Following alternate periods of decline and revival, over the last decades the system has become part of the wider social, economic and political processes in the province. By its nature, sasi tends to optimize the use of natural resources, but currently, in certain cases, sasi is manipulated by the local elite through the sale of harvest rights. Sasi is under stress in many parts of Maluku Province. While sasi is still valued in many parts of the Lease Islands, Seram and Ambon, fully functioning systems are becoming more rare.

*Patterns of Loss of Sasi*

*Loss of the entire sasi institution*

Of the 61 villages studied, in 19 villages the entire *sasi* institution was lost, that is, marine sasi, land sasi, and adat sasi; the later being the most traditional form of sasi. Most losses occurred in the 1990's on Ambon and Saparua. On Haruku Island, by contrast, some form of *sasi* has survived in every village.

There is no difference between Muslim and Christian villages; the loss of sasi has been steady in both. There is, however, a clear difference when you consider village size. The size classes are class 1: <1000; class 2: 1000-2000; class 3: 2000-3000 people; and class 4: > 3000 people. Losses have been greatest in size class 4, and more stable in size class 3.

*Loss of adat sasi*

As most villages have sasi on coconuts arranged by the church (sasi darat), adat sasi was identified as the type of sasi concerning terrestrial resources. Out of 47 recorded losses of *adat sasi*, over half occurred before the 1960's. Losses were moderate in the 1970's and 1980's but have become more severe in the 1990's. The trend by island is not significant.

Recent losses in the 1990s of *adat sasi* have occurred in both Muslim and Christian villages, but are concentrated in villages of size class 2 (1000-2000) on Saparua and Haruku. Since Law No. 5/1979* was passed to restructure village level administration, small villages have the status of a "dusun" or sub-village under a larger administrative entity. This means that there is no independent village government to execute *sasi* that probably caused adat sasi to dissolve.

*UU No.5/1979 was a National Administrative Law issued to restructure the village government according to a model as prescribed by the national government in Jakarta. The introduction of the law has often been referred to as undermining the existing village structure because no provisions were made to include and acknowledge the traditional adat institutions (Abrahamsz 1991).

The 1940-70's saw losses of *adat sasi* focused on large villages (class 4) on Ambon island. Population statistics from that period are unfortunately not available but it is possible that Amboṇese villages started to reach some critical threshold of population during those decades. Today, a*dat sasi* persists mostly in intermediate sized villages on Ambon.

*The erosion and loss of marine sasi*

Active marine *sasi* (sasi *laut)* institutions are hard to find. Out of 61 villages inventoried, only 17 had some form of marine *sasi,* but a number of these were effectively dormant. In the past, marine *sasi* was much more prevalent. Eighteen villages were identified that lost marine *sasi* in living memory, meaning that at one time at least 35 (57%) of villages had this institution. In 4 villages (Seith, Ouw, Seri, Rutah), one or more fishers interviewed thought *sasi* was either in force or had been in place at one time. In the other 22 villages either marine *sasi* never existed or it has been totally forgotten.

In over half the cases where marine *sasi* has been lost, the loss occurred prior to 1970. Since then, marine *sasi* has been relatively stable compared to other forms of *sasi.* Most losses in the 1970s to 1990s have been in either Class 1 or Class 4 villages, and in the 1990's the only recorded loss was on Ambon Island.

*Factors influencing activity of sasi*

The level of activity of sa*si* on terrestrial resources was measured using indicators for presence of sasi attributes, seasonal closures, consistency in the application of sasi, and local effort (enforcement). Similarly, marine *sasi* was scored using indicators for presence, closed areas, written rules and monitoring. Using this system it was found that land *sasi* is significantly more active in size class 3 villages ($p=0.01$).

In Maluku, fishing villages are most often homogeneous in terms of religion. The six villages where marine *sasi* was most active (score 10-12, see Table 21) were all homogeneously Christian or Muslim, i.e. with at least 95% of the population being of the dominant religion. Out of 17 cases of marine *sasi,* three were effectively dormant (score = 3) and another 3 were weak (score 6-7). One of the cases of dormant marine *sasi* occurred in a relatively non-homogeneous village and a second case was in a Christian *dusun* of a predominantly Muslim village *(desa).* Homogeneity thus seems to be important to the resilience of this traditional institution.

The existence of marine *sasi* is also linked to the fate of other parts of the institution. Villages with marine *sasi* usually have active land *sasi.* Likewise, where marine *sasi* has been lost for some reason, the land *sasi* institution that is left behind is also weak .

Resilience of marine *sasi* is also linked to the interplay among governing authorities. In the Muslim villages where the institution is neither *adat* nor church (sasi gereja), it has been more stable than in Christian villages. In a number of villages, *sasi* of marine resources was abandoned (Akoon, Ameth, Leinitu) or weakened (Haria, Ulath) when *adat sasi* was taken over by the church, which is predominately involved in land sasi. Compared to marine *sasi* of the traditional *adat* or "other" type, marine *sasi* in villages where sasi is taken over by the church is significantly less active ($p<0.05$). Additionally, where *adat sasi* has survived, losses of marine *sasi* have been half that of villages where only church *sasi* remains.

Table 21. Factors related to activity of sea *sasi* in central Maluku. Homogeneity status: 1 = 95-100% are of dominant religion; 2 = 60-80% are of dominant religion

| Name | Dominant religion | Homo-geneity | Administrative Status | Notes | Size Class | Activity score | |
|---|---|---|---|---|---|---|---|
| | | | | | | Land | Sea |
| Nolloth | Christian | 1 | Desa | | 3 | 12 | 12 |
| Haruku | Christian | 1 | Desa | | 3 | 11 | 12 |
| Pelau | Muslim | 1 | Desa | | 4 | 12 | 12 |
| Siri Sori | Muslim | 1 | Desa | | 3 | n/a | 12 |
| Morela | Muslim | 1 | Desa | | 3 | 11 | 12 |
| Itawaka | Christian | 1 | Desa | | 3 | 11 | 10 |
| Amahai | Christian | 1 | Desa | | 3 | 12 | 10 |
| Kabau | Muslim | 1 | Desa | | 3 | n/a | 9 |
| Ihamahu | Christian | 1 | Desa | | 2 | 12 | 9 |
| Tengah-Tengah | Muslim | 1 | Desa | | 3 | 12 | 9 |
| Hatusua | Christian | 2 | Desa | | 2 | 9 | 9 |
| Porto | Christian | 1 | Desa | | 4 | 10 | 7 |
| Paperu | Christian | 1 | Desa | | 3 | 9 | 6 |
| Ulath | Christian | 1 | Desa | *Sasi* moved to church in 1992 | 2 | 6 | 6 |
| Makariki | Christian | 2 | Desa | | 2 | 12 | 3 |
| Rohua | Christian | 1 | Dusun in a Muslim desa | | 3 | 12 | 3 |
| Haria | Christian | 1 | Desa | *Sasi* moved to church in 1995 | 4 | 8 | 3 |

Reasons for loss of *sasi* between 1940 and 1997

During the inventory of the 61 villages, the informants were asked if they could remember when some aspect of *sasi* changed or was lost, and why this had happened (Table 22). Explanations were often quite explicit and included contextual information pertaining to the evolution of socio-political systems in Maluku. The comments were only applicable to villages where *sasi* actually was lost or transformed. The numbers represent the number of comments, not the number of villages.

Table 22. Reasons causing *sasi* to become (partly) non-functional

| Cause decline *sasi* | # |
|---|---|
| Poor leadership led to decline in enforcement and compliance | 8 |
| Take-over of *adat sasi* by church | 8 |
| Conflict over leadership | 1 |
| Conflict between church and *adat* | 1 |
| Economic pressures led to non-compliance | 4 |
| Change in administrative boundaries | 3 |
| Conflicts over land | 1 |
| Urbanization and degradation of resources | 1 |
| Collapse of clove price increased fishing pressure | 1 |
| Other | 3 |

Weak leadership and conflicts are key elements in erosion of *sasi*. In the opinion of villagers, conflicts within the village government, conflicts between the village leader and traditional authorities (*adat)*, conflicts between the village leader and the traditional law enforcers (*kewang)*, conflicts among church organizations, and conflicts over land all resulted in partial or complete loss of the institution. Conflict between traditional *adat* leaders and village government leading to erosion of *sasi* were typical for Christian villages, while they never occurred on Nusa Laut.

Confusion over land and rights was, in some cases, due to changes in government unit boundaries as a result of the new government structure under Law No. 5/1979. In addition, pressure from worsening economic conditions has been mounting since the collapse of clove prices in the early 1990's. Crop failure and decline of the resource were also mentioned as causing *sasi* to collapse. Changes in administrative boundaries and the effects of World War II were most prevalent on Ambon and Nusa Laut.

The lack of effective enforcement, in combination with economic needs, political turmoil, and urbanization provided the incentives for people to violate sasi. Compliance and enforcement problems were more prevalent in Christian villages, and particularly on Ambon island. In eight cases, the village government delegated the authority over *sasi* to the church, causing adat *sasi* and marine *sasi* to decline. As of 1997, political or religious conflicts were documented as affecting 12 of the remaining *sasi* villages. In other words, in about a quarter of remaining *sasi* villages the institution is under stress.

*Results of the comparative case-study*

For the comparative case study, six villages were selected for study. Two villages were selected with strong sasi (Nolloth and Haruku), two villages where sasi is lost but about to be revitalized (Tuhaha and Hulaliu), and two villages where sasi was lost in living memory (Seri and Hutumuri-Toisapu). The findings from the in-depth interviews underscore the link between the different components (objectives, rules), the players and the external context of the sasi institution and illustrate the interactions among these through time.

*Village comparison*

Nolloth and Haruku villages, on respectively Saparua and Haruku island, were both characterized as having a strong sasi institution. The cases, however, are distinct. Whereas Nolloth can be described as a system designed primarily to provide resource rent for the village government (that is, revenues are for the village as a whole), Haruku's sasi has more to do with fair distribution of fish resources and conservation (everybody shares in the catch). Nolloth is a stable village, with legitimate leadership and strong representation of traditional authorities. The *kewang* (traditional enforcers) is functional and, together with the *kepala desa* (village head), serious in the prosecution of offenders. The harvest rights of sasi are reserved for the village cooperative (KUD), and income accrues to the village government and the harvesters. Other villagers benefit indirectly through village development projects, such as road construction and the construction of a fresh-water system - projects for which the village government also gets funding from the national government.

In Haruku, the harvest is communal and distributed among the villagers, people thus benefit directly and benefits of sasi are clear. In Haruku, a more important role is ascribed to the *kewang* and relatively less to the village head. *Kewang* members feel a strong responsibility towards sasi. Recently, the villagers in Haruku have become divided as a result of the installation of a new *kepala desa*. This leader, elected with a slender majority, supports sasi but also favors mining development

that threatens the resources under sasi. This has led to confusion and a dysfunctional village government, a situation that in turn poses a threat to sasi.

In Hulaliu (Haruku island), conflicts between the *kepala desa* and *kewang*, and in particular problems with accountability for the use of resource rents in the past, lie at the root of the decline of sasi. The current leader is trying to revitalize sasi but his position is unstable because he lacks the support of a large part of the village population. The revitalization process is thereby threatened.

In Tuhaha (Saparua island) there have been problems in the past between formal and traditional authorities. There is also a movement to revitalize sasi, but the relationship between the village government and traditional authorities first needs to be restored. The village government, which is only partly functional, has to be reorganized before a *kewang* can be installed.

In both Seri and Toisapu-Hutumuri on Ambon island, sasi is lost and fisheries management is minimal or lacking. Traditional village structures are to a large extent replaced by formal structures at the village level (desa), but less so at the sub-village (dusun) level. Artisanal fishers have to compete directly with large-scale fishers who roam the inshore waters for tuna, a feature less common around Haruku and Saparua islands. Both villages lie on Ambon and close to regional markets and hence are more in contact with modernization and urbanization, processes that affect local socio-cultural and economic structures.

The remainder of this section will describe the various elements of sasi and provide an analysis of how sasi functions and persists under different conditions.

*Objective of Sasi*

The general objective of *sasi* as articulated by villagers is to protect resources from theft and destruction. Theft is prevented through active monitoring and enforcement. To maximize yields, immature shellfish and fish are protected, and to ensure sustainable yields there are access and harvest restrictions. In Nolloth for example, there are lengthy closed seasons and a minimum legal size for lola shells (*Trochus niloticus)* harvested. In Haruku, destructive and overly efficient gear types are banned. Thus in these cases *sasi* does have a conservation objective. In addition, Haruku *kewang* leaders expressly identify equitable distribution of fish, particularly the support of village poor, to be an objective of their revitalized *sasi* institution. In their 1995 study, von Benda-Beckman et al. wrote: "throughout history the objectives of *sasi* have changed from limiting access and the regulation of power, to defining social conduct and the increase of economic benefits." The use of *sasi* for economic purposes, which has a long history in Maluku (von Benda Beckmann et al. 1995) is illustrated in Nolloth by the use of lola shells. Lola were formerly important as a food source. When in the 1960s the shells became commercially important, the village government of Nolloth replaced the communal harvest with a system that allowed the village government to auction the harvest rights. This was done to the dismay of the villagers who saw their personal direct benefits decrease.

A shift from communal harvests to the sale of marine harvest rights occurs in most villages where *sasi* is revitalized by a local government with commercial interests. Although in most villages the principle of *sasi* is valued and *sasi* is perceived as a 'good thing', a majority of the fishers interviewed object to the auctioning of marine *sasi* harvest rights, especially to outsiders. Both Tuhaha and Hulaliu village heads plan to auction the harvest rights and use *sasi* revenues for village development. However, fishers declared that they would respect *sasi* only if they would get direct benefits from a communal harvest. Villagers may be kept satisfied with village development projects, but there also may be problems because village income and expenditures are not

transparent. For example, at one point in the 1980's, when profits appeared to be being used for the village head's personal benefit rather than the public good, *sasi* in Nolloth nearly broke down.

*Rules and Regulations*

In order to regulate the harvest, certain rules have to be in place. Nolloth, Haruku and Hulaliu have written *sasi* regulations. The operational rules specify the products and marine species under *sasi*, gear restrictions, the timing of the harvest, etc. These operational rules are the base on which the fishers make their day-to-day decisions over compliance. The operational rules are nested in a set of collective rules that define the decision-making process around opening and closing of seasons, how to regulate access, and how enforcement is arranged. On the third level - the constitutional level - the structure of the *sasi* institution is defined through *adat*. *Adat* prescribes who is involved in the process and what their role is, for example, which clans and persons are responsible for decision-making, conflict resolution, execution of ceremonies and enforcement.

The process of decline involves non-compliance with operational rules but this in turn is directly dependent on the effectiveness of the collective choice rules. For example, in Hulaliu there was a conflict between the *kepala desa* and *kewang* because the *kewang*'s rights were neglected - a collective choice level problem - and this was the root cause for *sasi* to decline. Subsequent problems with compliance (operational level) were secondary, that is, the result of lack of *kewang* enforcement. *Adat*, as part of the village culture, however, persisted, and thus the constitutional rules remained intact.

Over the last decades operational rules have been modified. Boundaries of *sasi* areas, frequency of open and closed seasons, division of benefits, restrictions on gear use etc., all may and do change. In practical management terms, this affects the function of *sasi* but does not threaten its continued existence. On the other hand, where the constitutional rules were challenged, (e.g. a shift of authority from the *kewang* to the church, the loss of the *kewang*, the introduction of police as enforcers, the promulgation of national fisheries legislation), then the structure or legal basis of the *sasi* institution changed. This led to disappearance of part or all of a local *sasi* institution. Adaptation of constitutional rules may also, however, strengthen *sasi*. For example, in Haruku, where *sasi* on marine resources is enforced by the *kewang*, there is also *sasi* on coconuts and clove which is enforced by the church. The reason why these commodities are under church *sasi* is because the people asked the church to become involved at a period when theft was significant. Since that time the church has had a role which is distinct from, but supportive of, that of the *kewang*.

Because operational and collective rules may be lost more easily, they are less resilient than constitutional rules. However, the fact that operational rules, and to a lesser extent the collective choice rules, can be changed or abandoned and then revived, is an important feature contributing to adaptiveness and resilience of the larger institution.

Some *sasi* operational rules overlap and support national fisheries law on destructive gear types. In Haruku and Nolloth, formal regulations on mesh-size, the use of poison, blast fishing and bagans are included in the *sasi* rules. As is typical of non-*sasi* villages, Seri has only a few informal rules, while Toisapu-Hutumuri has no fisheries regulations at all. A lack of effectively enforced government rules has provided an incentive for fishers in Hutumuri to push for local management that can protect their fishing grounds against outsiders. Under national law, local *adat* institutions and village governments are allowed to pass local rules as long as they do not contradict national or provincial law. What is lacking is the motivation for village leaders to act in the absence of direction from a higher level.

*Role of traditional institutions*

Even though Law No. 5/1979 is expected to have caused confusion in the village, in the perception of ordinary villagers it had no dramatic and immediate impact. The fact that the traditional village structure was no longer acknowledged posed the village government with a dilemma as to how to meet the demands from Jakarta without violating the traditional social structure. Apparently, the requirements of the law, i.e. replacement of the traditional government structure by a formal one, were often implemented at a pace and in a manner suited to the local situation. In most cases the local government basically incorporated the traditional structure into the formal one, and thus change was not clearly visible.

Some villages have been rather successful in melding the formal and traditional government structures. In Nolloth, for example, the LMD is nearly fully overlapping with the traditional government structure (saniri negeri). Also, the village headman is elected according to traditional guidelines. In other villages, however, the introduction was less smooth and was a cause for conflicts. Traditional authorities became marginalized, as in Tuhaha. Where newcomers entered the village government through elections, villages became politically unstable. In all villages, there is some degree of overlap between formal and traditional authorities, but the extent to which the traditional authorities are represented and can exert authority varies.

The *sasi* study shows that the degree of overlap is decisive for the continuation and stability of *sasi*. In Nolloth, where the traditional authorities function within the new system, the *sasi* institution is strong. The villages where *sasi* ceased to function had problems with village leaders who did not successfully collaborate with traditional authorities. In Tuhaha, where the traditional authorities were not acknowledged but had to modify their role according to the new structure, *sasi* has disappeared. In Tuhaha the new village leader has to honor the traditional authorities and enable them to take a place in the village government before *sasi* can be revitalised. In Hulaliu, the village government neglected the *kewang*'s rights and caused *sasi* to decline. The village head now has to reconcile the differences in order to reintroduce *sasi*. Haruku is a different case. The introduction of the government structure took place in a period when *sasi* was just about to be re-institutionalized. Here, revival and reconstruction of *sasi* was an initiative of the *kewang*, but with support from a village head (*kepala desa)* who was also a raja (from the traditional "royal" clan).

Knowledge of *sasi*, or rather the body of knowledge, is passed on from father to son within certain lineage's and persons, i.e. *kepala kewang* (head of the kewang*) and kepala adat* (traditional village leader). The rituals and knowledge are secret and involve an almost extinct indigenous language (*bahasa tana*). In order to preserve traditional *sasi*, it is imperative that the process of passing down of knowledge is perpetuated. 'The keepers of *sasi* knowledge' were mentioned by a number of respondents who commented that the older generation is dying and taking *sasi* with them. At the same time, the process of 'modernization' accelerates as the younger generations leave to study in Ambon city where *adat* is regarded as a superstitious belief. As a result many youngsters lose interest in *sasi*, even in villages where *sasi* is strong (i.e. Nolloth).

The support and participation of the younger generation, however, is necessary for the success of *sasi* as a viable management institution. Especially in the villages where *sasi* is weak or has ceased to function, the inability to preserve the knowledge of *sasi* is a threat to its continuation. Of all the case-study villages, Haruku is the only one where knowledge of *sasi* is actively communicated to the new generation through the mini-*kewang* where they learn about *sasi* and the role of *sasi* in resource management.

*Leadership*

Village officials appeared poorly informed about village issues and the activities and programs of village organizations. In such cases, government decision-making may rest almost exclusively with the *kepala desa*. Thus, the modern *kepala desa* may hold a very powerful and authoritarian position. As such he is a key decision-maker and in many cases the dominant decision-maker in the *sasi* institution.

Before 1979, the position of village leader was hereditary through the royal *raja* line. Nowadays, the people elect the *kepala desa* and in theory anyone could be elected. However, Nolloth is a fine example of a situation where the *kepala desa* was selected because he is the raja. He was inaugurated not only by the village government but also by the *adat* leaders, and assumed the sacred function of *kepala adat,* an important traditional position. This allows him to lead the modern village government (LMD and LKMD), and to also be fully and legitimately involved in traditional ceremonies.

The results of the research support those of Volker (1921) and Riedel (1886) who maintained that compliance to *sasi* rules depended largely on strong and tactful leadership. The *kepala desa* must be honest and respected or *sasi* is undermined. This was illustrated by former leaders who abused *sasi* harvest profits in Hulaliu and Nolloth and caused *sasi* resources to crumble or weaken. In addition, local legitimacy is very important and this still stems largely from being part of the raja family line. In some villages, formally elected leaders are not legitimate either because they are not from the right family or because the people think a different member of the raja line would be more competent or more attuned to villagers' aspirations. Where a *kepala desa* lacks legitimacy, this can undermine *sasi*. In Haruku, for instance, the *kepala desa* is not a long-term village resident and is said to represent the interests of the pro-mining lobby. Hence, although he is a formally elected leader and many say he is of the raja clan (others disagree), he lacks local legitimacy to play a guiding role in *sasi*. This situation, wherein the *kepala desa* and the *kewang* each represent the two opponent groups in the village, seriously undermines the local institution. In Hulaliu, the initiative of the *kepala desa* to revive *sasi* is also hampered by a lack of legitimacy apparent from the level of local political opposition.

External interests may influence the election of a *kepala desa*, as was reported in Haruku and also in Hutumuri. Elections can be manipulated either in favor of or against traditional leaders. Under the Indonesian system, all candidates must be screened and approved by the government. Popular candidates may be disqualified at this stage, or some votes may simply be neglected during the election process. On one hand, lingering *adat* structures may make nonsense of the concept of democratic elections. On the other hand, traditional leaders with broad popular support may also be vulnerable.

*Boundaries*

Marine *sasi* is generally applied to shallow inshore areas. Outside the *sasi* area, other parts of the village territory, including deep water beyond the fringing reef, may also be rented out to outsiders. Generally, boundaries of the *sasi* land are clearly defined, have remained largely the same over the years, and are generally accepted. Fishers may accept areas of restricted access without complaint, but they do have reservations. For some non-*sasi* rented areas, the lack of legitimacy is compensated by a strong enforcement mechanism (Tuhaha). Crucial in acceptance of boundaries of restricted areas is legitimacy of the leaders, direct benefits for the excluded users and a strong enforcement mechanism.

*Enforcement and compliance*

Enforcement of *sasi* regulations is carried out by the *kewang*, the police, and/or village government. In Nolloth and Haruku, the *kewang* is strong, and plays an important role in the enforcement of regulations. In coastal villages there is still a firm belief that ancestral spirits and God guard the *sasi* regulations. Even in cases where the village government is responsible for enforcement, traditional sanctions can still play a role. "The offender can be lucky and escape from the *kewang* or police, but he still may get sick", a fisherman in Tuhaha explained. "Before long, he will seek either the church minister or *tuan negeri* (in more traditional villages) to confess his mischief because only a prayer or ceremony can relieve him from his burden."

The traditional *kewang* is highly legitimate because they enforce the law without showing favoritism. The police have the formal authority to implement the rules, but act arbitrarily and are not trusted by the people. In villages that have no active *kewang* but rely on the police for enforcement, as in Tuhaha and Hulaliu, enforcement is difficult. Not only are the police mistrusted but their effectiveness is also hampered by the fact that they reside far from the village and when they are needed, they take too long to arrive.

In villages where *sasi* is gone and/or where the *kewang* has been abolished, authority has shifted from the traditional enforcers to the formal village government. In Christian villages the government may have enforcement support from the church. In Haruku, Hulaliu and Tuhaha, the church is only involved in *sasi* on coconuts, while in Nolloth the church minister closely collaborates with the *kepala desa* and the *kewang* and he is also present at *adat* ceremonies including those of marine *sasi*. In non-*sasi* villages, the church was not seen to play a role in supporting enforcement of fisheries rules although it may, as in Seri, be called upon to bless fishers and their boats. The reason why the church is only directly involved in land *sasi* and not in marine *sasi*, is that fishing is of too high importance to the people. The power of the church and especially God is considered strong, and the church minister thinks that if the church were involved in enforcement of marine *sasi*, the punishment would be too severe. Therefore, the church does not want to be responsible for marine enforcement.

Where *sasi* is functional, compliance with fishing rules in general (both *sasi* and other regulations) is higher than in non-*sasi* villages. Non-compliance by local villagers is not usually a threat to the *sasi* institution, but is a sign of decline that is likely based in problems at the collective choice or constitutional levels, which can threaten *sasi*. Non-compliance may also be directed at an authority figure rather than at the *sasi* institution per se. In Hulaliu, the uses of destructive fishing techniques by a contra group were meant to undermine the authority of the village leader. Non-compliance by either locals or outsiders which threatens the very existence of local resources and is not effectively controlled by the *kewang* is, however, a threat to *sasi* because it is an incentive for people to abandon local management. Usually, however, intrusion in *sasi* areas is low (two to three times a year an offender is caught). However, in times of economic and political stress the rate of non-compliance can increase.

*Externalities*

The infrastructure, communication and transportation links of the villages on the islands of Haruku and Saparua are limited compared to the Ambon (non-*sasi)* villages. The minimal levels of in- and out-migration and tourism have no impact on village demography and appear to pose no threat to traditional institutions. Tourism in Haruku, stimulated by *sasi* ceremonies, may even help support the institution. Seri and Hutumuri on Ambon Island are, by contrast, heavily influenced by their proximity to Ambon city. Apparently, the greater involvement of people in the process of

modernization and globalization, the greater appreciation that people have for *sasi* and traditional structures. It is here that the loss of *adat* ideology and tradition is largest. Tradition of collective action and other indicators of social sustainability are also relatively weak. This is an important aspect to take into account when reinstitutionalizing *sasi* or developing a comparable management institution that must be widely applicable.

Pollution and resource deg*radat*ion resulting from modern development also pose a challenge to local resource management. The villages on Ambon have seen their resources decline due to pollution from fish and plywood factories. The environmental impacts of these operations are such that they would be beyond the control and influence of a traditional style village *kewang*. Revitalized local institutions require information management, networking and lobbying skills, and links to government departments having jurisdiction in environmental protection.

A related issue is that of the impact of large-scale development. Haruku is the one village that is influenced by mining exploration for copper and other base metals, as well as silver and gold. This enterprise seriously affects the political stability in the village and also emphasizes the limits of a village-based management institution that is not linked to higher levels of government. The *sasi* institution does not offer villagers the ability to intervene in regional development planning and licensing of mining operations. The *kewang* is powerless to prevent pollution from mining activities affecting *sasi* resources, and there is no provincial or national management body to which they can appeal.

National laws and programs are implemented through the provincial, district and sub-district government offices but information on fisheries and environmental law rarely reaches the village level. Knowledge of fisheries regulations is fragmented and generally fisheries regulations are poorly implemented. There are no government patrol boats in the area, and where it comes to protection of fishing rights, the villages are left to their own devices. This may motivate people to work together in defense of local resources. On the other hand, if *sasi* as an institution remains disconnected from governmental power centers, people may give up local operational rules because they are ineffective against externalities.

*The revival of Sasi in Central Maluku*

Currently, fisheries management is not yet a burning issue in most villages because reduced catches are compensated by high fish prices. Few village respondents had any clear idea of what fisheries management would entail, and rather think that the answer to declining catches is to upgrade their boats and gear. Nevertheless, all fishers in *sasi* villages said that *sasi* is useful and important, as did 90% of fishers in villages where *sasi* is being revived and 70% of fishers in non-*sasi* villages. In 14 villages, respondents expressed their desire to reintroduce *sasi* (land, marine or both), or strengthen existing *sasi* practices. Plans for revitalization were found in villages of all sizes and on every island. In some cases definite plans with timelines had already been developed; in other cases, indication to revitalize was based on wishful thinking. Most of the villages interested in revitalization were Christian.

The tendency to revitalize *sasi* is fed by the appreciation of *sasi* by the people, not just as a management system but as a cultural phenomenon. In Nolloth and Haruku, where *sasi* is still alive, people explained: "*Sasi* has a spirit, and everybody carries it because it is *adat* and part of their culture." The constitutional rules of *sasi* are based on and are part of *adat*, and because they cannot be separated from the local culture, it is at this level that *sasi* as an institution has its strongest resilience. This explains why *sasi* is still spiritually and ideologically significant, even where the practical execution of *sasi* has vanished.

Two villages that are seriously attempting to revitalize sasi are Hulaliu and Tuhaha. In both cases it is not fishers but village elite's (government staff with partial involvement of *adat* leaders) that are pushing the process forward. The reason for revitalizing *sasi* has less to do with its spiritual significance and much more to do with the possibility of controlling common property resources to generate government income. In considering revitalization processes it pays to look back to what caused the loss of operational *sasi* in the first place.

The main reasons for the collapse of *sasi* in both Tuhaha and Hulaliu were political problems, lack of trust among village leaders, and the subsequent withdrawal of the *kewang*. The practical execution of *sasi* was abolished but *sasi* remained part of the village ideology. The process of revitalization builds on this cultural base and re-establishment means reinstallation of the traditional authorities and reactivation of collective choice and operational rules. *Kewang* members have to be chosen and inaugurated, tasks delegated between the formal and traditional authorities, and operational rules designed. To be successful, the proponents of *sasi* renewal will have to pay attention to history and be careful to avoid past practices that led to breakdown.

In recent years, local NGOs, such as Yayasan Hualopu, have been working in the Lease Islands. They provide villagers with information on sustainable fisheries development and encourage local leaders to embark on the management of village territorial waters. Yayasan Hualopu, for example, is currently engaged in a program of mapping village marine territories and facilitating the development of local management plans. In this work, they hope to capitalize on the basis that *sasi* provides by encouraging the reinstallation of *kewang*s and the revival of the island-level Latupati institutions (traditional meeting of village leaders) with an emphasis on conflict resolution and management planning. The general plan is to promote development of a new law at the provincial level ("Perda" or "Peraturan Daerah") which will give legal recognition to the right of villages to enter into marine resource management and erect *kewang*-style management organizations. The aim of these supporters of *sasi* is clearly resource management and conservation.

Thus, in the process of revitalization there are three streams of thought which must be reconciled: 1) the wish of the village fishers to preserve *adat* culture and share in the benefits from fisheries resources while protecting their territories from outsiders, 2) the desire of local governments to extract resource rents, and 3) the push by academics, environmentalists and managers to develop viable local fisheries conservation and management.

*Synthesis*

Before the 1970's a large number of villages lost *sasi* due to post World War II social, administrative and economic change, internal village conflicts, and other reasons that were difficult to trace. The more recent breakdown of *sasi* has occurred in two distinct periods and villagers are able to articulate reasons for decline in their village.

The 1970s, at the eve of the introduction of the new formal government structure, were one period of decline. A fundamental factor was confusion or conflict in the village or between village authorities which undermined the legitimacy of the village leader or the institution itself. Political instability and/or a dysfunctional *kewang* invited non-compliance and led to abandonment of operational rules. *Sasi* was taken over by the church, either because of such conflicts or in an attempt to improve compliance. The church, interested only in land *sasi* on coconuts, did not get involved in marine *sasi*, which in some cases then declined.

The 1980's were a period of relative stability. Villages where *sasi* was alive and functioning remained stable. In some villages there was a tendency to revitalize *sasi*. The 1990's are a period of further decline of *sasi*. The period between the 1970's and 1990's covers one generation. Modernization and commercialization as a result of improved communication, infrastructure and education, and the expansion of market relations, influence the local culture and especially younger generations. The generational change, together with the rapid rate of social, economic and political change in Maluku in the 1990's, is most likely the reason why *sasi* is now suffering such relatively rapid losses.

The contemporary decline of *sasi* stems in large part from conflicts. Conflicts can in some cases be related to the social change that resulted from the introduction of the new village structure by the national government. Also, the election system has opened up possibilities for opportunists with vested interests to take the position of village leader. On the other hand, where traditional authorities (*saniri negeri*) merged into the new government (LMD), *adat* and *sasi* have remained a significant aspect of village life. Overlap between the traditional and formal government proved to be essential in the prolongation of *sasi*.

The continuing presence of *sasi* is affected by village size and proximity to a large urban center. This is clearly illustrated by the early and rapid losses of *sasi* recorded on Ambon Island that has historically been the government center and most densely populated island in the study area.

Ostrom (1990) writes that the likelihood of users designing successful common property institutions will be improved if the group is relatively small and stable, and if it is relatively homogeneous. This research confirms this, for *sasi* is most resilient in homogeneous villages of fewer than 3000 people. Villages close to the capital, where *sasi* no longer functions, have exceeded a critical size, become heterogeneous, and shifted from subsistence fishing and farming to large-scale fishing and urban employment.

Of all the forms of *sasi*, marine *sasi*, though less generally prevalent, appears to be relatively robust. Whereas *sasi* generally has suffered severe losses in recent years, marine *sasi* has been relatively stable and even shows signs of revitalization in the 1990's. This revival comes basically out of the heartfelt attachment of people to *adat* in general, and *sasi* in particular, but also the commercial value of marine products such as *Trochus niloticus* and sea-cucumber for foreign markets. The process is being further facilitated and reinforced by intervening NGO, government and academic supporters who see the potential value of *sasi* as a resource management system.

Where the people do not expect to benefit directly, they seem not interested in the revitalization of *sasi*. A lack of transparency in distribution of benefits further hampers the process. There is a risk that in villages where *sasi* is being used as a tool to extract resource rents, that *sasi* then turns into 'a government thing' controlled by local elite's. This is a disincentive for fishers to follow the new *sasi* rules.

Church *sasi* is the most common type of land *sasi* in Christian villages. The church also has the potential to play an important role in marine *sasi*. Church *sasi* derives it strength from the strong religious beliefs of rural villagers. The church is more stable than ever-changing village governments and is independent of political conflicts. This form of *sasi*, currently applied only to coconuts, provides direct individual benefits to the people and so is valued. Past shifts of authority over land *sasi* from *adat* to the church helped to shore up the effectiveness of the institution when the *kewang* lost enforcement capacity. In many cases, villagers believe that the threat of sanction by God is a more powerful deterrent than the sanctions imposed by the *kewang*. As seen from the inventory, where this happens, *adat sasi* as well as marine *sasi* may be lost. However, Haruku and Nolloth

provide examples where introduction of church *sasi* actually strengthened the local institution. Therefore, in *sasi* systems that are being revitalized, the church can play an important supporting role.

In some Muslim villages, *sasi* has evolved away from *adat*. Ceremonies and inherited positions have been abandoned, and religious leaders also have not developed a direct role in the institution. *Sasi* has become more of a commercial transaction between the village government and whoever wins the auction for resource harvesting rights. Nevertheless, this also appears to be a stable and resilient institution. The benefits and drawbacks of this form of *sasi* require further investigation, but a limited analysis did show that this sort of arrangement leads to problems in compliance when local fishers see benefits accruing only to elite's.

It is clear that *sasi* flourishes where the village leader is legitimate (*kepala adat*) and where he collaborates harmoniously and honestly with the other *adat* institutions and the church. Ostrom (1990) mentions reciprocity and trust as important conditions for successful common property institutions. This study would add legitimacy as another key factor for success. Apparently, the discrepancy between the theory of formal administrative structure and the de facto power structure that involves traditional authorities, makes village politics susceptible to manipulation and instability. Amendment of the law on village government (Law No. 5/1979) may be required to accommodate the need for legitimate *adat* authority figures in rural villages and increase stability of local government.

Because the constitutional rules are part of *adat*, and "*adat* is something that can not be changed", as village officials in Nolloth stated, the process of revival concerns the re-establishment and adaptation of operational rules (harvest regulations, access rules) and collective level arrangements (re-establishment of the *kewang*). *Adat* still forms the basis of *sasi*, but a redefinition of responsibilities and involvement of non-*adat* institutions, such as the church, the police and higher government levels, is possible. Such adaptation of the constitutional rules carries certain risks and must be advanced with care and tact.

The 1990s appear to be a critical decade in that *sasi* must adapt to modern society or it may, at the operational level, cease to function. According to Ostrom (1990) well-functioning local management systems are dependent on the enforcement and protection and legal recognition of local rights by higher levels of government. As a village organization active in enforcement, the *kewang* is more functional than the police. However, the *kewang* has never obtained formal enforcement powers. In cases where the *kewang* is being revitalized, their mandate needs to be formalized, and the *kewang* and police need to collaborate within a legal framework under provincial law. One possible model is that of Itawaka, where as a result of a village proclamation in 1995, the *kewang* became part of the official government. On the other hand, an arms length relationship with local government also has certain advantages. Various models need further investigation. Wherever the local institution is placed, it will still require legal recognition and support from higher government levels.

***Conclusion***

Berkes et al. (1998) claim that institutional resilience is a built in mechanism to react to external influences. Various social-ecological practices mentioned by these authors are found in *sasi*, for example, temporal restrictions of harvest, intergenerational knowledge, role of stewards, taboos and regulations, and sanctions and ceremonies. However, this study shows that these are not the mechanisms, but the components of the institution itself, and as a consequence are apt to change. What makes the institution, including all these components, strong (and thus resilient) is that which

links these components, i.e. legitimacy, trust, collaboration, transparency. Additionally, relations between those who benefit from the institution and those who manage it need to be sincere and transparent. A shared notion of the relevance of the institution stimulates a common objective to maintain it, in spite of external influences and in a situation where the temptation to abuse the system for personal benefits is strong. The extent to which external factors affect the social structure in the village depends on the feedback mechanisms, that is, the degree to which the local institution itself can mitigate the effects of external perturbations. Holling (in Berkes and Folke 1998) speaks in this context of adaptive management. *Sasi* has already outlived repeated predictions of imminent demise (Volker 1925, Cooley 1962) and is clearly both adaptive and resilient. There is therefore hope of rebuilding the institution in the form of co-management, in which the needs and aspirations of the various actors (fishers, local governments, *adat* leaders, environmentalists, and fisheries managers) can be successfully accommodated.

From this study it was possible to identify the following factors (components and linkages) that contribute positively to the resilience of *sasi* as a local institution and therefore should be considered during the process of revitalizing and modernizing the institution.

1. If the village head (*kepala desa)* of a village descends from the raja line and if he is *kepala adat*, his position is more legitimate than in villages where this is not the case. This legitimacy contributes positively to the execution of his authority with regard to *sasi*.
2. Where the *kepala desa* is elected with only a small majority, this results in fragile leadership and subsequent political instability. This seriously hampers *sasi* as well as any revitalization process.
3. A large overlap between the traditional and formal authorities in the village government (LMD) is a strong indicator that *sasi*, as part of the traditional structures, will be prolonged.
4. Vital for the process of revitalization is acknowledgement of the traditional village authorities within the new structure.
5. Where traditional institutions such as the *kewang* and *tuan negeri* are acknowledged, enforcement of *sasi* regulations is more effective. If collaboration with the police or other formal institutions is required, a clear definition of rights and mandates should be developed and approved by higher government levels.
6. It is important that the formal and traditional institutions collaborate closely with religious authorities, such as the church or Muslim institutions that are generally stable and not involved in village politics. Where there are strong bonds among these institutions, *sasi* is highly resilient.
7. It is necessary to define the *sasi* structures, powers and responsibilities within the framework of provincial and national legislation, to provide local institutions with more capacity to deal with external threats and become involved in development planning, execution and evaluation.
8. In newly installed *sasi* systems, *sasi* regulations are considered more legitimate if the villagers profit directly. In villages where *sasi* rights are auctioned and people have no control over the revenues there is no incentive to comply with the *sasi* regulations.
9. Collaboration requires a shared value system, in this case *adat*. The support and participation of the younger generation is necessary for the survival and effective operation of *sasi*.
10. Collaboration, trust and legitimacy are a function of a village size and homogeneity. When the population exceeds 3000 people and/or the village becomes heterogeneous, the cohesive mechanisms break down. In these villages another type of management institution i.e. not traditional *sasi*, needs to be established.
11. While revamping the institution to increase functionality in resource management, it will be useful to retain traditional titles and structures as well as elements of ceremony, to provide a strong spiritual and cultural basis. However, care must be taken not to alienate new generations of fishers.

Thus, several factors seem to be important for institutional resiliency. These include: leadership; linkages between traditional and modern social, economic and political structures; legal support for local institutions; benefits of the management system are received by the majority of actors; shared values for collective action among the actors; and small, homogeneous communities.

In order to perpetuate the cultural core of *sasi*, the sacred knowledge and rituals in the indigenous language must be passed down before they are forgotten. Loss of interest of younger generations and the subsequent loss of *sasi* knowledge linked to *adat* is a threat to *sasi* as a cultural institution and could therefore undermine its effectiveness as a resource management structure. Berkes and Folke (1998: 416) mention traditional ecological knowledge as the basis of management practices. *Sasi*, although it limits resource use, is in most cases not explicitly a management system, that is, a conscious effort to manage and conserve the resource. Detailed knowledge of the resource base and related natural systems is lacking, whereas non-scientific and magical explanations for resource decline are still current. Although villagers do have a notion of over-exploitation, harvest restrictions are mainly based on tradition and aim to maximize yields. In this case it is the loss of traditional knowledge concerning *sasi* ritual, not local loss of ecological knowledge, which is a threat to the resilience of the *sasi* institution. The trend to loss of *adat*-related knowledge was already clear decades ago when Cooley (1962) wrote; "Christianity and education were the primary forces that caused the local language to die out. The loss of the language was a direct blow...to *adat* for two reasons. First, it is widely held that to be valid *adat* must be performed in the indigenous language" Secondly, he maintained, without the language, "it is already doomed for even though it may be continued for a time, the ceremonies are devoid of content and seem purposeless". Cooley concluded that *sasi* "as part of the *adat* system... seems completely doomed in the very near future". It is interesting that 35 years later we are witnessing not just stability but resurgence in at least one form of *adat* institution: marine *sasi*. This brings up the question: just how important is language and ritual, and how much needs to be incorporated into a revitalized institution. If proponents insist on returning to traditional style and ceremony, this could strike a patriotic chord in these times of national turmoil replete with calls for regional autonomy if not outright secession. On the other hand, too much emphasis on *adat* could alienate younger generations of fishers and inhibit the introduction of science-based management tools.

## REFERENCES

Abrahamsz, J. (1991) Nasib Lola dan Lembaga Sasi di Kepulauan Kei, Maluku Tenggara. In: *Kabar Dari Kampung* 48 (IX): 52-61.

Benda-Beckmann, F. von, (1992) Changing Legal Pluralism in Indonesia. In: *Yuridika*. Majalah Fakultas Hukum Universitas Airlangga 8 (4): 1-23.

Benda-Beckmann, F. von, K. von Benda-Beckmann, and A. Brouwer (1995) Changing 'Indigenous Environmental Law' in the Central Moluccas: Communal Regulation and Privatization of Sasi. In: *Ekonesia, a journal of Indonesian Human Ecology*, No. 2.

Berkes, F. and C. Folke (1998) *Linking Social and Ecological Systems.* Cambridge University Press, Cambridge, UK.

Berkes, F. 1992. "Sucess and Failure in Marine Coastal Fisheries of Turkey. In Daniel W. Bromley, David Feeny, Margaret McKean (eds.), *Making the Commons Work: Theory, Practice, and Policy,* San Francisco: ICS Press.

Coase, R. 1937. The Nature of the Firm. *Economica,* 4: 386-405.

Colby, A,, L. Kohlberg, B. Speicher. A. Hewer, D. Candee, J. Gibbs, and C. Power. (1987). The Measurement of Moral Judgement, Vol. 1. Theoretical Foundations and Research Validation. Cambridge, Cambridge University Press.

Cooley, F. (1962) *Ambonese Adat, a General Description.* Yale University, USA.

Dahlman, Carl J. 1979. The Problem of Externality. *Journal of Law and Economics,* 22: 141-162.

Feeny, D. 1995. Optimality, Sub-Optimality, Nirvana, and Transaction Cost: Foraging on the Commons. *Presidential Address at the Fifth Meeting of the International Association for the Study of Common Property* , Bodo, Norway, May 25.

Folke, C. and F. Berkes (1995) *Resilience and the Co-evolution of Ecosystems and Institutions.* IASCP Reinventing the Commons Conference, Session 23, Resilience in Institutions and Ecosystems, Bodö, Norway.

Hanna, S. 1995. Efficiencies of User Participation in Natural Resource Management. In Hann, S. And M. Munasinghe (eds.) Property Rights and the Environment – Social and Ecological issues. Biejer International Institute of Ecological Economics and the World bank. Washington, D.C.

Kuperan, K., N. Abdullah, I. Susilowati, I. Siason and C. Ticao. (1997). Enforcement and Compliance with Fisheries Regulations in Malaysia, Indonesia and the Philippines. ICLARM Co-Management Project Research Report No. 5. Makati, Philippines.

K.Kuperan, N. Abdullah, R. Pomeroy and E. Genio. (1998). Measuring Transaction Costs of Fisheries Co-Mangement. Paper presented at the Seventh Common Property Conference of the International Association for the Study of Common Property (IASCP) Conference, 10-14 June, 1998, Vancouver, Canada.

Libecap, Gary. 1990. *Contracting for Property Rights*, Cambridge University Press, Cambridge.

Novaczek, I. and I. Harkes (1998) *An Institutional Analysis of Sasi Laut in Maluku, Indonesia*. WP No. 39. ICLARM, Manila.

Nikijuluw, V.P.H. (1995) Community-based Fishery Management (Sasi) in Central Maluku. In: *IARD Journal*, Vol. 17, No. 2.

N. Mustapha, K. Kuperan and R. S. Pomeroy. (1998). Transaction Costs and Fisheries Co-management. Marine Resource Economics Vol. 13. pp. 103-114.

Ostrom, E. (1990) *Governing the Commons: the Evolution of Institutions for Collective Action*. Cambridge University Press, UK.

Pollnac, R. B. (1994) Research Directed at Developing Local Organizations for People's Participation in Fisheries Management. In: R. S. Pomeroy (ed.) *Community Management and Common Property of Coastal Fisheries in Asia and the Pacific: Concepts, Methods and Experiences*. ICLARM, Manila, Philippines.

Randal, Alan. 1972. Market Solutions to Externality Problems: Theory and Practice. *American Journal of Agricultural Economics*, 54: 175-83.

Riedel, J. G. F. (1886) *De Sluik- en Kroesharige Rassen Tusschen Selebes en Papoea*. s'Gravenhage.

Susilowati, I. (1998). Economics of Regulatory Compliance in the Fisheries of Indonesia, Malaysia and the Philippines. Unpublished Dissertation Thesis. University of Putra Malaysia.

Tyler, T. R. (1990) Why People Obey the Law. Yale University Press, New Haven.

Volker, T. (1925) *Adatrechtbundels*. Published by KITLV, printed by Martinus Nijhoff, Den Haag.

White, A.T., L.Z. Hale, Y. Renard and L. Cortesi (eds) 1994. Collaborative and Community Based Management of Coral Reefs: Lesson from Experience. West Hartford, Conn: Kumarian Press.

Williamson, O.E. 1973. Market and Hierarchies: Some Elementary Considerations. *American Economic Review*, 63: 316-25.

Williamson, Oliver E. 1985. *The Economic Institutions of Capitalism: Firms, markets, Relational Contracting.* New York: Macmillan.

Zerner, C. (1994) Through a Green Lens: Customary Environmental Law and Community in Indonesia's Maluku Islands. In: *Law and Society Review*, Vol. 28, No 5.

# Chapter Nine
# Case Studies of Fisheries Co-Management in Asia

A number of case studies on fisheries co-management were conducted in collaboration with research partners across Asia. The purpose of the case studies was to systematically assess the performance of co-management as an equitable, sustainable and efficient management strategy, guided by a common institutional analysis research framework. This framework (see Chapter 2) links contextual attributes with the incentives to cooperate in resource management, as well as analyzes the outcomes of co-management arrangements. Its structured approach permits documentation and evaluation of the origin, current status, operation, and impact of co-management institutions and facilitates a comparison across sites at differing levels of complexity. This chapter draws insights from eleven case studies from the Philippines, Bangladesh, Indonesia, Thailand and Vietnam.

Four site selection criteria guided the choice of case study sites: 1) actual sharing of responsibility and authority for resource management between the government and the resource users; 2) existence of institutional and organizational arrangements (i.e., property rights and rules and resource user organization); 3) establishment of a resource management technology at the site (for example, marine sanctuary, marine reserve, mangrove rehabilitation); and 4) continuity or sustainability of resource management interventions at the site for at least two years after the project was completed and/or the external agent (NGO, academic or research institution, government agency) has left the area.

The latter part of this chapter presents a typology of the co-management case studies. The typology reflects diverse aquatic resource systems under which co-management has taken place in Asia and synthesizes the variables that have prompted resource users and other stakeholders to work together. It also highlights the predominant attributes associated with various sites.

It should be noted that what is presented in this chapter are only brief summaries of much longer and more comprehensive case studies. A full listing of the titles and authors of the eleven case studies is provided at the end of this chapter.

## 1.0 Philippines

The case study sites in the Philippines cover two islands and two bays. These include: 1) San Salvador Island (Katon, Pomeroy and Salamanca1997); 2) Cogtong Bay (Katon, Pomeroy, Ring and Garces 1998); 3) Malalison Island (Baticados and Agbayani 1998); and 4) Orion, Bataan (van Mulekom and Tria 1998).

### *1.1 The Marine Conservation Project for San Salvador (MCPSS)*

San Salvador Island is a 380-hectare village that forms part of Masinloc municipality in the province of Zambales, Philippines. It lies on the western coast of Luzon, about 250 km from Metro Manila (Figure 15).

San Salvador has a population of about 1,620 persons, comprising about 284 households in 1996. This represents an increase of 8% over 1989, the initial year of implementation of the Marine

Conservation Project for San Salvador (MCPSS). Village households are dependent on fishing (64%), farming (23%), trading (4%), and service-related occupations (9%). Such occupational structure has remained fairly stable since the project started, where fishing and farming have continued to be the dominant economic activities.

In-migration largely accounts for the emergence of heterogeneous village population since the 1970s. Village residents are physically distributed across the island in three distinct ethnolinguistic clusters. The native *Sambals* (50%) occupy the northwestern and southeastern portions, while the *Ilocanos* and *Pangasinenses* (20%) reside in the northeastern portion. The *Visayans* from Central Philippines (30%) inhabit the southwestern part. In the 1970s and 1980s, resource use conflicts often occurred between the *Visayans* on one hand, who used sodium cyanide and dynamite, and the rest of the residents, who normally deployed non-destructive fishing gear such as hook and line, nets, and spearguns.

The San Salvador fishery is multi-species, multi-gear, and mainly artisanal. Fishing operations are generally done with motorized boats in dispersed fishing grounds, both around and outside the island. Food fish, both sedentary and migratory, are normally caught around the island. These include grouper, snapper, mackerel, anchovy, tuna, wrasse, and rabbitfish, among others. Aquarium fish, which are sold in the international market, are largely caught in the waters of Pangasinan, a neighboring province. The major types of fishing gear used are bagnets, compressor, hook and line, handline, nets, and spearguns.

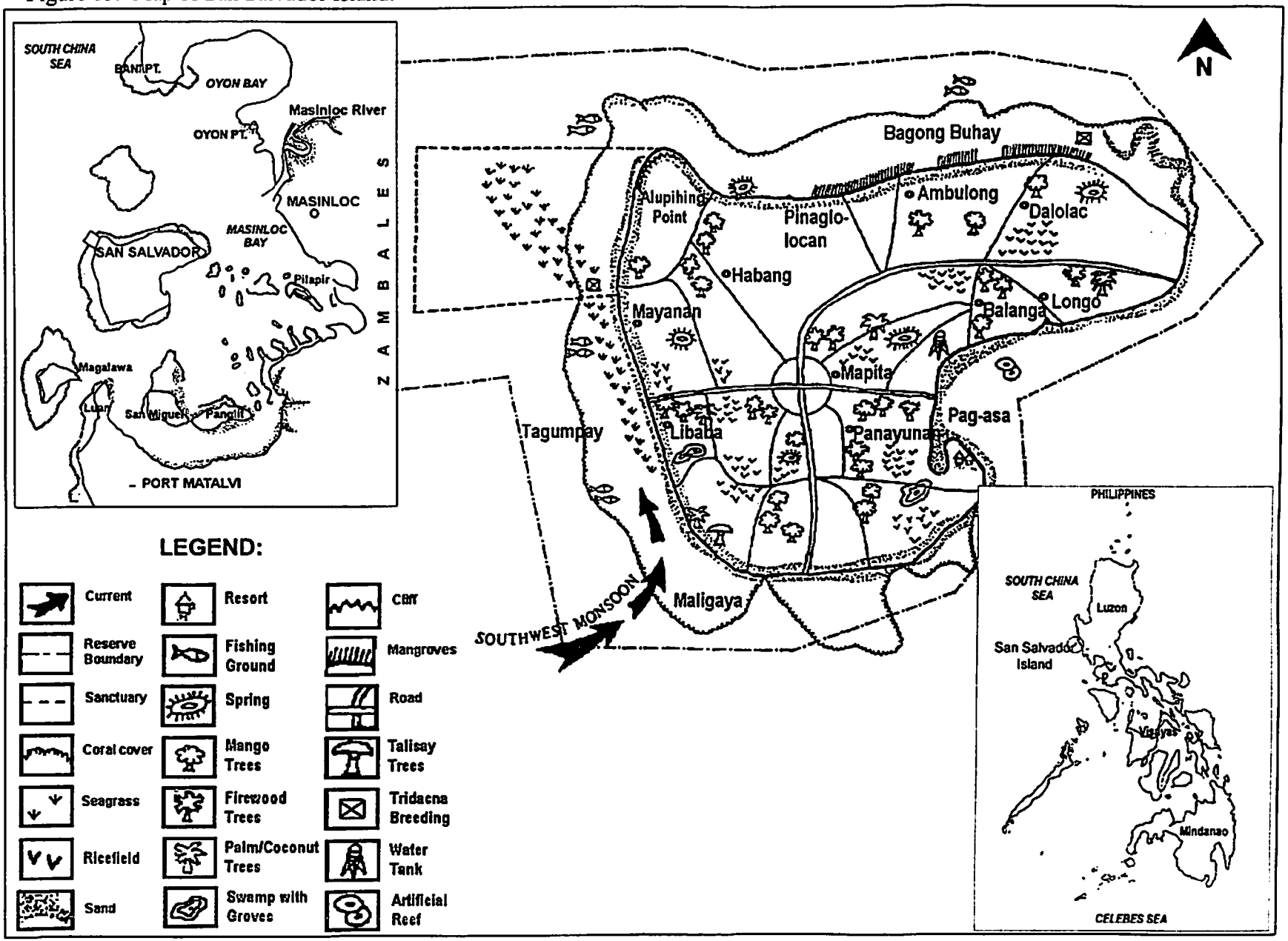
**Brief History of Resource Management at the Site**

The island has been inhabited by three generations of residents. The initial migrants, who were largely farmers from the mainland of Zambales province, had neither their own tradition of fisheries management nor an indigenous expertise on fish stock management. The village residents, moreover, did not have a history of collective action in fisheries management prior to the implementation of the Marine Conservation Project for San Salvador or MCPSS.

During World War II (early 1940s), Japanese troops occupied the island and sometimes used explosives to catch fish, marking the early beginnings of blast fishing on a limited scale. After the war, village fishers continued with their non-destructive fishing methods to meet the subsistence needs of the residents. Until the late 1960s, the prevalence of abundant marine resources, socioeconomic homogeneity of village residents, and a subsistence village economy enabled the residents to live together with minimal resource use conflicts.

In the 1970s, the scenario began to change due to the influx of migrants from the central Philippines who brought with them destructive fishing methods, the integration of the village

Figure 15. Map of San Salvador Island.




Source: Haribon Foundation

economy into the international market for aquarium fish, and the pronounced shift to destructive fishing operations such as blast fishing, aquarium fish collection using sodium cyanide, and use of fine mesh nets. These events led to the progressive devastation of San Salvador's fishing grounds and to conflicts among resource users.

The effects of fishery depletion and unabated destruction of coral reefs began to be felt in the 1980s. Open access to the resource, rapid decline in fish stocks, and existence of unscrupulous village residents contributed to worsening resource conditions. Village fishers using hook and line and gillnets reported that their average fish catch per fishing trip dwindled from 20 kilos in the 1960s to barely three kilos in 1988. Many reef fishes, such as groupers, snappers and damselfish, became scarce. A pre-project coral reef assessment in 1988 indicated an average of 23 percent living coral cover for the entire island.

Rampant illegal fishing activities prevailed in the 1970s and 1980s, fostered by a *de facto* open access fishery and lack of vigilant law enforcement. The highly centralized national government of the Philippines at that time was too distant to control the situation, while the San Salvador fishers themselves were too fragmented to embark on any collective action to avert resource degradation.

**Changes in Resource Management: Major Initiatives**

External change agents were instrumental in initiating resource management measures. A Peace Corps volunteer who arrived in San Salvador in 1987 was responsible for assessing the needs of the village, surveying coral reef conditions, and holding informal dialogues with resource users and stakeholders on the long-term consequences of environmental degradation. In 1988, he conceptualized the MCPSS, a community-based coastal resource management (CBCRM) project for coral reef rehabilitation. Funding came from the Netherlands Government and the Jaime Ongpin Foundation. Haribon Foundation, one of the first non-government organizations in the Philippines to recognize the role of the community in resource management projects, served as the lead implementing organization (1989-1993). Through the project, it had the opportunity to establish a marine sanctuary that featured a biological intervention (i.e., marine sanctuary and reserve) and a governance intervention, initially through CBCRM.

Project activities formally started in January 1989, a month after project launching. The goal was to reverse the downward trend in fish yields. The MCPSS sought to enhance institutional capabilities, develop and implement a marine resource management plan, and establish a coral reef fish sanctuary and a marine reserve. In addition, it encouraged the formation and strengthening of local groups responsible for marine resource management and income-generating projects. Central to the achievement of the project's goal was the community organizing process. Despite the absence of a tradition of collective action in fisheries management and the existence of heterogeneous village residents, the project succeeded in mobilizing the residents to take collective action on resource management problems. Intensive information campaigns helped the residents realize the consequences of unsustainable resource uses and heightened their concern for nurturing their natural environment, upon which their survival and livelihood depend.

A major event in the first year of project implementation was the 10-day trip to Apo Island, a marine sanctuary in the Central Philippines, of seven village residents who comprised the informal core group-cum-internal change agents. The Apo Island experience helped generate the confidence and

the motivation among the village residents that they, too, could embark on a similar undertaking. In 1989, the core group members spearheaded a campaign to support the 127-hectare marine sanctuary and reserve of San Salvador. Together with the external agents, they drafted a local ordinance that banned fishing within the sanctuary and allowed only non-destructive fishing methods in the marine reserve, such as hook and line, bamboo traps, gill nets (3 cm or larger), spear fishing without compressor, and traditional gleaning. In response, the Masinloc Municipal Council passed an ordinance in July 1989 that helped provide legitimacy to the San Salvador marine sanctuary and reserve at the local level and imposed penalties on rule infractions.

The MCPSS was not conceived as a co-management project. However, the Masinloc municipal government, which has political jurisdiction over San Salvador, was drawn into the picture in several ways: 1) passage of enabling legislation (Municipal Ordinance 30-89) in July 1989, which provided a legal basis for sanctuary management and for apprehending rule violators; 2) mediation of conflicts between village-based resource users as well as between local and outside resource users; 3) provision of a motorized boat, hand-held radios, and fuel for patrolling the coastal waters in response to the request of San Salvador residents; 4) formal creation of a patrol team in 1993 to enforce fishery laws; and 5) provision of a political environment that allowed the pursuit of community-based initiatives. Thus, the beginnings of co-management date back to mid-1989, prompted by the political dynamics in San Salvador and by limited resources on the part of village fishers for enforcement operations. The project also called for the settlement of disputes. Village fishers recalled that confrontations with violators of the sanctuary ordinance required the support of the municipal mayor, particularly when village authority figures were unable to do so. Community organizers were hesitant to become directly involved in law enforcement since they felt that it was an inappropriate role.

Support from the Village Council was manifested in the endorsement of the sanctuary ordinance in 1989 and the banning of *kunay*, a traditional fishing gear that uses a long scareline of coconut fronds for herding fish from the reef flat into a fine mesh net. The Village Council is a formal decision-making body in the village, whose members are elected to political positions with a three-year tenure. The Council also proposed to the Masinloc Municipal Council stiffer penalties for violations of the sanctuary ordinance.

In 1991, policy and legal support from the national government came through the passage of the Local Government Code, which gave the municipal government jurisdiction over municipal waters. The national government, moreover, declared Masinloc Bay as a protected seascape in 1993 under Presidential Proclamation No.231.

Haribon Foundation turned over the project in 1993 to the village-based fishers' organization it helped establish. Four years of community organizing work drew to a close, paving the way for the crucial task of sustaining project initiatives with local resources.

Co-management became increasingly more visible in the post-project phase (1993 onwards). The Village Council and the Municipal Council have taken a more active role in sustaining project initiatives by providing funds, personnel and additional facilities. Led by the Masinloc municipal government, law enforcement is now a collective responsibility of the government-deployed patrol team, fishers' organization, and the village police. The municipal government demonstrated its continuing support by constructing a new guardhouse in San Salvador, providing food for the marine

guards, augmenting radio facilities, and allocating funds for law enforcement operations. It also approved stiffer penalties for violations of the sanctuary ordinance. The Village Council, for its part, has deployed its village police and paid for the honoraria of resident marine guards. The village fishers have continued to adhere to non-destructive fishing practices, patrol the waters on a 24-hour basis, and guard the sanctuary. In July 1996, the San Salvador sanctuary won a prestigious national award for its achievement in coastal resource management and local governance, providing a source of pride to all partners and reinforcing the incentive to protect the sanctuary.

The strengths of the project lay, in part, in the active involvement of resource stakeholders in project planning and implementation, well-defined objectives, supportive leadership, strong linkages with the municipal government and with sources of technical expertise and funds, and generation of tangible project benefits. Decision-making was participatory, marked by a series of consultations, dialogues, and public hearings to thresh out issues and conflicting interests, as well as by interaction among partners.

**Incentives to Cooperate**

At the level of resource users, the factors that prompted cooperation were dependence on fishery resources, recognition of resource management problems, and legitimacy and enforceability of rules. At the level of government and non-government organizations, the concern for improved living conditions and for sustainable coastal resource management served as a motivation to collaborate. Worth noting, too, is the national acclaim for the resource management accomplishments of San Salvador, which reinforced the sense of pride of resource users and project partners and provided a new incentive to collaborate in the post-project phase.

The path to co-management, however, was not problem-free. Alienation and resentment prevailed among aquarium fishers and those who used destructive fishing gear due to the lack of alternative livelihood activities at the site. The displaced groups were compelled to fish in distant fishing grounds around the province and in neighboring provinces. The introduction of an alternative, non-destructive technology for catching aquarium fish using barrier nets came one year after destructive methods were banned. Over time, tangible project benefits in the form of a higher fish catch from San Salvador's fishing grounds helped encourage rule compliance and adoption of non-destructive fishing practices.

**Outcomes of Co-management**

The San Salvador experience attests to the triumph achieved by a fishing village in rising above the odds associated with *de facto* open access nature of the fishery and worsening marine resource conditions. More importantly, it demonstrates that a partnership between the village and the local government can succeed in averting resource degradation and sustaining resource management initiatives after the external donor has phased out from the site. Co-management has been instrumental in redefining resource access, encouraging fishers to shift to non-destructive practices, and instituting measures to guard the coastal waters from poachers and illegal fishers. In the process, a remarkable improvement in resource conditions occurred. Fishers, moreover, perceived positive socioeconomic changes over time.

Biological changes are manifested in several ways. Based on key informant interviews, the average fish catch per fishing trip increased from barely three kilos in 1988 (pre-project) to about 6-10 kilos

in 1996. This may be attributed to the protection of habitats where fish can breed and grow, primarily through the formal designation of a marine sanctuary; the control of destructive fishing practices, such as blast fishing and sodium cyanide fishing; and the pursuit of vigilant law enforcement by the local government and the village fishers. A recent resource assessment affirms that the condition of fish habitats has indeed improved and fish families have become more abundant. These may be seen in the extent of living coral cover, which more than doubled from 23 percent for the whole island in 1988 to 57 percent in 1998, and in the number of fish species, which increased by about 47 percent over the same period.

A comparative perception of other outcomes before and after co-management (1988 versus 1996) shows that the San Salvador fishers perceived positive changes. They felt that their knowledge of fisheries improved, particularly on fish stock management. Prior to the project, local knowledge was basically limited to fish capture and fishing gear, but relatively little was known on the biological/reproductive capacity of fish stocks. This type of knowledge is crucial to sustainable fisheries management. The fishers, likewise, perceived that co-management led to a more active sharing of information on fisheries among village residents. Contributing to this were project strategies that placed a premium on village-wide information campaigns, trips to other sites with similar resource management interventions, interactive meetings, and informal dialogues. Other areas where the fishers perceived relatively larger gains are satisfaction with fishery arrangements, benefits from the marine reserve, and quickness of resolving community conflicts. Fishers felt that conflicts among resource users tended to be resolved faster during the co-management phase. This could be attributed, in part, to the legitimacy of rights and rules, existence of mechanisms for conflict resolution, and intercession of the municipal mayor whenever village authorities needed assistance in dealing with difficult issues. Perceptions of ease in collective decision-making on fisheries management were also positive, partly attesting to the efficiency of co-management arrangements at the site.

Finally, the fishers perceived gains in equity. They felt a stronger sense of participation, influence over fisheries management, and control over fisheries, which was reinforced through the project's empowerment strategy and participatory decision-making. They also perceived gains in the fair allocation of access rights, in household well-being, and household income over time. The outcomes are inspiring, particularly when viewed in the context of a degraded resource base in the late 1980s, lack of prior experience in collective resource management, and conflict-torn resource users. The project has provided the fishing village a reason for optimism, a motivation for taking collective action, and a sense of pride in its resource management achievements.

### *1.2 Mangrove Rehabilitation and Coastal Resource Management Project (MRCRMP) of Mabini-Candijay, Bohol: Cogtong Bay*

Cogtong Bay is located in the Central Visayas region of the Philippines. Two municipalities, Mabini to the north and Candijay to the south, share the Bay's 10,000 hectares of municipal waters (Figure 16). Limestone hills and a thin fringe of mangroves are found at the outer portions of the Bay. The inner portion has extensive mangrove stands bordered by rice fields and coconut lands. Out of 2,000 hectares of mangrove forest, 1,400 hectares are still intact. Of these, about 275 hectares in the islands of Lumislis, Kati-il, Tabondio and Calanggaman were declared as mangrove wilderness by the national government. These are characterized by secondary bushy growth, having been cut repeatedly in the past. The rest of the mangrove areas, comprising about 600 hectares, have been

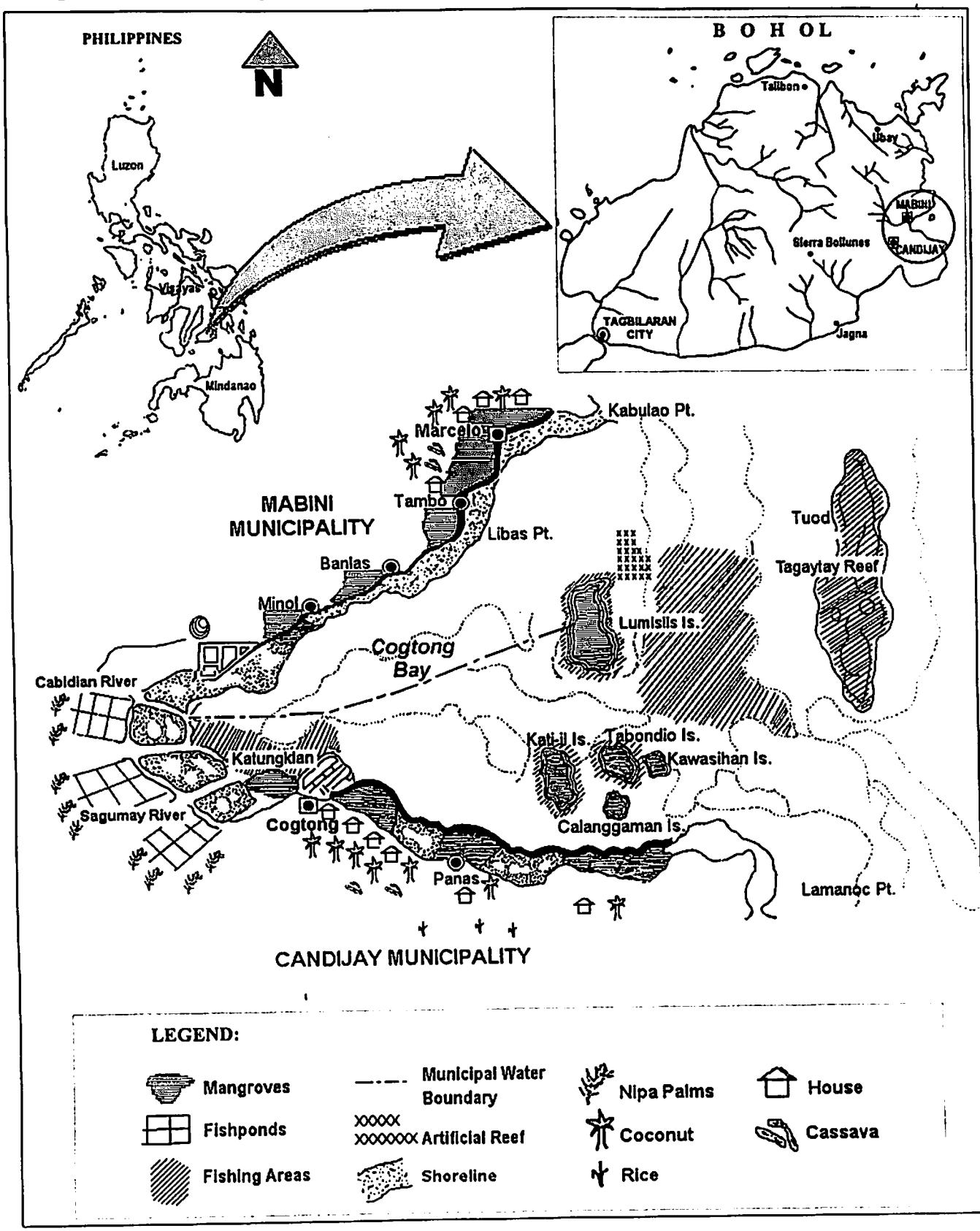
converted to fishponds.

The coastal villages of Cogtong in Candijay and Marcelo in Mabini are inhabited by native Boholanos (83 %) and other Visayans from neigboring provinces. The predominant religion is Roman Catholicism. The village residents are fairly homogeneous in terms of ethnicity, religion, and occupation. About 3/4 of the population at the case study sites rely on coastal resources for survival and livelihood, indicating a high degree of dependence on coastal resources. Aside from fish, most families gather crabs, shellfish, algae and other marine products for subsistence, as well as for sale to local markets.

The population of Cogtong has grown from 2,508 persons (434 households) in 1988 (pre-project year) to about 3,361 persons (or 561 households) in 1997. This represents an increase of 27 percent over 1988, equivalent to 3 percent per year. Mabini's population has grown more slowly from 675 persons (or 120 households) in 1988 to about 777 persons (or 144 households) in 1997. This translates to an increase of 15 percent over 1988, or approximately 1.7 percent annually.

The Cogtong Bay fishery is multi-species, multi-gear, and mainly artisanal. Fishing operations are generally done with small, non-motorized boats in dispersed fishing grounds, both outside and within the Bay. Small pelagic species, including sardines and mackerel, are caught offshore. Rabbitfish, mullet, trevally, wrasse, scad and snapper are caught within the Bay. The types of fishing gear used are gillnets, handlines, fish corrals, spears, fish traps, squid jiggers and Danish seine.

Figure 16. Resource map of Cogtong Bay.



**Brief History of Resource Management at the Site**

Historically, Cogtong Bay has been marked by open access, where unrestricted entry to the waters and free-for-all harvesting of coastal products prevailed until the mid-1980s. The Bay has no customary rights of tenure to the fishery. For the mangrove areas, however, some form of informal management and tenurial rights have existed for three generations of residents in Cogtong, Candijay. Some 25 families informally took care of small mangrove areas of one hectare or less per family. Informal tenurial rights were passed on to the succeeding generations. Eventually, these rights became formal when the third generation applied for mangrove stewardship contracts in the latter half of the 1980s.

Fishers in Cogtong Bay recalled that fishery resources were abundant and mangrove stands were thick until the 1960s. Resource abundance, together with the use of non-destructive harvesting practices and the predominance of subsistence village economies, enabled the coastal residents to utilize coastal resources without major conflicts in resource use. The next two decades, however, saw a drastic change in the situation due to three major developments. These include the introduction of fishpond technology from Iloilo, a province in the Western Visayas region; the arrival of commercial fishers and entry of commercial mangrove cutters from neighboring provinces; and the integration of Cogtong Bay into the heavily market-driven economies of nearby provinces and urban centers, such as Cebu and Tagbilaran. These factors hastened the degradation of the Bay's resources and resulted in conflicts among resource users. The open access resource and lack of vigilant law enforcement efforts fostered the use of illegal fishing practices (i.e., use of fine mesh nets and blast fishing), as well as rampant mangrove cutting for firewood and for fishpond development. The situation was aggravated by fragmented resource management functions among national government agencies and a lack of leadership. This gave rise to unclear jurisdiction over coastal resource management. The shift from subsistence village economies to market-driven economies opened new linkages to provincial and regional markets in the Visayas, which intensified resource use.

The devastation of mangroves and fisheries posed a serious resource problem and was a source of discontent among coastal residents, whose very survival is intertwined with the Bay's resources. Village fishers became increasingly aware of the decline in their average fish catch over time. Their average catch reportedly dwindled from about 20 kilos in the 1960s, to 10 kilos in the 1970s, to approximately 5-7 kilos in the 1980s. The native residents found disturbing the influx of non-coastal residents and outsiders from neighboring provinces who destroyed mangrove areas to make fishponds.

**Changes in Resource Management: Major Initiatives**

In 1989, a major effort to avert resource degradation in Cogtong Bay and promote a more sustainable coastal resource management (CRM) came through the initiative of ACIPHIL, Inc., an externally-based private firm that has actively provided technical assistance to resource management projects in the Philippines, including the Central Visayas Regional Project. ACIPHIL entered into a partnership with the Department of Environment and Natural Resources (DENR) of the national government to pursue mangrove rehabilitation and coastal resource management as a component of the USAID-funded Rainfed Resources Development Project (RRDP). Inspired by the nearshore fisheries component of the World Bank-assisted Central Visayas Regional Project (1984-1992), the Cogtong Bay project of Mabini-Candijay sought to transform resource users into resource managers

who are directly responsible for day-to-day resource decisions. It adopted a co-management approach to address the problem of resource degradation and poverty in coastal villages along Cogtong Bay from 1989 to 1991.

The project featured a set of interventions and a process of empowering coastal villagers to carry out their own development and manage their renewable resources. Community organizers were hired as catalysts to initiate awareness campaigns, strengthen local capabilities, forge linkages with government units and establish village-based fishers' associations for coastal resource management. In line with efforts to improve the condition of coastal resources, the project introduced mangrove management as a major intervention. Complementing mangrove management were other project components, such as community organizing, capability building, environmental education, mariculture (i.e., culture of mussels and oysters), concrete artificial reefs, and project facilities. The Network Foundation, a non-government organization, assisted ACIPHIL in implementing the Mangrove Rehabilitation and Coastal Resource Management Project (MRCRMP) of Mabini-Candijay between 1989 and 1991. Among the project's physical accomplishments were the organization of 13 fishers' associations, issuance of 265 Certificates of Stewardship Contracts (CSCs) for mangrove tenurial rights, rehabilitation of 110 hectares of mangrove areas in Mabini and Candijay, and installation of 265 modules of concrete artificial reefs.

The assistance of the government was visible in several ways: provision of funds, resolution of policy issues, law enforcement, passage of enabling legislation, and issuance of property rights. Central to project implementation was the provision of secure mangrove tenurial rights to local fishers. The MRCRMP phase (1989-1991) ushered in the redefinition of access to mangrove areas and the establishment of formal tenurial rights through the issuance of 25-year CSCs. The DENR gave CSC holders the right to manage their mangrove areas and harvest their trees, provided they replant each tree cut. Non-CSC holders were not allowed to cut mangrove trees in CSC-covered areas. This period also saw the need for a clearer delineation of political and legal boundaries to address issues of jurisdiction and resource use. The fragmentation of functions for coastal resource management at that time was manifested in the jurisdiction over mangrove areas by the DENR and in the authority of the Bureau of Fisheries and Aquatic Resources (BFAR) over fisheries.

During project implementation, a closer coordination between the DENR and the BFAR became imperative to resolve conflicting policies on resource use and fishpond development. BFAR at that time was encouraging fishpond development and issuing Fishpond Lease Agreements (FLAs). In some instances, this led to the clearing of well-stocked mangrove forests for fishpond construction. Village residents asked why they were expected to plant new mangroves and refrain from cutting existing trees when outsiders were allowed to come in and destroy mangrove forests. The struggle between FLA holders and village fishers was resolved when the DENR ruled that cutting trees in mangrove forests for fishpond development was illegal. In the absence of cutting permits from the DENR, FLA holders could not cut mangrove trees legally.

Recognizing the importance of strict and vigilant law enforcement efforts, the project staff and village fishers' associations linked up with the municipal government of Mabini and Candijay for support in terms of facilities, police officers, and local legislation. The management of Cogtong Bay's resources called for a committed partnership between the government and the village residents. Joint patrol teams regularly guarded their coastal waters and mangrove areas. Although prevention of illegal fishponds was not envisaged as a project activity, the fishers' associations felt

that the problem was serious enough to warrant collective action. In many instances, they succeeded in preventing the construction of illegal fishponds and the illegal harvesting of mangroves for commercial sale. They also played an active role in controlling blast fishing in the Bay.

During the post-MRCRMP phase, however, fishers observed a lower level of rule compliance. This was due, in part, to weaker law enforcement and lower support from the municipal government that came with a change in political leadership and with budgetary constraints. Consequently, the lack of vigilance and the breakdown in enforcement efforts encouraged illegal fishers to resume their destructive activities in Cogtong Bay. Illegal mangrove cutting, however, was less problematic in areas with formal property rights. The CSC holders, on their own, continued to protect their mangrove areas.

Political boundaries became more distinct when the Local Government Code effected the devolution to local government units of many of the functions previously performed by BFAR and DENR. At present, the municipal government exercises jurisdiction over municipal waters (i.e., waters within 15 kilometers from the shoreline of the municipality) and over the management of community-based forestry projects. Areas beyond the municipal waters as well as those outside of communal forests, however, remain under the BFAR and DENR, respectively.

In recent years, the Village and Municipal Councils of Candijay and Mabini have demonstrated a stronger interest in coastal resource management. They have supported the establishment of a new fish sanctuary at Lumislis Island, pushed for stricter local legislation, and recognized communal mangrove areas for firewood gatherers.

### Incentives to Cooperate

The shift from open access to a communal property rights regime for mangrove areas in Cogtong Bay was prompted by several factors. These include: 1) a common dependence on coastal resources on the part of resource users; 2) desire for better coastal resource management on the part of government organizations and non-government organizations; 3) concern for improving the socioeconomic condition of poor coastal residents; 4) legitimacy of property rights; and, 5) realization of the need for collective action against illegal fishing and illegal mangrove cutting to avert further resource degradation.

Disincentives to cooperate, on the other hand, initially stemmed from conflicting government policies and indifference of some local government officials to strict law enforcement. These were eventually resolved when the MRCRMP drew attention to these areas and, together with fishers' associations, pressured appropriate organizations to take action.

The delineation of mangrove property rights, however, led to the displacement of firewood gatherers. The restriction of harvesting rights to CSC holders alienated the firewood gatherers, but this was resolved with the designation of communal mangrove areas for firewood gathering. To prevent the rapid depletion of mangroves, the municipal government passed a local ordinance that banned the sale of mangrove firewood outside of Mabini and Candijay. The intent was to meet only the needs of the domestic market.

**Outcomes of Co-Management Arrangements**

The co-management experience in rehabilitating mangroves at Cogtong Bay may be regarded as a victory over indiscriminate mangrove cutting on a large scale and a demonstration of a greater consciousness among resource users of the interaction between man and his environment. Nurturing the resource base and protecting livelihoods over the longer term called for a shift from a "use orientation" to a "resource management orientation" that actively seeks the enhancement of knowledge, skills, responsibility and accountability of resource users and other stakeholders. Central to this perspective is the recognition that resource users are *de facto* managers of the natural resource base and stewards of the environment in which they live.

Mangrove rehabilitation and provision of stewardship contracts to mangrove planters paid off. A post-project mangrove assessment in July 1997 indicates a relatively good mangrove growth at the reforested areas, particularly at Katungkian, which seems to have been influenced by protection from waves, relatively shallow depth, extensive water run-offs, and a muddy soil layer. The total basal area of mangrove stands was highest in Katungkian at 6.82 $m^2ha^{-1}$. It was slightly lower at other sites, such as Panas, Catiil and Lumislis. Compared with San Miguel Bay, another site in the Philippines where overharvesting and mangrove conversion to aquaculture also led to mangrove denudation, mangrove growth at Cogtong Bay is relatively better.

In relation to fish catch per fishing trip, key informants noted a continuing downtrend in the 1990s for various types of fishing gear, particularly for longline, fish pot, handline, spear gun and squid jigger. The only exceptions apply to gillnet and fish corral, where the average fish catch of about 3-10 kilos in 1997 comes close to the estimated catch in the 1980s. Though marine sanctuaries were established in 1995, they are relatively recent. The absence of benchmark data, moreover, precludes conclusions on the extent to which a change in fish abundance and living coral cover has occurred.

From the perspective of fishers, positive socioeconomic changes occurred in a number of indicators, given a comparison of the situation before the project (1988) and after the project (1997). Larger positive changes were perceived in knowledge of mangroves, information exchange on both mangrove management and fisheries management, control over mangrove resources, quickness of resolving community conflicts, and influence over community affairs. They also perceived an improvement in household income and household well-being, among others. The fishers, however, did not perceive a statistically significant change in the overall well-being of coastal resources. This perception seems to have been influenced by the relatively lax enforcement of fishery rules during the post-project phase, return of illegal fishing activities in recent years, and a general downtrend in fish catch for simple types of fishing gear. The fishers, nonetheless, are optimistic that the fishery will improve in the next five years. It appears that the co-management regime has been more successful in mangrove management due, in part, to the issuance of stewardship contracts that provided a strong incentive to protect the mangrove stands and the relative ease in patrolling the mangrove areas on the part of the mangrove planters.

The experience of Cogtong Bay affirms that the management of coastal resources is not easy. It draws attention to the difficulty of managing coastal resources without the sustained cooperation of the government and the resource users to make rules and regulations work, particularly for fisheries management. Gains, nonetheless, are possible in spite of formidable odds if resource users and the government have a shared commitment to sound resource management and livelihood protection

and are willing to take decisive action. The continuing existence of mangrove stands established by the project along Cogtong Bay, the persistence of holders of mangrove stewardship contracts to voluntarily guard their respective mangrove stands from illegal cutters, and the recent emergence of new resource management initiatives (i.e., marine sanctuary) provide concrete proof that resource stakeholders have made a breakthrough.

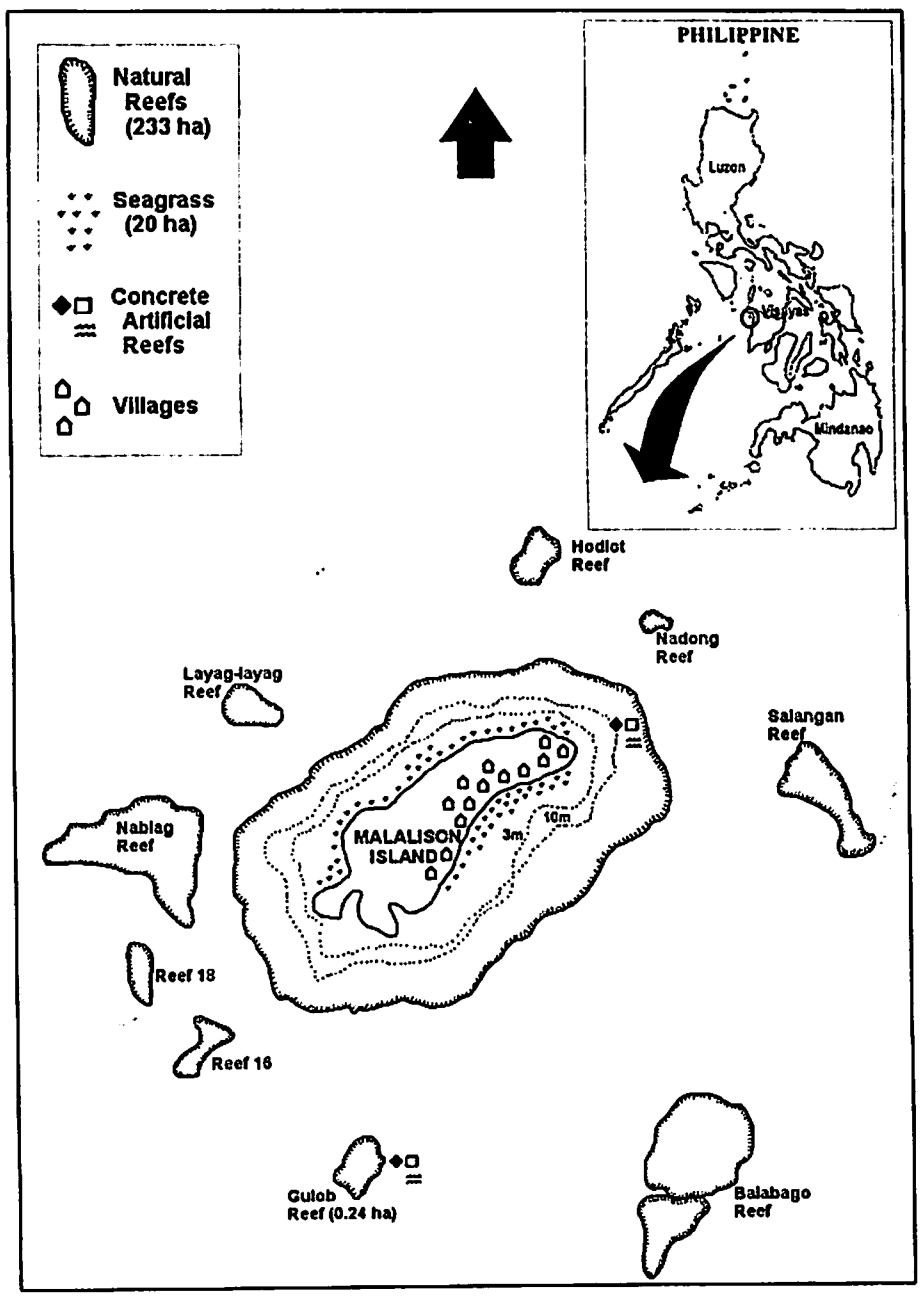
### *1.3 Community Fishery Resources Management Project: Malalison Island, Antique*

Malalison is a small island village with a total land area of 55 hectares. It is found in the municipality of Culasi, Antique in the central Philippines (Figure 17).

Three dominant families, consisting of descendants of the early island settlers during the Spanish era, have inhabited Malalison. In 1995, the island's population was estimated at 512 persons, representing a 4.0 percent increase per year since 1990 (pre-project year). At that time, Malalison had a population of 421 persons. The average household size at present is about 5-6 members. The village residents are homogeneous in terms of ethnicity, religion, and occupation. Ninety-seven percent (97%) are native *Ilongos* who were born on the island while three percent are migrants. Almost all the village residents are Roman Catholics. About 80 percent of the village households are dependent on fishing, shell gathering, and fish trading. Others are livestock raisers (4%), construction workers (3%), laborers (9%), and food vendors (2%). About 2 percent are not employed.

The Malalison fishery is multi-gear, multi-species, and artisanal. Fishers normally fish around the island and in nearby areas with hook and line, spear, nets and compressors. The

Figure 17. Map of Malalison Island, Philippines.



types of fish caught are snappers, mackerels, groupers, surgeons, jacks, tuna, emperor, and marlins, among others. During low tide, women and children glean shells, sea urchins and sea cucumber. Most fishers (60%) use non-motorized boats. The rest have motorized boats and sailboats. Nobody owns boats that exceed three gross tons. The majority of the Malalison fishers reported that their fishing grounds have not changed over time and that they have shared nine reefs around the island with fishers from neighboring villages. Only 19 percent have frequented deeper waters.

**Brief History of Resource Management at the Site**

Historically, the waters of Malalison have been characterized by open access. Nonetheless, there was an attempt on the part of the Culasi municipal government to regulate the fishery from the 1930s to the 1970s by accepting bids for four coral reefs in Malalison waters. The person who won the bid enjoyed the right to fish in the designated area. Fishers had to pay 10 to 20 percent of their catch from the area to the person who won the bid.

The 1970s saw a more rampant use of blast fishing, whose beginnings actually date back to the end of World War II. The use of sodium cyanide in catching aquarium fish, a fishing method picked up from migrant fishers, also became widespread in the 1970s.

In the mid-1970s, the residents of Malalison filed a petition with the municipal government to open the Malalison waters and stop the bidding process. As a result, the fishers gained free entry to various fishing grounds. Fishers with hand-paddled boats and sailboats converged near the island. Spear and net fishers frequented the reef areas, while hook and line fishers moved to the deeper portions of the sea and reef slope.

The 1980s ushered in more intensive fishing operations. Commercial fishing vessels using purse seine and bagnet entered the Malalison waters, particularly in January and February, causing periodic conflicts between the native fishers and the transient fishers. Compressor-aided spear fishing started in 1987. The native fishers learned this method from fishers on a neighboring island and discovered that they could stay underwater for a longer period. The following year, a group of fishers put up a smaller version of the *muro-ami*, which enabled them to catch 200 to 300 kilos of fish in one fishing trip. *Muro-ami* is a fishing method that uses stone-weighed scarelines to drive fish out of their coral habitat into a surrounding net. Though this method is illegal, its use in Malalison continued until 1991.

In the late 1980s, dwindling fishery resources became evident. A subsequent fish landing census from 1991 to 1992 indicated a low yield from coral reefs of 5.8 tons $km^2$ $year^{-1}$. If the reefs were intact, the yield would have been higher at 17 tons $km^2$ $year^{-1}$. Live coral cover was low at 35 percent. The patch reefs and the southern fringing reef were substantially degraded, indicating that destructive fishing methods (i.e., cyanide fishing, blast fishing and *muro-ami*) were used in the past.

**Changes in Resource Management: Major Initiatives**

In 1991, the Aquaculture Department of the Southeast Asian Fisheries Development Center (SEAFDEC) launched an eight-year Community Fishery Resources Management Project, with funding support from the International Development Research Center of Canada (IDRC). The

project aimed to enhance the coastal environment through a community-based approach to resource management and to improve the socioeconomic condition of fishers. Four major interventions were introduced: 1) deployment of concrete artificial reefs to enhance fish habitats; 2) grant of territorial use rights of fisheries (TURFs) to solve problems brought about by ineffective law enforcement; 3) community organizing and institution building; and 4) alternative livelihood. SEAFDEC tapped a non-government organization, known as the Participatory Research Organization of Communities and Education toward Struggle for Self-Reliance (PROCESS) Foundation, to handle community organizing and institution building.

During the initial phase, the inexperience of the research team in community-based projects created problems. Expectations of immediate project benefits prevailed among the village fishers. SEAFDEC's research activities and the community organizing activities of PROCESS were not integrated. Moreover, other problems included an unstable leadership within the Fishermen's Association of Malalison Island (FAMI), lack of understanding and appreciation of research activities by some community members, and absence of a full-time project leader.

To address these problems, the project team held regular community dialogues, general assemblies, staff visits, joint planning workshops, and meetings with the fishers' association. The project also facilitated information exchange on fisheries management through visits to other CBFM sites, seminars, and annual forums where research results were shared with the fishing village.

The project has drawn its strengths from several factors. One is the active role of the municipal government of Culasi in project planning and implementation. Thus, the project was a co-management project at the outset. The municipal government formally designated an area of one square kilometer for FAMI's management, where territorial use rights of fisheries are in place, and provided funds for training and livelihood assistance (Baticados and Agbayani 1998). Another factor is support from the *Barangay* (Village) Fisheries and Aquatic Resources Management Council (BFARMC) in endorsing to the municipal government the establishment of a fish sanctuary in Guiob reef in 1995. This hastened the provision of legitimacy to the fish sanctuary and related resource management activities. The third factor lies in the availability of external expertise, largely through SEAFDEC and PROCESS, in building up local capabilities, promoting non-destructive fishing practices, and encouraging interaction among resource stakeholders. The presence of these external agents helped bring about a rethinking of fishing practices and a better compliance with fishery-related rules.

**Incentives to Cooperate**

The key reasons that induced various resource stakeholders to work together largely stemmed from resource use conflicts and recognition of dwindling fishery resources; desire to improve the socioeconomic conditions in the village; legitimacy, enforceability and applicability of rules, and tangible project benefits.

The homogeneous and fishery-dependent village of Malalison was disturbed by the incursion of transient fishers who used highly efficient fishing methods, leading to conflicts with village fishers. The consequent decline in fishery resources prompted the village fishers to jointly assess the situation with the external agents and pursue measures to reduce the threats to their resource base and livelihood.

The concern of external agents for sustainable resource uses and for uplifting village conditions served as a springboard for initiating co-management arrangements and resolving gear conflicts. Bringing together the resource users and the local government units at the municipal and village levels to agree on appropriate measures and to enforce the rules was crucial to the reduction of illegal fishing activities.

The passage of the sanctuary ordinance by the Culasi municipal government formalized the collaboration between the resource users and the local government to manage coastal resources. This was consistent with the Local Government Code of 1991, a landmark national legislation that grants local executives the political and legal mandates to shape the course of coastal resource management within their area of jurisdiction. The creation of the FARMC also institutionalized the participation of fishers in the development and conservation of their resources.

Potential conflicts, nonetheless, exist. There is a brewing tension among the village fishers on the use of compressor-aided spear fishing. Though this method is not illegal at present, some fishers resent its use in Malalison. Non-users of compressors feel that there is an adverse effect on their own fish catch since they are using less efficient gear.

**Outcomes of Co-management**

The Malalison experience dramatizes an attempt to reverse destructive fishing practices through a collaborative effort on the part of external agents, village fishers, and local government units at the municipal and local levels. The acquisition of external fishing technologies and the entry of transient fishers who deployed destructive fishing gear altered the condition of the Malalison fishery over time. This has been translated into degraded reefs, dwindling fishery resources, and conflicts among resource users. The establishment of co-management arrangements proved to be an important turning point, marking the institution of property rights and rules, re-thinking of fishing practices, and reduction of resource use conflicts. The Malalison experience demonstrates that local government units at the municipal and village levels and resource stakeholders can work together to address issues related to sustainable resource uses and betterment of socioeconomic conditions. In a study conducted by SEAFDEC, the Malalison fishers expressed that significant changes have been associated with co-management arrangements. Consistent with the capacity building and empowerment approach of the project, the village fishers perceived improvements in equity, particularly in terms of control over the fishery, fair allocation of access rights, participation and influence over fisheries management, household income, and overall household well-being. They also felt that collective decision-making has become easier and conflict resolution has been faster since the establishment of co-management arrangements. This was linked to the existence of formal bodies for planning, policy-making, and arbitration of disputes. Apart from these, perceptions of rule compliance, information exchange, and overall well-being of the fishery were positive, bearing favorable implications for sustainability.

Nonetheless, the ability of the fishers and resource stakeholders to jointly maintain resource management interventions after SEAFDEC phases out from Malalison remains to be seen. Building on earlier initiatives and meeting new resource management challenges will shape the course of future co-management arrangements.

### *1.4 Coastal Resource Management in Orion, Bataan*

Orion is a municipality in Bataan province that lies along Manila Bay (Figure 18). Manila Bay may be regarded as a nightmare for sustainable development and resource management. It has a large area of 1,500 km$^2$, is heavily polluted, and suffers from outbreaks of red tide and overexploitation of fish and non-fish resources. Orion municipal waters cover almost 10 percent of the bay area.

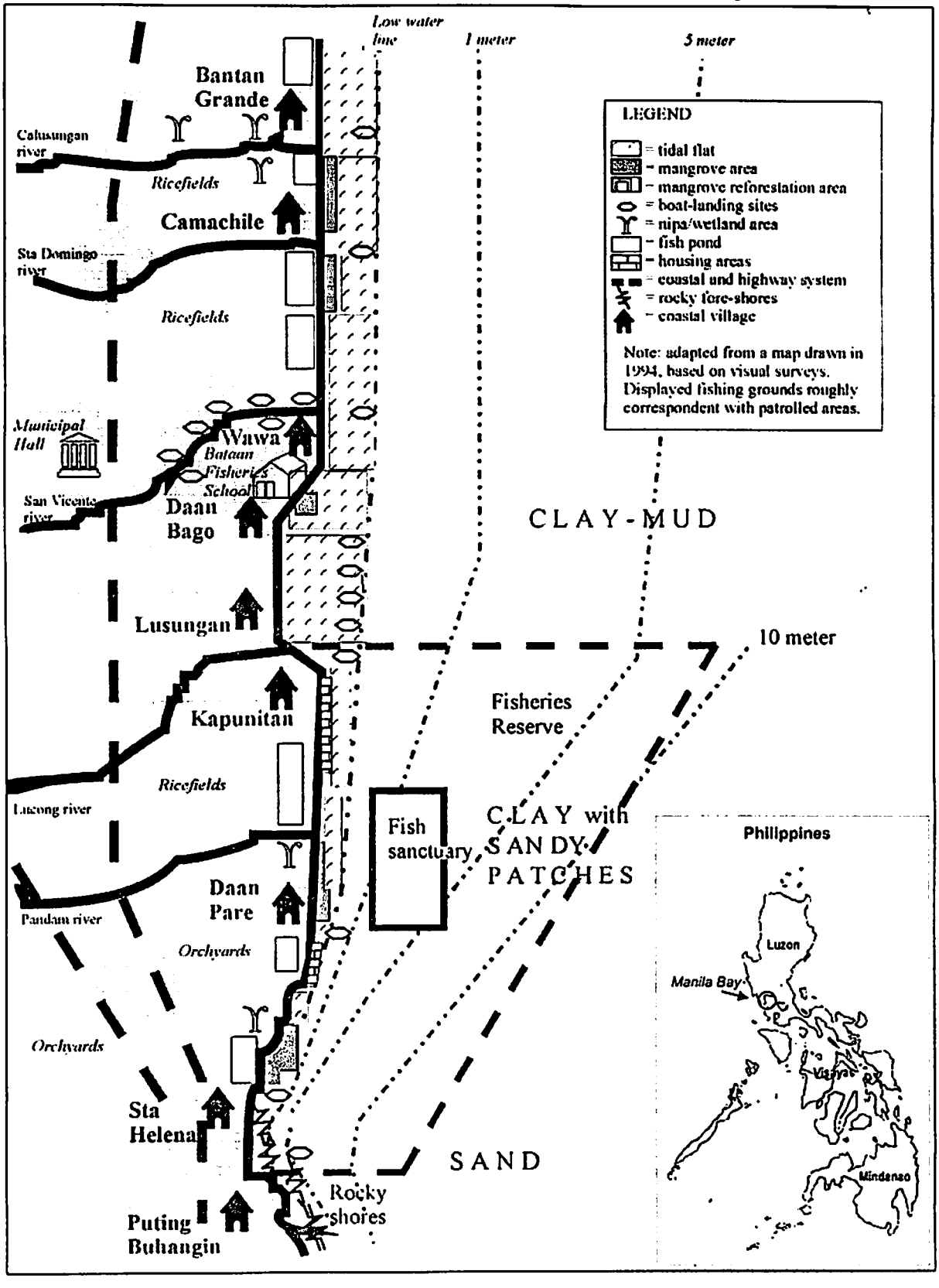
Orion has 23 villages, of which nine are considered coastal. The municipal coastline of Orion spans about nine kilometers. The population density in the coastal zone of Orion is high with approximately 1,541 persons/km$^2$. The residents are fairly homogeneous in terms of ethnicity. About 88 percent are *Tagalogs* while the rest are *Visayans*. Forty percent of the population is directly dependent on the fishery as a source of income. Most of the residents of Orion are engaged in a mixture of livelihood sources as a survival strategy, given the degraded condition of Manila Bay.

The Orion fishery is multi-gear and multi-species. Less than 20 small pelagic species and benthic non-fish species make up almost 90 percent of the fish catch. The dominant gear types are gillnets, longlines, hook and line, small seines, trawls and pushnets. Most fishers use small boats (less than 3 MT) with outboard (16 hp) or in-board (4-K) engines. The majority of the fishers in Orion fish outside the municipal boundaries. They consider the entire Manila Bay as their fishing ground. The fish are sold locally in Bataan (75-80%) as well as in distant Metro Manila.

**Brief History of Resource Management at the Site**

Manila Bay used to teem with fish and other marine life. According to older fishers in Orion, fishing was easy in the 1940s and 1950s, often involving no more than throwing a seine in

Figure 18. Map of the coastal area of Orion with main socioeconomic and ecological features.



the water from the shore. They recall that many species were not even harvested but discarded as by-catch. Moreover, Orion and many other coastal areas along Manila Bay at that time still had plenty of natural mangroves.

In the 1960s and 1970s, an extensive commercial fishery gradually developed. Large trawls, both foreign and domestic, harvested large volumes of fish. During the same period, coastal habitats and mangroves were destroyed on a massive scale in response to the needs of a growing resident and immigrant population for housing and for fishponds. Industrial estates and beach resorts also emerged. Fish yields declined rapidly. The fishers decided to invest in larger and more efficient gear, encouraged by government-funded development programs that aimed to improve access to capital. As a consequence, fishers were able to venture into more distant fishing grounds within Manila Bay.

In the 1980s, small-scale fishers started using destructive and illegal means of fishing. Yields continued their downward trend, species disappeared, and the returns from fishing became marginal. In the first half of the 1990s, the large community of small-scale fishers in Manila Bay hardly made any economic profit from the fishery despite long hours at sea. The rampant abuse of the ecosystem increased in spite of the government ban on commercial fishing in the bay. Frequent red tides and an El Nino phenomenon in 1998 aggravated the problems of fishers.

**Changes in Resource Management: Major Initiatives**

The attempt of the national government to increase economic production and efficiency of the small-scale fisheries in the late 1970s was perceived to have contributed to present levels of overexploitation and marginal returns. Recognizing this, the Philippine government embarked on a nation-wide Fisheries Sector Program (FSP) in the late 1980s that placed a premium on the rehabilitation of the coastal ecosystem and fisher participation in management.

In 1990, a non-governmental organization (NGO) known as the Philippine Rural Reconstruction Movement (PRRM) started a program in Bataan that aimed to promote sustainable municipal fisheries, diversify income sources, and build capacity and opportunity for community development. This was done through its Sustainable Rural District Development Program (SRDDP). Since 1991, the PRRM incorporated the concerns of fishers in the program and initially organized fishers into village-based associations. This quickly led to fisher-based patrolling activities and deployment of artificial reefs. The fishers themselves initiated efforts to protect a small patch of mangroves from the threat of destruction. In 1992, the organizing efforts resulted in the federation of fishers at the municipal level, known as SUGPO (*Samahan at Ugnayan ng Pangisdaan sa Orion*).

It took another one to two years of organizing before the fishers readily participated in drawing up plans and initiatives in fisheries management. Their first priority was to exclude commercial and destructive fishing gear from the fishing ground, partly by means of an efficient patrolling by volunteers from the village. In 1993, the municipal government enacted ordinances on the use of fisheries resources. Frequent consultations took place between the fishers and the representatives of municipal and provincial governments.

In 1998, the joint effort of the fishers and the government culminated in a comprehensive Coastal Resources Management Plan. Among the rehabilitation measures being pursued are mangrove reforestation, sanctuary establishment (no fishing), and marine reserve establishment (limited

fishing). The local fishers' association has recently reforested about eight hectares and has applied for mangrove stewardship agreements with the national government to obtain a 25-year right of tenure over reforested areas. In addition, a mangrove nursery has been established at the Bataan School of Fisheries. A 50-hectare sanctuary is being maintained within the Orion waters. Although the sanctuary was set up in 1994, the marking structures were only installed in mid-1996. Initially, the fishers were apprehensive that a group of small trawl fishers in Orion would object to the buoys and markers.

Surrounding the sanctuary is a marine reserve with an area of six square kilometers. Fishing in the reserve is allowed only if passive, small-scale gear types are used. At present, more than 90 percent of the local fishers support the maintenance of the sanctuary and the reserve.

Under the current co-management system, the fishers are responsible for planning, policy and rule formulation, project proposal preparation and implementation, and enforcement of fishery-related rules. The municipal government provides legislative and formal endorsement, administrative support, and funding for the patrol teams. The present fisheries co-management system in Orion may be characterized as advisory with some elements of informative management.

**Incentives to Cooperate**

The incentives that induced the resource users and the government to cooperate are varied. At the level of the fishers, these involved dependence on the fishery, access to government and non-government funding, legitimacy of rules, tangible benefits from co-management efforts, and existence of various mechanisms for conflict resolution, information exchange, and collective action.

At the level of the NGO, the motivation lay in its concern for environmental sustainability, service delivery and impact, and desire to bring about an improvement in the socioeconomic and political conditions of coastal residents. On the part of the municipal government, the incentives took the form of concern for the local resource base, political stability and constituency, and formal mandate for coastal resource management.

**Outcomes of Co-management**

The co-management system in Orion, Bataan emerged in the context of declining fish catches that were closely linked to rampant overfishing and resource degradation. The case of Orion highlights the need for stakeholder participation in fisheries management. Moreover, where rehabilitation efforts are slow due to the extent of resource degradation and the size of the management area and where fishing income is inadequate to meet survival needs, the diversification of income sources becomes imperative.

Despite the environmental odds faced by Orion fishers, they perceived positive changes over time. These perceived changes, however, are basically related to less tangible benefits (i.e., participation, influence, resource access, rule compliance, information exchange and knowledge of fisheries) rather than to more tangible benefits (i.e., increases in fishing income, higher fish catch and improvement in the general condition of the fishery). This is understandable in light of the scale on which the project is implemented and the small management area compared to the total fishing ground. Co-management appears to have been more associated with perceived changes in social,

political and attitudinal aspects. In spite of the apparent lack of tangible benefits, co-management continues to enjoy a large base of support in Orion.

## 2.0 Bangladesh

The case study sites at Bangladesh cover inland waterbodies, primarily semi-enclosed lakes. They include Hamil Beel (Thompson et al. 1998) and Ox-bow Lakes (Khan and Apu 1998).

### *2.1 Community-Based Management of Hamil Beel*

Hamil Beel is a small semi-enclosed lake located in Dhanbari union. It is under Modhupor thana in Tangail District, found in north-central Bangladesh (Figure 19). The horseshoe-shaped beel (lake) has a dry season area of about 16 hectares (40 acres). The lake retains water throughout the year and has a small catchment of adjacent fields. The depth of the water in the lake never falls below one meter, even in the dry season, except in very exceptional drought years (1986 and 1995).

In the monsoon season, the lake is connected with the Bangsi River to the east through a small channel. Fishers block this channel with a bamboo fence to prevent fish from escaping from the lake. In high flood years, the lake connects with wider floodplains linked with the Jamuna river. Only in these years can fish can move freely between the lake and floodplains and river.

The residents of five villages around Hamil Beel are predominantly Muslim, and are mainly involved in farming and in providing labor services. Fishing is a secondary occupation. The participants who hold rights over the fishery form a homogeneous group, with the exception of a few influential leaders. They are part-time fishers who derive about half of their household income from fishing. The stocked fishery (carp) and most natural fish production are market-oriented. Some small fish are caught for food. Seine nets are used for organized fish harvesting, while push nets, cast nets, and hook and line are deployed for individual subsistence fishing.

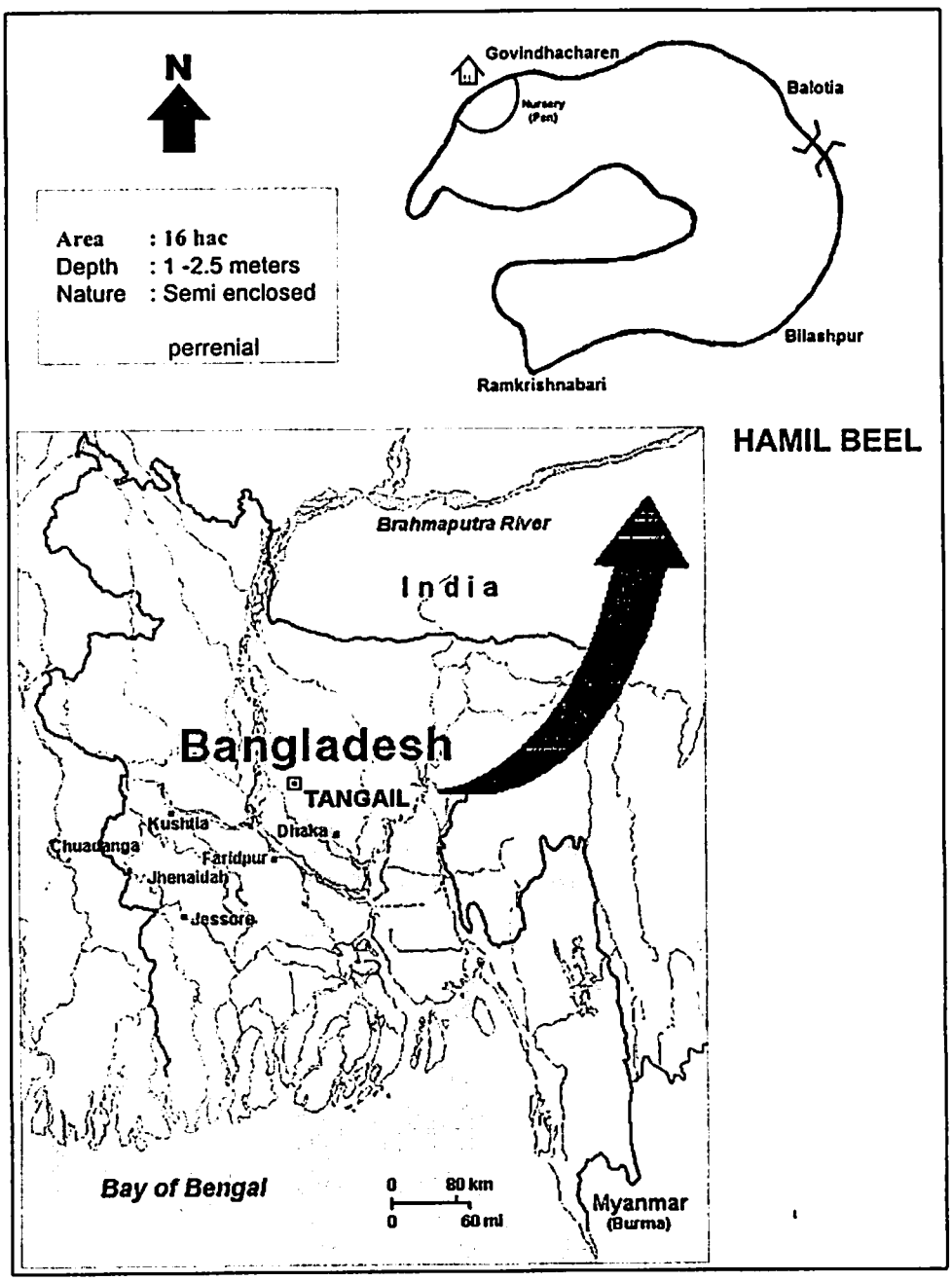



Figure 19. Map of Hamil Beel, Bangladesh.

**Brief History of Resource Management**

Fishers recall that during the 1960s, abundant and diverse native fish species were found in Hamil Beel. However, connections with the river system became less regular due to siltation,flood control, and other infrastructure works. Fishers observed a gradual decline in fish stocks, along with the disappearance of the economically important migratory Indian major carps.

Until 1971, the government leased out fishing rights in the lake to private individuals through an open auction. The naturally occurring fish stock was harvested in large numbers. In 1972, a fishers' organization emerged, known as the Dhanbari Fishers Cooperative Society. It controlled the beel fishery from 1972 to 1987. A local fisher, who was well acquainted with the laws on public leasehold fisheries and who had good relations with the local leaders and the elite, led the cooperative society. The ordinary group members did not show much interest in management, possibly due to fear of the powerful people involved in the fishery. Thus, the fishers were open to exploitation. The cooperative society retained control over the lake by establishing strong linkages with local leaders and government, particularly with the local staff of the Department of Fisheries (DOF) and the Thana administration. From 1972 to 1987, the cooperative society purchased wild fry and fingerlings (about 2-5 cm long) in boatloads.

From 1988 onwards, Hamil Beel came under a licensing system that was instituted under the New Fisheries Management Policy (NFMP). Under the NFMP, individual fishers were to receive licenses directly from DOF on payment of a fee, instead of bidding for the lease. In practice the cooperative leaders retained control – they organized listing of their members as the "genuine" fishers who would be licensed and then paid their license fees. In this period, cooperation between the fishers and DOF increased and hatchery-reared carp was obtained for stocking the beel.

The financial returns from the beel fishery were poor, despite stocking during the NFMP period, which lasted for six years. The maximum production occurred in 1990/91 but was only 291 kg/ha. In 1988, a severe flood caused the stocked fish to escape and wild species to enter the lake. A serious fish disease, called Epizootic Ulcerative Syndrome (EUS), first reached the lake during this flood and in some subsequent years wrought havoc on the beel fish population.

In 1995, there was no motivation to stock the lake due to lack of government support, changes in policy and a high flood. The breakdown of existing systems led to an open access fishery for natural fish and sporadic fishing in the lake by transient fishers.

**Changes in Resource Management: Major Initiatives**

The year 1996 saw new changes in the fishery, largely due to the initiative of a new government project and the assistance of a non-government organization (NGO). Hamil Beel fell under the coverage of the Community-Based Fisheries Management (CBFM) Project, a partnership involving the DOF, NGOs and ICLARM. Under the project, the local fishers were encouraged to take over the management of the fishery themselves. Caritas, the partner NGO, was responsible for supporting both the government and the local fishing villages in the introduction of new CBFM practices in Hamil Beel and four other waterbodies.

In early 1996, the fishers were reorganized into six groups. A Beel Management Committee (BMC)

comprising existing fisher leaders and representing all six groups was formed and stocked Hamil Beel in May 1996. Production under the reorganized arrangement improved and the returns were distributed equitably among the fishers. To encourage the groups to be self-reliant and cohesive, the field staff of Caritas encouraged each fishers' group to begin a savings scheme. The fishers attended training courses in leadership and management, bookkeeping/accounts management, gender awareness, and adult literacy courses, which led to consciousness raising and capacity building. Caritas also extended credit to finance both fishery and non-fishery activities (i.e., rice husking, carpentry, van and grocery). Women were involved in training and income-generating activities.

A new Beel Management Committee was elected in early 1997, and the lake was again stocked in the same year. However, the change in leadership led to a weakening of the ex-leader's power and the emergence of factions among the fishers. Underlying these is the awareness of fishers of exploitative practices in the past and of the need for change.

Under the new management, nonetheless, there were problems related to quality control of stocking, lack of commitment to guarding the lake, poaching, and mismanagement of funds. Complaints about the current BMC persisted in 1998. When the BMC attempted to exclude some 20 members for not contributing to stocking costs, it resulted in a dispute with those who demanded reinstatement. The ex-leader and his supporters used this dispute to strengthen their move to discredit the existing BMC and regain power. They filed a legal case against the current BMC leader alleging misappropriation of funds. At this stage, the project partners are in the process of diffusing the conflict. The situation highlights a power play involving the fishers, the DOF, and the NGO. For 10 years, the DOF had a working relationship with the leaders. Consequently, the ex-leaders have sought the support of the DOF in their attempt to discredit the new BMC. The BMC, on the other hand, has looked for support from the NGO that helped its new leaders gain power. Fortunately, such internal disputes have not escalated to the point of losing control over the fishery.

### Incentives to Cooperate

At the level of the fishers, the incentives to cooperate in fisheries management are varied. They rest mainly on direct economic benefits associated with better management of a stocked fishery, secure access rights, and attraction to greater participation and equity in management. At the level of the government and non-government organizations, the incentive for working together lay in a common concern for sustainable inland fisheries and for a more equitable distribution of financial returns among the Hamil Beel fishers.

In the first year of implementing the CBFM Project, there was considerable cooperation among the resource users when the advantages of the new approach were apparent to all. In the process, however, the empowerment of fishers led to the weakening of authority of the ex-leader, who was the primary decision-maker for more than two decades. This gave rise to rifts within the fishers' organization and to ineffective guarding of the beel. Eventually, the ex-leader stopped attending meetings and refused to cooperate. External threats to the fishers' control over the beel have been a big incentive to cooperate. For example, in early 1999, the local municipal council tried to auction fishing rights in the beel although it lacks this authority. The acting BMC, ex-leader, NGO and DOF all cooperated to resist this threat.

**Outcomes of Co-management**

The Hamil Beel experience represents a triumph over the inequitable sharing of returns from the fishery and a bold attempt to give ordinary fishers a voice in planning and decision-making. The restructuring of the fishery from an elite-dominated sector to a broad-based, participatory-oriented sector paved the way for more transparent decision-making and a realization of higher incomes among the members of the fishers' organization. The immediate achievements of co-management were visible in terms of increased fish catches due to stocking with larger fingerlings in appropriate numbers, better rule compliance, and a more equitable sharing of benefits.

Perceptions of the Hamil Beel fishers attest to improvements over the first two years of CBFM implementation. In particular, the fishers perceived positive changes in information exchange, knowledge of the fishery, compliance with rules, and control over the fishery. These may be mainly attributed to the interactive discussions pursued by the project, development of local capacities for collective action, legitimacy of fishery-related rights and rules, and policy support from the government. The fishers also felt that they could now influence community affairs and make their opinion count. Despite internal conflicts within the fishers' organization that came about with fisher empowerment and weakening of authority of traditional leaders, the fishers perceived relative ease in resolving conflicts and in collective decision-making under the co-management regime. Making this possible are the existence of clearly defined rules and procedures, availability of appeal bodies, and occasional mediation by external agents to diffuse tension.

There is a higher level of acceptance of BMC's rules and control of the fishery among the CBFM participants. This is understandable because other households in the same villages have been excluded from the fishery. Ultimately, widespread acceptance will depend on the legitimacy of the new co-management arrangements under the CBFM project.

The Hamil Beel experience highlights the dynamic and evolving nature of co-management and underscores the appropriate handling of conflicts and consensus building. Changes in the status quo may be accompanied by tension, shifting loyalties, undermining of influence of traditional leaders, and emergence of new leaders. An understanding of the history of fisheries management at the site and a good grasp of the dynamics of stakeholder behavior are vital, particularly in the context of shifts in leadership, management arrangements and benefit sharing.

### *2.2 Fisheries Co-management in the Ox-bow Lakes of Bangladesh*

Ox-bow lakes were formed by deeper sections of winding rivers that either changed their courses in the past or died. These sections are bends, both ends of which are silted up, rendering them semi-closed water bodies in dry seasons. During the rainy season, however, they get connected with the floodplain or their dried up parts. The name ox-bow is derived from its shape, which resembles a horseshoe.

The Ox-bow Lakes, locally known as *baor*, have been subject to a number of management regimes over time. In the British colonial period (1757-1957), they belonged to the landlords (*Zamindars*) on whose land they were situated. In 1950, the East Bengal Estate Acquisition and Tenancy Act converted Ox-bow Lakes into government property and placed them under the jurisdiction of the

Ministry of Land (MOL). The MOL leased these lakes for three years to private leaseholders and cooperatives through an annual auction. The leaseholders engaged professional Hindu fishers in return for a share of the fish catch. They also allowed the poor to gain access to these lakes, and in the process, enjoyed social esteem in the community. The short duration of the lease, however, discouraged investments. Water hyacinths covered the lakes. Productivity was low. The leaseholders retained the lakes more as a symbol of prestige than as an income-earning asset.

In the late 1960s, the government attempted to increase carp production by introducing polyculture in closed water bodies, primarily through the Development Management Scheme (DMS). The Department of Fisheries (DOF) was responsible for overseeing the scheme. Professional fishers participated in a catch sharing arrangement, where they retained 40 percent of the harvested fish. This percentage was 15 percent higher than that allowed by the leaseholders. The scheme, however, was unable to achieve its goal due to poor management, limited fingerlings and limited funds. Fisher cooperatives were formed after independence in 1971 to allow fishers to participate in the auctions for lease of waterbodies. However, the cooperatives came under the influence of local elites, which reduced the role of ordinary fishers to mere workers.

In 1980, the DOF launched the World Bank-assisted Oxbow Lakes Project I (OLP I), which sought to increase fish production and improve the socioeconomic condition of the fishing villages. Each ox-bow lake was managed by a DOF manager with fishers treated as wage laborers for a stocked capture fishery. The OLP I served as an experiment in government management of public waterbodies. However, it did not foster self-sustaining fisheries management due to the lack of involvement of the resource users in fishery and ancillary operations.

In 1985, the DOF initiated the Ox-bow Lakes Small-Scale Fishermen Project (OLP II). The objective of OLP II was to transfer the culture-based fisheries management of ox-bow lakes to the fishers themselves by creating appropriate institutions and a mechanism for guaranteeing security of tenure. The project, which actually took off in 1991, is a social fisheries project that became the first experiment in fisheries co-management arrangements at Ox-bow Lakes. It was funded by the International Fund for Agricultural Development (IFAD). The Danish International Development Agency (DANIDA) provided technical assistance, while a local NGO, known as the Bangladesh Rural Advancement Committee (BRAC), mobilized the fishers and strengthened local management capacities. BRAC is one of the oldest and largest NGOs in Bangladesh.

The project was designed to augment the production of the lakes and to ensure that fishing rights (security of tenure) goes directly to the fish producers and catchers. Fishers' groups were formed from the ranks of license holders and from those who were prepared to invest in the productive capacity of the lakes. In line with this, the government provided long-term access and harvesting rights that lasted from five to ten years. At the core of OLP II was the concept of self-help.

With the implementation of OLP II, the fishers were given the right to manage natural waterbodies near their village. The government of Bangladesh issued licenses to fishers and provided technical support to enable them to invest in the productive capacity of the lake. DOF is the leaseholder of the lakes under OLP II; the fisheries user right is in the hands of the respective lake management groups (LMGs), which consist of the LFT (comprising a number of fishery teams) plus the fish farming group (FFG) comprising a number of pond groups managing the FFG ponds constructed on public land at the edges of the ox-bow lake. The LMG pays the annual lease fee to MOL through the sub-

district fisheries officer of DOF, and, in return, the fisheries officer issues fishing licenses to each fisher.

The project area for OLP II is in Jessore in southwestern Bangladesh (Figure 20). The area has a wide alluvial plain intersected by numerous rivers. The receding and shrinking rivers have left behind waterlogged areas. OLP II covered 23 natural ox-bow lakes. Case studies of co-management were undertaken in three lakes: Porapara, Saster and Nasti. Among these lakes, Porapora Lake represents the best case of co-management in terms of outcomes.

**Porapora Lake**

Porapora Lake has an area of 89 hectares. It is one of the larger ox-bow lakes with good water quality. Its water remains greenish throughout the year, which is good for fish culture. The lake is also used for jute-retting and irrigation, but these uses do not pose a threat to fish culture.

The fishers of Porapora are heterogeneous in terms of religion, but not in ethnicity. Muslims comprise the majority, and are engaged in both fishing and farming. The Hindu fishers, who belong to the minority, depend solely on fishing. Muslims are newcomers who have decided to engage in fishing due to the absence of other livelihood opportunities. Most households in the community have been caught in a low-income trap due, in part, to the exploitative social structure, lack of education and technical know-how and lack of credit access.

**Brief History of Resource Management at Porapora Lake**

Prior to OLP II, Porapora Lake was almost fully covered with different species of floating aquatic and semi-aquatic vegetation. Porapora Lake was managed by leaseholders who introduced stocking of Indian carps on a limited scale.

Traditionally, fishing was done with *kochai* or seine net. At the beginning of the project, very few fishers were skillful in fishing by brush shelter, locally known as *komar* fishing. Over time, their number grew as a result of their participation in project training activities.

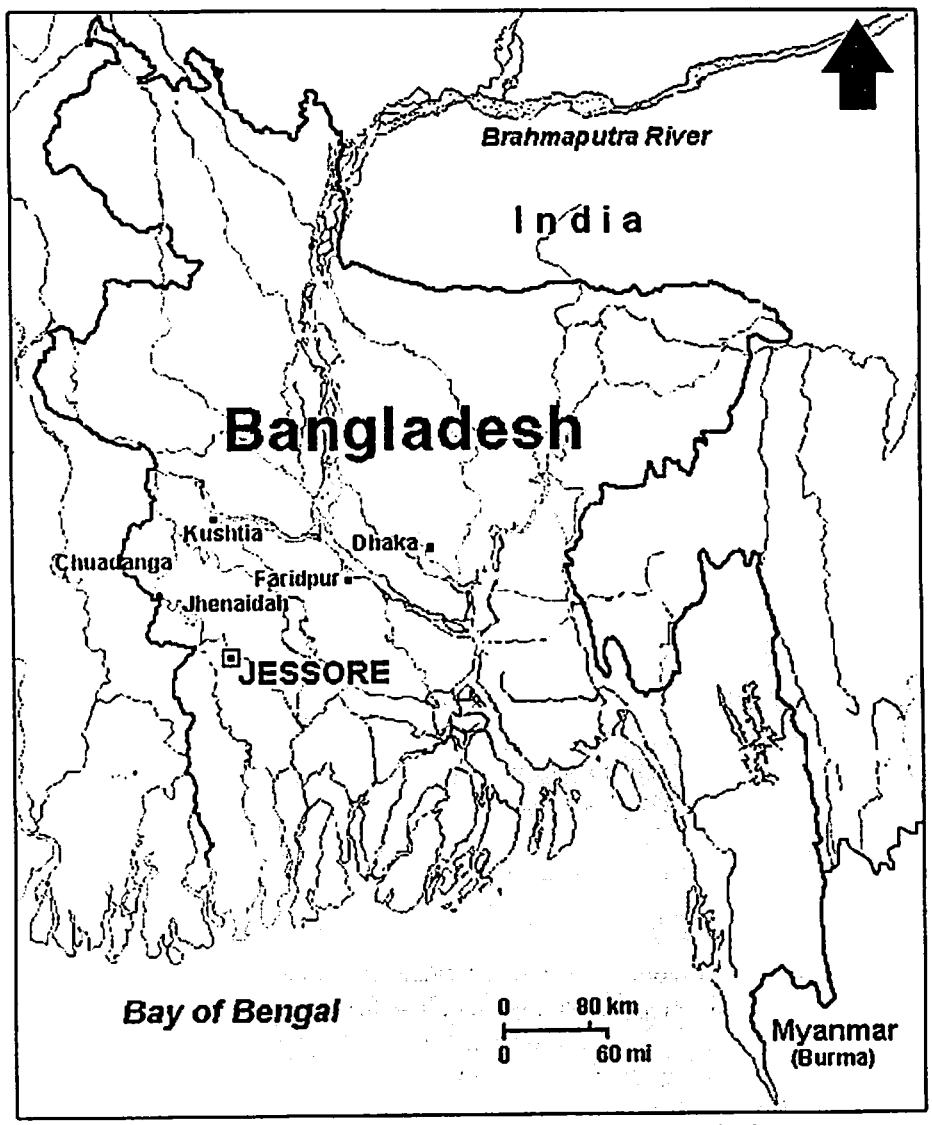



Figure 20. Map of Oxbow Lakes, Southwestern Bangladesh.

**Changes in Resource Management**

Under OLP II, the lake was brought increasingly under carp culture. The Lake Fishing Teams (LFTs) received fingerlings from private suppliers, many of whom were previous leaseholders who were ready to supply any amount on credit. Before the provision of credit by the OLP II through BRAC, these private suppliers were the only sources of fingerlings. It was a time when fishers generally had no knowledge of fisheries management. They were dependent on their leaders who carried out all activities, including purchasing.

There was an instance when a local leader drew an amount of money for the fingerlings in 1992/1993. However, no purchase was made and no stocking was done. As a consequence, the local leader lost his title. A positive offshoot was the entry of local residents into fingerling supply, which was once a monopoly of outsiders. A new generation of fingerling traders emerged among the villagers. At present, most of the suppliers belong to the locality and are known to fishers. This situation, along with the development of the fingerling trade in the locality, has helped curtail corruption and misuse of funds.

**Incentives to Cooperate**

At the level of the fishers, the primary incentives to work together are dependence on the lake's resources, possession of legitimate user rights, equitable benefits from managing the stocked fishery and democratic decision-making. At the level of the DOF and the BRAC, the motivating factor is their commitment to increasing the direct participation of fishers in resource management.

Fishers are among the poorest groups in Bangladesh. Muslim and traditional Hindu fishers belong to the same low economic stratum and share characteristics that are common to those who have lived in the same villages for generations. Their dependence on a common resource base for their livelihood has provided a motivation to collaborate in fisheries management. This was stimulated by assistance from the government and BRAC, along with use rights, credit access (for stocking and fishing gear), and tangible benefits from participating in collective resource management. By forming a group and having access to important services, stocking and fish harvesting became much easier for the fishers to undertake. The project prohibited members from seeking election to the management committee for consecutive terms, curbing the hold of traditional leaders and enabling new leaders to emerge.

There were, nonetheless, cases of conflict between resident fishers and rich, non-resident fishers. Most resident fishers wanted to drop the latter group because they engaged in a private lease outside Porapora, about 11 km away. Fishers were polarized into two groups. Non-resident fishers got together to fight Porapora fishers, but did not win in the election. This somehow drove a wedge into overall group solidarity. Eventually, however, constant participation in guarding, stocking and fishing drew the fishers together, reducing estranged feelings in the process.

**Outcomes of Co-management**

The OLP II affirms that the resource users and the government can collaborate in achieving higher fish yields from the lakes, building local capacity for direct participation in fisheries management

and introducing more equitable arrangements. Overall, the average fish yield improved from 450 kilos per hectare to almost 700 kilos per hectare. The Ox-bow lakes have adopted equal remuneration for equal work, which is a basic principle of the project for income sharing. All groups pool their day's catch and share the proceeds, irrespective of their status in the group. Due to this arrangement, fishers have reportedly been able to own land and increase their credit worthiness. Disparities in the size of rooms within household dwellings also decreased. Before, only leaders lived in spacious rooms. Now, even members can afford to have large rooms.

Fishers, moreover, attained the ability to frame operational rules for governing resource use and implementing them. Rules regarding stocking, harvesting and marketing are laid out, along with rules on illegal entry and poaching. All fisher members are involved in decision-making on the lake fishery. An opinion survey involving a comparison of pre-project and current situations indicates that fishers strongly believe that they have the necessary skill to participate in fisheries management and to influence decision-making. They also felt that the sharing of income from fishing has become more equitable.

The experience at Ox-bow Lakes is a portrayal of how access to the fishery has shifted from the privileged few to the broader group of fishers who needed to survive and earn a decent livelihood. The heavy dependence of village residents on fishing and the limited opportunities for alternative livelihood have given external agents and the government a reason for concern and for taking action.

The experience shows that the proximity of the lake to the households is important. Fishers who live near the banks tend to have a closer affinity with each other and a greater involvement in collective resource management than those who live in distant villages. Moreover, the Ox-bow Lakes experience affirms that legal and policy support from the government is vital in providing legitimacy to use rights and law enforcement efforts, as well as in reducing encroachment into lake fisheries by the elite.

## 3.0 Indonesia

The case studies in Indonesia cover coral reef management of Jemluk Island, Bali (Nikijuluw 1996), indigenous coastal fisheries management in Sulawesi, Maluku and Irian Jaya (Nikijuluw 1998), and *sasi laut* management system in Maluku Province (Novaczek and Harkes 1998).

### *3.1 Management of Coral Reef Areas in Jemluk Village, Bali*

Jemluk is a village in northeastern Bali, Indonesia (Figure 21). Jemluk is a part of Abang District, the Regency of Karang Asem. Its coastline spans a length of about two kilometers.

The waters within 400 meters from the beach are designated for the activities of the villagers. The water bottom consists of living coral, sandy coral, muddy coral, and black sand.

The oceanographic condition of the inshore waters cannot be separated from that of open waters. During August, relatively cooler and higher salinity water from the Banda Sea passes by the Jemluk area to the Java Sea. During February, mud from the Jemluk river floods the sea, explaining the existence of muddy coral and black sand at the bottom of the Jemluk waters. The waters, nonetheless, are clear because of the circulation process of tidal waves.

Of the many tourist destinations in Bali, Jemluk is known for its coastal waters, which offer sport fishing, scuba diving and snorkeling. Before becoming renowned as tourism spot, Jemluk was a modest fishing village.

The population of Jemluk in 1996 reached 567 persons, consisting of 279 males and 287 females. An average household has five members. Almost 93 percent of Jemluk's 117 households are engaged in fishing, while the rest derive their income from agriculture (3.4%), trading (1.8%), and services (1.8%). Fishing is confined to nearshore waters mainly due to the predominance of non-motorized boats or of boats with small engines that are unsuitable for offshore fishing.

In terms of origin, the earliest residents of Jemluk arrived as migrants from Culik village. As tourism developed, people from surrounding villages, such as Tista and Bunutan, also came to live in Jemluk.

The Jemluk fishery is artisanal, multi-gear and multi-species. Most fishers use hand line and drift gillnet to fish for their subsistence needs. Other fishers use troll line and bottom gillnets and sell their catch, usually comprising mackerel, little tuna, pomfret, snapper and grouper. In Jemluk, troll line and hand line are the most commonly used fishing gear (261 units each). There are only three units of gillnets and 12 units of drift gillnets. The hand line is for catching demersal fish and the gillnet is for pelagic fish. The fish are sold in the village market.

Among the 100 fishers in Jemluk, 40 percent are engaged in tourism. They offer their boats for tourist excursion. The frequency of trips has increased steadily increased from 324 trips in 1992 to 2,400 trips in 1995.

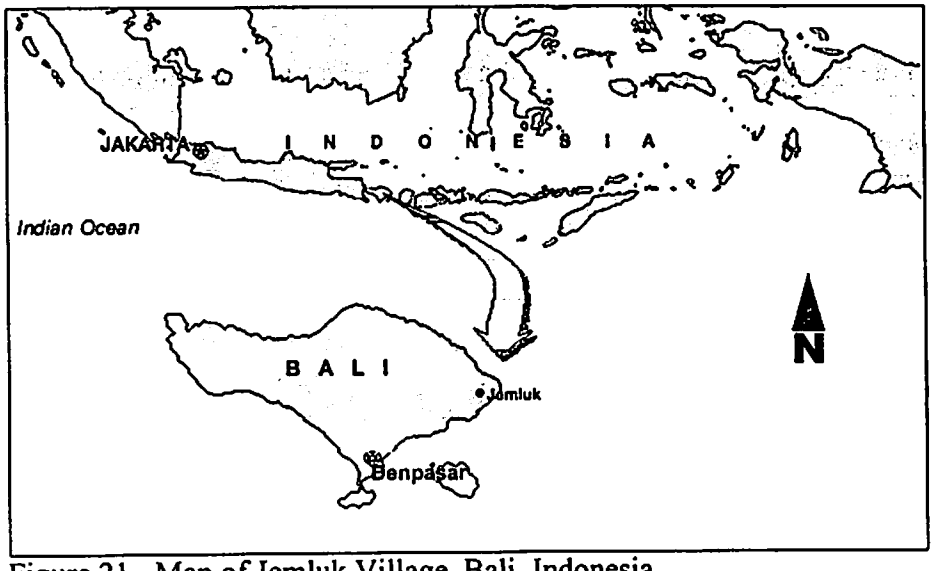



Figure 21. Map of Jemluk Village, Bali, Indonesia.

**Brief History of Resource Management at the Site**

About 30 years ago, village residents used the living resources of the reef ecosystem mainly for daily subsistence. The international demand for spiny lobster and ornamental fish, however, led to the commercial capture and collection of these marine products. As the demand for building materials increased, corals were used to provide brick and road materials. Despite a provincial decree banning coral collection, rule compliance was low since many village residents had built their livelihood on coral collection.

The ornamental fish industry, along with easy access to the export market through international flights from the capital city of Denpasar, also contributed to the destruction of the coral reef ecosystem. Fishers used cyanide to catch ornamental fish from coral reefs, resulting in resource degradation. The production and number of species of seaweed, mollusk and spiny lobster reportedly declined. At present, coral ecosystems in Bali are regarded as an important asset for attracting tourists.

**Changes in Resource Management: Major Initiatives**

The Provincial Fisheries Service of the Directorate General of Fisheries (DGF), in collaboration with the Research Institute for Marine Fisheries (RIMF), initiated resource rehabilitation efforts at the site in 1991 and 1992. Through the Coastal Waters Development Project, 18 modules of artificial reefs were installed in the waters of Jemluk, covering an area of about 217 cubic meters. The main objective was to provide a substitute for destroyed coral reefs and a habitat for fish and other marine organisms. Another objective was to improve the well-being of the villagers.

The project involved the residents of Jemluk in constructing and installing artificial reefs, as well as in monitoring fish abundance and fish diversity. Old tires and concrete were the primary materials used in constructing artificial reefs. The Provincial Fisheries Service was responsible for providing extension services.

The installation of artificial reefs ushered in the influx of tourists to Jemluk for snorkeling and scuba diving. Though tourism dated back to 1982, the number of tourists increased after the installation of the artificial reefs. Tourism created other economic opportunities. Fishers who previously depended on fishing alone were able to diversify their income sources by transporting tourists on their boats to diving and snorkeling areas.

In 1992, the fishers formed the Tunas Mekar Fishers Association (TMFA) in order to deliver better services to tourists and synchronize schedules. In the process, intense competition in tourism-related activities and conflicts among fishers were reduced. The TMFA had 43 members in 1994, comprised of fishers who used motorized boats and who were committed to the provision of better services. Each member paid a membership fee of Rp 150,000. Due to the requirement of owning motorized boats as a condition for membership, only 40 percent of the fishing households joined the TMFA. Non-members, nonetheless, were able to derive benefits from fishing in the artificial reefs, particularly when inclement weather prevented them from going to more distant fishing grounds. Moreover, they had a greater chance of catching fish when the TMFA members could not fish due to their tourism schedules.

To manage the waters of Jemluk, the village residents initiated basic rules that applied to both members and non-members of the TMFA. The rules and regulations include the type of allowable fishing gear, area of fishing, and obligations of villagers. Every resident was prohibited from dumping garbage in the sea and litter on the beach. The provincial government, in a bid to attract more tourists to Bali, intensely promoted cleanliness of the environment. The TMFA members, moreover, agreed to clean the beach once a month.

The village residents are involved in monitoring and enforcing the implementation of rules and regulations. Fishers, both members and non-members of the TMFA, patrol the waters. Local police are responsible for backing up the patrol teams. The executive board of the TMFA is responsible for enforcing the rules and regulations of the organization. These rules are written in the TMFA constitution. The rules dealing with all residents of Jemluk are unwritten. There is no penalty system for the non-TMFA members, unlike TMFA members. Nonetheless, the rules are effectively implemented since there are no reported violations.

**Incentives to Cooperate**

Initially, the incentive to collaborate in resource management stemmed from the recognition of coral reef degradation as an alarming problem and the need to take action on fish habitats, given the heavy dependence of Jemluk on the fishery. Over time, new incentives emerged, largely in the form of additional earnings from eco-tourism. The artificial reef areas attracted tourists to Jemluk, particularly those who went for diving and snorkeling. Both the local government and the village realized that it is to their own advantage to keep their beaches pristine and to preserve their recreational areas in order to sustain tourist arrivals from other countries. These economic incentives, in part, encouraged the village residents to comply with a set of rules that aimed to preserve the integrity of the environment and the reputation of the site as a major tourist destination.

**Outcomes of Co-management Arrangements**

There was no biological baseline study before the introduction of artificial reefs. During project implementation, the results indicated that two months after the first installation of the artificial reefs, the fish became diverse. There were 28 families consisting of 114 species of fish. Fish abundance improved from five pieces per cubic meter in 1991 to 61 pieces per cubic meter in 1992.

The ban on the use of destructive and illegal fishing methods helped restore the opportunity to catch high-value fish from coral reefs. Demersal fish catch increased from 3.9 kilos per fishing trip before the project (1990) to 13.3 kilos per fishing trip after the project (1995). The implementation of a resource management project brought about a positive impact as fishers landed more fish and as the distribution of fish landings became more equitable.

In conclusion, the deployment of artificial reefs in Jemluk waters paved the way for local fishers to establish a resource management strategy involving the village and the government. The artificial reefs provided alternative fish habitats and functioned as fishing grounds for small fishers. These reefs also provided a springboard for income diversification to take place through the creation of new livelihood opportunities from tourism.

### *3.2 Indigenous Coastal Fisheries Management System in Sulawesi, Maluku and Irian Jaya*

This section is drawn from a description of indigenous systems in Indonesia (Nikijuluw 1998). It is in line with the effort to document traditional systems based on available materials, both published and unpublished.

Indigenous management refers to management systems based on local knowledge. In certain parts of Indonesia, these systems have existed for centuries and have been managed through different modes or structures. In Irian Jaya. management is by village, by clan and by tribe. In South Sulawesi, it is by family and in North Sulawesi, by community. Management has been associated with rights of access, extraction of benefits, protection of the area and the resources from other users, and transfer of ownership.

In Sulawesi, Maluku and Irian Jaya, fishers' organizations are vested with traditional authority, whose nature varies with the social organization. *Sasi*, a type of indigenous management that exists in Maluku, is organized by traditional secular leaders. *Sasi* is a set of customary practices and rules. It establishes limits on access to collectively controlled or individually owned territory and/or resources. It is closely linked to the prohibition of entry into a certain area during a given season. The village head is normally the leader of *sasi* organization. In implementing and enforcing the rule, he is assisted by the traditional village police (*kewang*), whose members represent village clans. Villagers are actively involved in reporting violations.

Aside from the village-managed *sasi*, the church also organizes *sasi*. In this type of system, the church leaders provide leadership, but they do not have field controls, surveillance or penalties. Nevertheless, the church-managed *sasi* is apparently effective.

In North Sulawesi and Irian Jaya, a customary council (*Dewan Adat*) sets and implements resource-related rights and rules. The council consists of the clan head, formal leaders and church leaders. The village head, under the auspices of the council, is actively involved in determining rules and regulations.

In South Sulawesi, the indigenous system involves the recognition of the individual right of the owner of a *rumpon* or fish aggregating device (FAD) to access and control the waters. The owner of the FAD has the exclusive right to fish in the area of 10,000 sq m surrounding his FAD. This exclusive right is widely recognized by the villagers and fishers. The right to use the waters around the FAD can be bequeathed to another person after the contraption has been destroyed. If other fishers wish to install a new FAD or use an existing one, they must ask permission from the previous owner.

A simple form of collaborative fisheries management between government and fishers was found in Ambon and Jayapura. In Latuhalat, Ambon, the mayor passed a decree in April 1990 to protect village rules. The written rules cover fishing permits and licenses in village waters. Another decree stipulates the boundaries of village waters.

In Irian Jaya, large enterprises and applicants must first ask permission from community leaders before applying for a formal license from the Fisheries Service. Without a recommendation from the community, the Fisheries Service will not issue a fishing license.

**Rules and Rights**

In Teblasufa, Jayapura, ownership of marine waters is divided into two types: 1) waters belonging to the village, and 2) free waters owned by everyone. The village waters are further divided among clans. Fishers enjoy rights of access and withdrawal (i.e., harvesting), but the rights of management, exclusion and transfer belong to the head of each clan. The head of the clan can allow fishers outside of its clan to enter the territorial waters. The formal head of the village can also permit non-villagers to fish in village waters. However, the village head must secure the consent of clan heads. The clan head has the authority to close coral reef areas during a particular period to let the fish grow to a suitable size. Villagers cannot fish in coral reef areas.

The right of management is embodied in different forms of common consent on the fishing season, areas open to fishing, type of fishing gear and equipment, and allowable catch. There are also rules on environmental protection, such as the ban on coral head collection. The enforcement of management rights lies with the village police or *kewang*. The *kewang* has its own rules and organization. At times, it may not be part of the formal village government structure. If this is the case, it is under the control of villagers and customary leaders.

Members of a clan can catch fish in the waters of another clan, provided they use simple fishing gear such as hook and line or spears. To use modern gear, they must obtain a permit from the customary council. The council, however, must first seek the concurrence of the affected clan.

In the coastal villages of Maluku, communities claim access and withdrawal rights over the waters facing their village. Over time, villagers and their leaders have jointly set rules and regulations. The rules include how, when and where to harvest or collect resources. Present-day regulations are modifications of rules made during the pre-colonial era. Fines, for instance, have been adjusted to reflect current values.

The decision to transfer or share a village fishing permit with non-villagers is arrived at during community meetings. However, it is now common for the formal village government to grant the right to share, sell or lease rights related to resource access and harvesting.

In Christian villages, there is a tendency to transfer property rights from villagers and from the village government to church organizations. The church, through its pastors, elders and deacons, stipulates harvesting rules. A percentage of the harvest is given to the church organization. The money is normally used to construct and maintain churches.

**Conclusion**

Indigenous coastal fisheries management is a local management approach. It is unique in the sense that the same system may not be found in other areas. Comparative studies of different indigenous management systems are called for in order to unearth the contextual variables that influence each system.

Indigenous management systems may be regarded as stepping stones for the government to increase participation in resource management. By managing resources, local people could broaden their

participation to cover economic and community development outside of fisheries and coastal zone management. Local rules, moreover, would tend to have more legitimacy if nested in formal rules and regulations.

### *3.3 The Sasi Laut System in Maluku Province, Indonesia*

Maluku is a province in Eastern Indonesia (Figure 22). It has a population of about 2 million people. About 5.2 percent of the residents depend on fishing, many of whom are artisanal fishers. Many more are fisher-farmers.

The tiny Lease Islands (Ambon, Haruku, Saparua, Seram and Nusalaut) found in Central Maluku hold 12.5 percent of the population of Maluku and are almost 10 times more densely populated than the rest of Maluku. In general, the settlements and farming activities are concentrated along the narrow strip of relatively flat coastal land. Artisanal and small-scale commercial fisheries contribute significantly to village economies in terms of employment and income, but villagers are also active in the agricultural sector. Because good farmland is limited and the population relatively dense, the fisheries sector is viewed as a vital economic sector. The sea is a source of income as well as food for the household. The average income from the fishery in a typical village ranges from about 12 to 28 percent of total household income.

The resources of Central Maluku are exploited not only by the local population, but also by boats based in Sulawesi, Java and foreign countries. Fisheries production figures for the commercial fleet show a marked increase over time. In 1974, fisheries production in Maluku was only 59,485 tons. By 1993, fish landings had dramatically risen to 189,081 tons. According to government statisticians, this represents only a fraction of Maluku's potential maximum sustainable yield (MSY). However, in spite of optimistic projections at the national level, fish catches since 1995 have been declining in Maluku. Similarly, shrimp landings in Maluku are declining, and landings of small pelagics are uncertain. More recent assessments estimate that small pelagic catches in Central Maluku are already at 80-90% of MSY. Because of a shortage of baitfish, pole and line catches of larger pelagics are also static or declining.

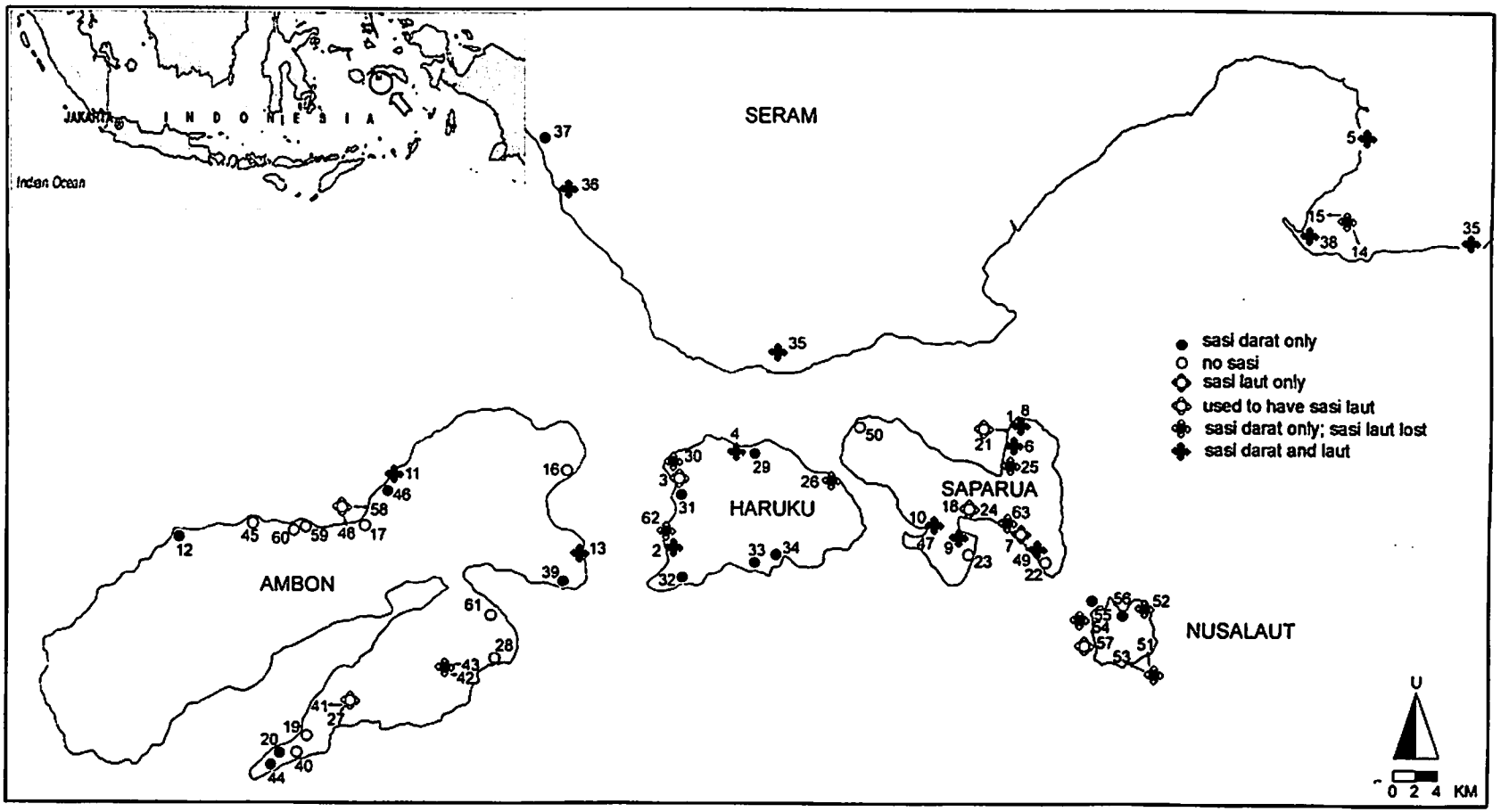



Figure 22. Map of Maluku Islands, Indonesia.

**History of *Sasi* in Maluku**

In some Maluku communities, control over the land and marine territory (*petuanan*) and its resources is vested in a social institution that has a code of conduct, rules and regulations. This institution is known as *sasi*. *Sasi* is not simply an institution designed to regulate resource use. It also has a significant cultural role. "It is an encompassing body of meaningful relations between people, the natural environment and gods, ancestors and spirits." Local legend speaks of *sasi* being in place in the 14th century and perhaps earlier. Others maintain that *sasi* developed in the 16th century in response to the needs of clove traders. *Sasi* is based on customary law and ritual practices (*adat*) and over the past decades has functioned to control exploitation of natural resources.

The "spice wars" between foreign fleets (Portuguese, Dutch and British) that continued until the twentieth century had stimulated militancy and mobility in the people of Maluku and fostered their fierce attachment to their territories. This could have been positive in terms of reinforcing *adat*. On the other hand, however, the introduction of western religions and colonization affected the sovereignty of local leaders. In some cases, wholesale slaughter (as in Banda) and forced evacuation alienated people from their territories. In general, *adat* culture is believed to have reached its zenith in the mid-1600s. The pattern since then has been one of decline of *adat*, punctuated with periods of resurgence.

During the occupation and Christianization of Maluku by the Dutch, *sasi* was initially discouraged, along with other "pagan superstitions and rituals." However, the Dutch subsequently revived and revised *sasi* to control and maximize harvests of valuable spice crops, regulate land tenure and provide a means of social control. In its revised form, the emphasis on spiritual aspects declined, while economic aspects became prominent. During this period and into the 1900s, native Mollucans were often resentful rather than supportive of the Dutch style of *sasi*. It was perceived as an imposition of Dutch ethics and a burden to poorer members of society. Under Dutch influence, what had been purely an *adat* institution became integrated to some extent with the village leadership supported by the colonial government. At a later point, the church also came to have a role in *sasi*, transforming the institution into a religious institution where government and *adat* leaders worked together.

From 1880 to 1893, Dutch Resident Reidel attempted to abolish *sasi*. He wanted to break the power of traditional leaders over the spice trade and abolish their rights to enforce *sasi* rules. In spite of his efforts, the *sasi* institution continued to survive and evolve in many villages. In 1921, the Dutch actually supported *sasi* by formalizing the institution with a decree.

During World War II, the Japanese occupation represented an extreme threat to all *adat* institutions. Later, Indonesian independence involved a civil war in Maluku, a time when many leaders were lost and clans scattered. Integration into the new nation of Indonesia meant a further blow to local indigenous language and culture because *Bahasa* Indonesian became the language of compulsory schooling. Subsequent decades of civil strife and political turmoil at local and national levels continued to challenge the strength of local culture. In more recent decades, cultural change intensified as economic development proceeded. Although weakened over time, *sasi* never disappeared. *Sasi* rules developed at the community level are still used by communities to control and maximize harvests as well as to regulate aspects of social behavior.

The purpose of *sasi* has been debated. Although there may be spin-off benefits in terms of resource sustainability, *sasi* is largely perceived as an institution for managing social interactions, mediating tenure disputes and maximizing economic returns, rather than a resource conservation and management institution per se. On the other hand, *sasi* was clearly aiming to protect the resources in the 1920s, when the use of poisons in the fishery was banned under *sasi* rules. Today, *sasi* is again undergoing change, with a renewed emphasis on conservation aspects.

The application of *sasi* to marine resources may have never been as widespread as *sasi* on land crops. Marine *sasi* has been speculated to have applied only to pelagic fish, with the objective of protecting migratory fish from disruption to maximize harvests for local consumption. In the decades following the 1930s, the emerging international markets for *Trochus* shell (*lola*) and sea cucumber appear to have prompted the development of additional types of marine access prohibitions and related ceremonies in places such as the Kei Islands in Southern Maluku. Similar rules are evident in central Maluku today and appear to date back to at least the 1960s.

In Maluku province, certain marine tenure rights and management responsibilities are a part of culturally embedded institutions and traditions. Under *adat* law, coastal villages typically claim *de facto* rights of access and withdrawal over fairly extensive areas of both land and sea. While some or all the land portion of the *petuanan* is divided up among local clans, the marine area is communally owned. In the Lease islands, marine territories usually extend to the edge of the reef slope but in Southern Maluku, the *petuanan* in some cases extends to the farthest limits from which the land can still be discerned. Access and withdrawal rights in the marine *petuanan* were originally restricted to and shared among community residents. However, exclusive rights of access and withdrawal for particular areas or species may also be sold or auctioned by the village government to individuals or companies. In some cases, control over the marine *petuanan* is vested in an organisation called the *kewang* (traditional enforcer), which is part of the *sasi* institution.

A basic principle involved in the resource management aspect of *sasi* is one of closed and open seasons. Areas of land and sea, particular crops or marine species, are placed under a harvest prohibition for varying lengths of time. Different species are regulated in different villages, depending on the available resources, market price and fishers' preferences. While *sasi* is in effect, these areas or resources may not be harvested without the permission of the *kewang* and *kepala desa* (village head). *Kewangs* do grant exemptions, usually in cases of dire economic need or to provide resources to support a local cultural or religious celebration.

### Incentives to Cooperate

Under *sasi*, the incentives to cooperate are varied. They comprise a combination of religious, socio-cultural, and economic incentives. Fear of retribution from God or being socially outcast appears to be a powerful incentive for fishers to comply with local rules within their village territories. Even so, *sasi* fishers are pragmatic. In times of need, they reserve the right to apply for exemption from the rules and expect leniency in enforcement because "they have to eat fish."

Respect for *adat* and for elders plays a large role in the legitimacy and popularity of *sasi* and is an incentive to comply with *sasi* arrangements. Village heads that descended from the *raja* line have a powerful incentive to support *sasi* because of social prestige and legitimacy. A village head from

outside of the "royal family" can also benefit from the legitimacy that comes with being associated with *adat* authorities. Participation in *sasi* ritual or showing interest in reviving *sasi* is a strategy to stabilize leadership The church, by cooperating with and supporting *adat* leaders, enhances its own positive image as a useful, practical player interested in improving community well-being through *sasi.*

At the level of village governments, the incentive lies in the collection of revenues from *sasi.* However, this must be approached with some sensitivity as the majority of fishers strongly object to the sale of access and withdrawal rights to outsiders or to the village elite. There is also resistance to any scheme that replaces direct benefits to harvesters with indirect benefits provided through local government projects.

Village tenure over a defined area of both land and sea is strongly entrenched in the culture and recognized as legitimate by fishers even in the absence of a formal law. This legitimacy of traditional tenure is an incentive to cooperate within *sasi,* particularly when it is accompanied by security of access or guaranteed benefits for local people. *Sasi* is generally perceived to be useful and beneficial, particularly in terms of higher levels of cooperation and social harmony. This perception that *sasi* is a good thing for society in general is an incentive to comply with the rules.

Dependence on the fishery is a strong economic incentive. When land crops fail or prices slump, the fishery provides secondary income. For instance, the intensity of use of marine resources increased in the aftermath of the 1990-91 collapse of clove prices in Indonesia. Before, a large part of the village income was derived from the spice trade. The Lease Islands and Ambon were prosperous. Between 1991 and the price revival in 1998, many people who formerly harvested cloves for a living turned to the sea as a source of income.

Disincentives to cooperate, however, also exist. Among these are a very low regard for the police and lack of respect for local governments that do not enjoy legitimacy. The individualism of fishers and the predominance of family-centered culture in Maluku, moreover, is a strong disincentive to cooperate with outsiders within a resource management framework. The inferior position of women in village decision-making is another hindrance to full participation of stakeholders in fisheries management.

The government-promoted national ethic of non-questioning obedience to central authority is a powerful disincentive to village leaders who otherwise might institute reforms or introduce new village-level management structures. When all actors down a hierarchical chain wait for some higher authority to take responsibility for decisions, very little gets done outside of the official, centrally programmed activities. A second disincentive arising from the centralized national policy is the lack of approval of any non-governmental, grassroots fishers' organization. In the post-Suharto era of reformation, this may change.

**Outcomes of *Sasi***

Fishers perceive control over resource management to be tight in *sasi* villages, and rule compliance to be high. Where marine resources under *sasi* are harvested as a communal crop and distributed equitably among the population, fishers accept this as fair and do not complain about restrictions to their individual rights of withdrawal. Women, however, are excluded from decision-making, making

*sasi* inequitable in this sense. *Sasi* is fundamentally male-dominated and paternalistic. In most cases, the general populace does not question arrangements intended for the greater public good and enforced according to traditional law and culture.

*Sasi* has significant social impacts in terms of relatively high levels of interaction around community issues, a strong tradition of collective action, and less conflict among resource users. In relation to economic and ecological benefits, the benefits emanate from rules that restrict access and limit harvest seasons. *Lola (trochus)*, currently on Indonesia's endangered species list, could have been extinct in Maluku were it not for *sasi*. A survey of several habitats indicated that *trochus* were only found inside or close to the *sasi* area in Nolloth, where they are under local protection. None was found in non-*sasi* villages, where commercial exploitation had taken place in the past. The same finding holds for sea cucumbers.

The possible impact of *sasi* on the broader (pelagic) fisheries resource is not clear. There is a general lack of "fit" between *sasi* and the modern fishery which is geared to deep water pelagics. Fishers' perceptions of declining stocks pertain to the impact of all forms of resource management in Maluku and not specifically to *sasi*. It is unlikely that the protection of small areas of coral reef and seagrass bed under *sasi* provides an incremental and indirect benefit to the larger fishery, unless these inshore areas happen to be critical spawning or nursery habitat for pelagics. However, the ethic underlying *adat* and *sasi*, and the example of management provided by functional *sasi laut* may well have positive psychological impacts on fishers. Through their familiarity with *sasi*, fishers of all kinds are introduced to fundamental and important management concepts packaged in a culturally acceptable way.

In conclusion, *sasi* is an institution embedded in local culture and therefore not transferable as a unit to other cultural contexts. Nonetheless, it illustrates a clear example of a local resource management system that has successfully enforced local rules on gear types, access, closed areas and harvest seasons in coastal villages over several centuries. Distinct to *sasi* are an ethic of working together for the benefit of the community, attachment to a cultural

tradition, and the tendency to comply with sanctions based on religious beliefs. *Sasi* also provides an alternative to the western concept that local management must be highly participatory and democratic.

## 4.0 Thailand: Fisheries Co-management in Ban Laem Makhaam

This section draws insights from the case study conducted in Ban Laem Makhaam, Thailand by Masae et al. (1998). Ban Laem Makhaam is a coastal village on the western coast of Southern Thailand (Figure 23). It is one of the six administrative villages in Khao Mai Keaw Sub-district, Sikao District, Trang Province. The village is located on an island-like cape. Sharing the entire cape area are three other villages.

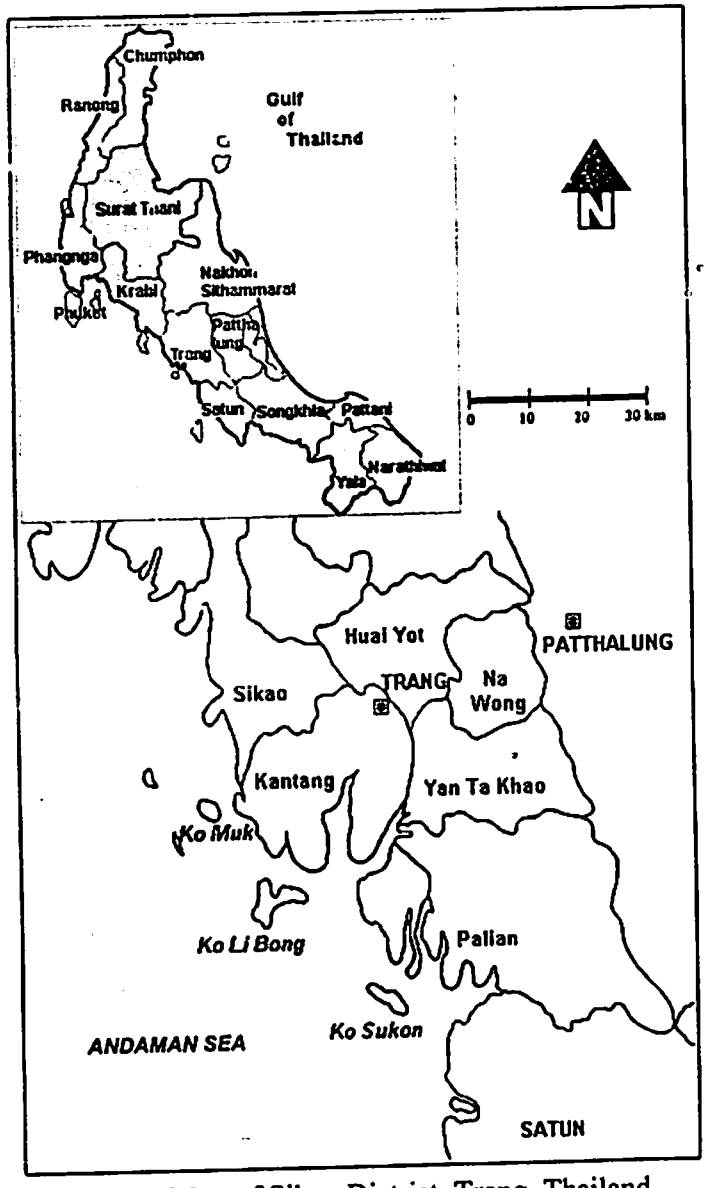



Figure 23. Map of Sikao District, Trang, Thailand.

The early settlers, who were very skillful at sailing, are believed to have arrived in Ban Laem Makhaam some 200 years ago. They came from coastal communities in Penang and Langkawi in Malaysia and Satun in Thailand. The majority of the present residents of Ban Laem Makhaam are descendants of the early settlers. The rest are either migrants who had kinship and marriage ties with the descendants or workers in charcoal factories who found employment opportunities in the village in the 1940s.

Overall, the village residents are largely homogeneous in terms of ethnicity and religion. About 97 percent of the households are Thai-speaking Muslims At present, the village has a population of 593 persons (or 118 households). Only three households are Buddhists. In terms of livelihood, the majority (or 83 %) of the households are engaged in fishing. Others derive their earnings from rubber plantations, fish trading and grocery shop operation. The existence of close kinship ties has contributed to a relatively harmonious social environment in the village.

Fishing within 3,000 meters from the shoreline is restricted to non-destructive types of fishing gear, such as gill net, fish trap, squid trap, and hook and line. The major products caught from the waters of Sikao are shrimps, prawns, squid, cuttlefish, mackerel and trashfish.

**Brief History of Resource Management at the Site**

Fish were largely caught for subsistence until the late 1960s. The entry of an outside fish dealer marked the shift to a market-oriented fishery, after the local fishers realized that they could sell their marine products to regional markets. The expansion of commercial fishing, however, brought about a tremendous change in fishing technology and marketing. Efficient fishing methods, of which some were destructive (i.e., blast fishing, push nets, trawl nets and set bag or *pong pang*) were introduced to meet the demand for fish from a growing external market. The open access nature of the fishery allowed commercial fishing boats from the outside to enter the fishing grounds and compete with local fishers, contributing to the degradation of fishery resources. Such degradation was also closely linked to the exploitation of mangrove forests for charcoal production that began in the early 1940s. Although mangrove cutting for charcoal production was done under concessions, the concessionaires did not really adhere to the rule to replant mangrove trees on a rotation basis.

When the problem of resource degradation worsened in the 1980s, some fishers started to be concerned with their livelihood. They began to reflect on the causes of degradation and the ecological interaction between fishery and other resources, especially mangrove, coral reef and sea grass. Informal group discussions began in 1982.

**Changes in Resource Management: Major Initiatives**

Fisheries co-management in Ban Laem Makhaam emerged from a search for solutions to resource degradation in the village. There was no specific project for implementing co-management arrangements in the beginning. The starting point for the active involvement of village residents in fisheries management was the entry in 1985 of Yadfon Association (YFA), a local non-governmental organization. A group of development activists with a strong participatory orientation in rural development began to work in a few coastal villages in Sikao District, where poverty incidence was relatively high. YFA sought to improve living standards in coastal villages and promote self-reliance. Initially, it sent volunteers to live in the

village to obtain an in-depth understanding of village problems.

The close interaction between the field workers of YFA and the village leaders led to the realization that fisheries and coastal resources needed more attention. There was a close link between coastal resource conditions and other aspects of village life, including power relations and socioeconomic problems. In 1986, YFA introduced sea bass and grouper cage farming and raised people's awareness of destructive fishing. It established a strong partnership with influential village members, such as the village headman and his assistants, the main Islam religious leader (*imam*), and some active fishers. It also encouraged the village fishers to organize themselves. After several informal discussions and dialogues, an agreement was reached to ban all destructive fishing methods. The influential village members took it upon themselves to encourage compliance with the agreement.

From 1987 to 1988, conflicts on resource uses occurred at two levels: among village residents and between residents and outsiders. YFA used these situations to motivate the local leaders to be more active in protecting community rights and to raise the environmental awareness of village residents. An exchange of ideas took place among interest groups, supplemented by studies of academic institutions on the dangers of resource devastation. In 1989, the village and the YFA decided to pursue mangrove rehabilitation, followed closely by a ban on destructive fishing within 3,000 meters from the shoreline. On the opening day of the Community Mangrove Rehabilitation Project, several high ranking government officials, local academics and journalists were invited. In the process, work on coastal resources management in the community gained due recognition. Active campaigns took place to support mangrove rehabilitation, as well as to stop destructive fishing. YFA staff served as catalysts, facilitators and advisors to local leaders.

Historically, the policy-making and public administration systems of Thailand are highly centralized. Local initiative for resource management in Ban Laem Makhaam was initially NGO-driven, enhanced by the presence of external change agents and academics who are interested in promoting sustainable resource management. Government support came later, upon the request of the local fishers and the YFA. The YFA has been influential in creating local awareness of the coastal ecosystem and empowering village residents to protect their resources and their livelihood. Beyond the village level, it has been instrumental in developing a network of small-scale fishers and in bringing together the government and the fishers to address collective concerns.

Support from the Department of Fisheries (DOF) came in the form of allocation of related development projects, protection of the fishing rights of small fishers, and enforcement of laws and regulations. The DOF approved the ban on all destructive fishing methods within 3,000 meters from the shoreline, providing livelihood protection for small fishers. The government also pursued more widespread law enforcement activities that helped reduce illegal fishing practices, not only within the village but also in neighboring villages. This was in response to the request of the village leaders and the YFA to ban destructive fishing methods in all nearby villages.

**Incentives to Cooperate**

The decision of the resource users and other stakeholders to cooperate was largely an offshoot of an awakening process at the village level that made the residents aware of the consequences of resource devastation on their income and livelihood. Being dependent on the fishery, the resource stakeholders felt that they have to ban destructive fishing methods, which accounted for most of the

resource degradation. They had to act collectively to fight fishers from other areas who deployed illegal and destructive fishing gear in their coastal waters. Support from external organizations, which provided technical, legal and financial support, also reinforced the incentives to cooperate, making fishers feel that they are not alone in their fight for sustainable resource management.

**Outcomes of Co-management**

Ban Laem Makhaam represents a case of harmonious co-management arrangements in a setting that is characterized by ethnic and religious homogeneity. A survey of pre-project and post-project perceptions affirms that village fishers perceived improvements in the resolution of resource use conflicts. The fishers, likewise, perceived positive changes in sustainability indicators, such as abundance of fishery resources, knowledge of fisheries, information exchange on fisheries management, and rule compliance. These changes may be regarded as a direct result of the shift to non-destructive fishing practices after the establishment of co-management arrangements.

Fishers have observed that shrimps, crabs and other marine species increased within two years of enforcing the ban on destructive fishing methods. They have attested to an improvement in their catch per fishing trip, as well as to the introduction of more development projects in the village after co-management arrangements were established. Government officials quickly saw the capacity of the village residents for working together with other organizations, both government and non-government.

The fishers, moreover, perceived behavioral gains, particularly in terms of participation and influence in a number of vital areas (i.e., mangrove management, fisheries management, and general community affairs), manifesting the extent to which they have become involved as partners in development. The experience of Ban Laem Makhaam provides an inspiration to resource users, government and other stakeholders in their quest for viable and practical solutions to pressing resource management problems and in their effort to make co-management work.

**5.0 Vietnam**

This section is based on the case study done in Can Gio, Vietnam by Pham and Phung (1999). Can Gio is the only coastal district in Ho Chi Minh City, located some 65 kilometers from the city center (Figure 24). Its coastline spans a length of 14 kilometers. Can Gio is bounded by the Nha Be district to the north and by the East Sea to the south. Found at its eastern border is the Tan Thanh district and at its western border, Can Giouc and Go Cong districts.

Can Gio has an area of 71,361 hectares, accounting for 1/3 of Ho Chi Minh City's total land area. It contains a forested land area of 39,355 hectares, which comprises about 95 percent of the city's overall forest area. Most of this forest is classified as mangrove forest (26,909 hectares). The mangrove forest is a source of firewood and housing materials. It is also valuable for brackish fisheries and aquaculture.

In 1995, Can Gio had a population of 54,846 persons. Most households derive their income from mangroves (32%), employment in the service sector (20%), fishing (18%), trading (14%) and farming (10%). The rest (6%) earn their income from government employment. Most households have secondary income sources to cope with crop failure and other calamities. Supplemental

income comes from salt-making, sale of fruit crops, aquaculture and livestock raising, among others.

Fishing may be classified as inshore, inland and offshore. Out of the total fish production of 20,675 tons in 1996, inshore and inland fishing accounted for 50 percent and 3 percent, respectively. The balance of 47 percent came from offshore fishing. For inshore and inland fishing, the major types of fishing gear used are bottom stationary net and small gill net. For offshore fishing, trawl and gill net are used.

The residents of Can Gio are homogeneous, belonging to the Kinh ethnic group. They originally came from other provinces in Vietnam.

**Brief History of Resource Management at the Site**

Historically, Can Gio was covered with a dense mangrove forest. Before 1964, resource use was basically dictated by meeting the needs of the household, rather than by a commercial market demand. The period 1964 to 1975, however, saw the rapid exploitation of the forest for firewood and charcoal. The dramatic devastation of mangroves and other wildlife may also be attributed to a defoliant called Agent Orange that was used by the Americans during the Vietnam War.

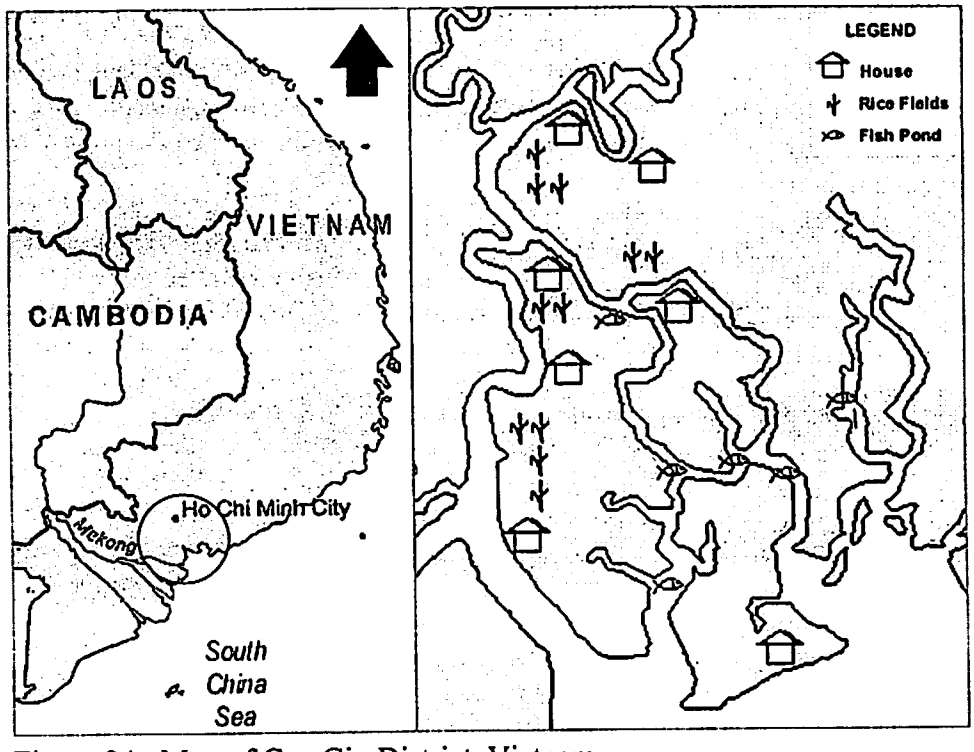



Figure 24. Map of Can Gio District, Vietnam.

After the country's reunification in 1975, the Government and the Party recognized the significance of the mangrove forest in protecting the coastal environment. From 1978 to 1990, the government of Vietnam pursued a number of forest rehabilitation programs on a large scale and issued policies to protect mangrove forests. There was a perception, however, that the activities of the local population were harmful to the forest. Consequently, all mangrove areas were allocated to 17 state forest enterprises. The government completely banned local residents from entering the mangrove forest, depriving them of resource access privileges and treating them as outsiders rather than partners in resource management. As a result, illegal logging became rampant in the 1980s. At its worst, about 10,000 hectares of mangrove forest were destroyed within a short span of two years (1988-89).

**Changes in Resource Management: Major Initiatives**

In 1989, the national government of Vietnam, the Ministry of Agriculture and Rural Development, and the People's Committee of Ho Chi Minh City decided to re-think their management strategies. This time, they wanted not only to protect the mangrove ecosystem but also to improve the socioeconomic condition of local residents.

In 1990, Tam Thon Hiep commune was chosen as a pilot site for plantation farms. The government offered land and forest to local residents, backed by 30-year contracts that stipulated the benefits, responsibilities, and penalties of the participating households. In addition, each household received five hectares for homestead, aquaculture, and salt-making uses. The households received a monthly allowance for protecting the forest. Moreover, about 5-6 forestry staff lived in the forest together with the households, giving them a better understanding of problems and solutions.

In May 1991, the government officially declared the forest of Can Gio as a protection forest. This move was partly prompted by the recognition of the forest as a buffer against the onslaught of wind and waves. From a military standpoint, it was also a means of securing and defending the area against intruders.

In the same year, the Duyen Hai Forestry Plantation Farm changed its name to the Management Board for Protected and Environmental Forest (MBEF). At present, the Board is under the supervision of the Ho Chi Minh Agricultural Service and is directly responsible for mangrove forest management.

Since 1991, the Board has carried out a land allocation program that focuses on the participation of households. It has allocated the mangrove forest area to various uses. Out of 27,000 hectares, about 11,474 hectares went to local households and 12,274 ha to forest farms. The remaining area fell under the management of the Can Gio Controller Station. This marked the beginning of community-based mangrove management in Can Gio.

The shift to community-based management of mangrove forests was enhanced by government policies that encouraged user participation in resource management, as well as by financial and technical assistance from international and local organizations. The policies were embodied in a 1991 national regulation that permitted the People's Committee to distribute mangrove areas, in Decree 100 of 1991 that allowed households to participate in production contracts, and in the Land Law of 1993 that granted households land use rights of 5-30 years. Two external organizations --

OXFAM America and Japanese Voluntary Organization -- extended assistance in the form of agricultural production loans and shrimp larva for small shrimp funds. Favoring community-based mangrove management was the provision by the Board of secure forest forest use rights to participating households. This was carried out in cooperation with Can Gio's District People's Committee and Communal People's Committee. For the mangrove forest, 30-year contracts were given to households. For fast-growing forest species, the contract holder got a 20-year duration. For slower growing perennial species, a longer period of 50 years was granted.

Contract holders are allowed to share in the proceeds from thinning and pruning activities, resulting in direct economic benefits to the holders. The holders get 65 percent of the pruned products. Others get 35 percent for their labor as well as by-products (i.e., branches and small stems), if they do not receive a monthly allowance. If the contract holder reforests the area himself, he is entitled to all the products. He can decide on the price and choose his market outlets. The rights associated with these contracts may be transferred to the heir, in case the household head dies while the contract is still in force. In case the contract holder can no longer comply with the terms of the contract, the rights may be granted to another household, provided the contractor agrees with the transfer.

Contract holders are also given the right to report illegal mangrove cutting and to turn over illegal mangrove cutters to the judge. The least severe punishment for non-compliance with the rules is a warning or a gear confiscation. For more severe offenses, imprisonment is imposed. Since the establishment of community-based resource management, no large-scale violation has been reported.

### Incentives to Cooperate

The incentives to cooperate on the part of resource users in Can Gio were largely driven by economic benefits from mangrove management. The provision of use rights and the clear delineation of obligations, moreover, have helped strengthen the enthusiasm of local households to participate in local mangrove management.

On the part of the government, the incentives lay in its concern for the environment, for internal security, and for better management methods. Vietnam emerged from the war against the United States with heavily devastated forests. Such forests have been a traditional source of income for many local residents as well as a source of fuel and housing materials. The recognition of their significance played a key role in the decision of the government to pursue large-scale reforestation programs in Can Gio.

On the part of the People's Committees, the underlying reasons to cooperate were associated with compliance with management responsibilities and promotion of an equitable sharing of benefits from mangrove products.

### Outcomes of Co-management Arrangements

The co-management strategy of Can Gio, Vietnam is a response to a widespread devastation of the mangrove forest over time that resulted from a heavy reliance on the forest for fuel requirements, use of a defoliant by the Americans during the Vietnam War, and rampant illegal mangrove cutting in reforested areas during the post-war era. The subsequent shift in government policy from state ownership of mangrove forests to community-based mangrove management paved the way for

village residents to care for their mangrove resources in the spirit of stewardship and reduce the incidence of illegal mangrove cutting.

A household survey conducted in Can Gio in 1997 affirms that respondents perceived significant improvements after the implementation of the mangrove rehabilitation program. In particular, they felt that gains were achieved in control over resource use, resolution of mangrove-related conflicts, compliance with rules, and resource access. These reflect positive perceptions of the decision on the part of the government to allow Can Gio residents to gain access to mangrove areas and to share in the responsibility for resource management. The experience shows that co-management of mangrove resources has been associated with perceptions of positive changes in rule compliance and conflict resolution. Where a sense of partnership prevails and where residents are assured of sharing in the benefits of resource management, there is a perceived willingness to follow rules and to reduce conflict-ridden situations.

Also significant are perceived increases in satisfaction with the management of the mangrove forest and in knowledge of mangroves. These are directly linked to the mangrove management training provided by the Board to the households and the active exchange of information among village residents. In addition, information campaigns were helpful in raising knowledge of mangrove ecosystems.

In conclusion, the Can Gio experience demonstrates that the introduction of community-based co-management systems must go hand in hand with capacity building, provision of legitimate use rights, and incentives to cooperate. Also important are supportive policies on resource management, existence of coordinating structures for implementing mangrove management, and provision of financial and technical support.

## 6.0 Typology of the Co-management Case Studies in Asia

This section summarizes the contextual variables found in the ten case studies to arrive at a typology. Sulawesi was excluded from the typology due to the paucity of information on contextual variables. The variables are grouped into five categories, namely, 1) physical, technical and biological characteristics; 2) market attributes; 3) socioeconomic and cultural attributes; 4) institutional and organizational arrangements; and 5) exogenous events. Tables 1 to 5 provide insights into the diverse settings under which co-management arrangements have taken place.

### 6.1 Physical, Technical and Biological Characteristics

The case studies affirm that co-management can work in diverse aquatic environments, ranging from coral reefs (Philippines and Indonesia), mangroves (Philippines, Thailand and Vietnam), lakes (Bangladesh), rivers (Indonesia) and marine fisheries (Indonesia). In almost all countries covered by the case studies, resource-related problems such as declining harvests and deteriorating habitats were experienced. Worsening resource conditions provided a compelling stimulus to re-examine resource management practices and take collective action to reduce the threat to livelihood and food supply.

The co-management sites in Asia are associated with differing geographic locations. Forty (40) percent of the sites are islands and another 40 percent are located along the bay/gulf. About 20

percent are inland sites. Common to all co-management sites is the existence of clearly defined physical boundaries in managed areas. Buoys and visible markers often serve to delineate boundaries.

The fisheries at the sites are predominantly artisanal, rather than industrial. Multiple species and multiple gear are distinct characteristics of the fisheries. The major types of fishing gear include hook and line, fish corrals, and gillnets. In some cases, purse seine, compressors, *muro-ami*, trawls, and bagnets are used. Fishers generally use small, non-motorized boats for fishing their operations. Fishing patterns tend to be dispersed, rather than localized. This partly reflects the search for better fishing grounds, given the progressive decline in fish catch in most areas covered by the case studies.

### 6.2 Market Attributes

The fisheries of the sites are primarily market-oriented. Though fish are also caught for household consumption, these are usually small fish that command relatively lower prices in the market. Highly marketable fish, such as snappers, groupers, and carp, are often caught for income rather than for subsistence.
Fish caught for income are usually sold in domestic markets. Aquarium fish, on the other hand, are primarily exported to the international market, particularly Europe and the United States.

Fishers are not entirely dependent on just a few buyers/traders. Buyers, however, tend to have more control over price determination if a credit-marketing relationship exists. Otherwise, the fishers are free to sell their fish to anyone at prevailing market prices.

Women are often engaged in important subsistence and income-generating activities that are directly linked to the use of aquatic resources, such as shellfish gleaning, selling fish to traders and consumers, and making *nipa* palm shingles. Women also process simple products, such as dried fish, smoked fish, fish paste, and other items.

### 6.3 Socioeconomic and Cultural Attributes

The Asian experience shows that homogeneity is a positive force in successful co-management arrangements. About 70 percent of the case study sites are homogeneous in terms of ethnicity, religion and fishing gear, while the rest are heterogeneous. Nonetheless, co-management is possible even among heterogeneous sites. Where heterogeneity exists, experience shows that community organizing activities, social preparation and value formation are important in fostering and sustaining collaborative efforts. Positive attitudes toward collective action also help in the pursuit of co-management arrangements.

The absence of a tradition of collective action in resource management is not a setback. Prior to the establishment of co-management regimes, 80 percent of the case study sites had no prior experience with formal resource user organizations. Collective arrangements for resource management were not in place. A heavy dependence on the fishery alongside a perceived resource crisis, however, proved to be a potent force in pushing resource users to take collective action. It provided a bond that brought resource users together to address threats to their livelihood and survival.

Indigenous knowledge of the fishery before co-management took place was relatively high for fish

capture, but low on the biological aspects of the fishery. Consequently, training on stock management, sustainable coastal ecosystems and non-destructive practices became an imperative activity at co-management sites. Complementing this were information campaigns, capacity building for sustainable resource management, and information exchange.

### 6.4 Institutional and Organizational Arrangements

In 70 percent of the case studies, the primary initiative for co-management was NGO-driven. This is true of the Philippines, Bangladesh and Thailand. It took external agents to raise a common awareness of resource problems and challenge resource users and stakeholders to collectively embark on appropriate action. Government-driven initiatives are fewer, accounting for 20 percent of the cases (i.e., Bali, Indonesia and Can Gio, Vietnam). Only one case was tradition-driven (i.e., *sasi* in Maluku, Indonesia), where century-old practices have continued to influence resource management arrangements.

At NGO-driven co-management sites, the NGOs were responsible for working with the resource users on a day-to-day basis. They have been instrumental in raising environmental consciousness, developing local leaders, building up collective capacity for resource management, and facilitating access to resources and other important services. They have also played a key role in motivating resource users to push for more equitable and sustainable management practices.

At government-driven co-management sites, the government has been in the forefront of issuing enabling policies, protecting use rights, providing funds for implementing actual programs and projects at the site, and extending technical assistance in relation to the adoption of new technologies. It has also been active in enforcing laws on resource use and management in cooperation with the community of resource users. The NGO, on the other hand, has practically no role based on the documented cases.

In terms of management modes, the role of the government at the case study sites may be regarded as cooperative, advisory, consultative or informative. It is cooperative where the resource users and government are active partners in decision-making and implementation of resource management interventions (i.e., Philippines and Bangladesh). It is advisory in cases where resource users advise government of decisions to be taken and ask for formal endorsement of these decisions from the government in order to obtain legitimacy for resource management actions (Maluku, Indonesia; Orion in Bataan, Philippines; and Bhan Laem Makhaam, Thailand). It is consultative where mechanisms exist for the government to consult with resource users, but decision-making rests primarily with the government (i.e., Can Gio,Vietnam and Bali, Indonesia). At the tradition-driven site of Maluku, Indonesia, the role of the government may be regarded as informative. Under the informative mode, user groups have the authority to make decisions. They merely inform government of these decisions. Often, they are more powerful than the formal village government in terms of resource management decisions.

Of the various countries covered by the case studies, the Philippines has the most extensive experience with co-management and community-based management of coastal resources. It also has strong laws supporting devolution and co-management. The new Thailand constitution and national development plan explicitly support community-based management initiatives. The Master Plan for Fisheries Development to the Year 2010 in Vietnam and the policies of the Ministry of Fisheries

encourage local user rights and participatory approaches to resource management. In Bangladesh, the government and non-governmental organizations are jointly promoting sustainable use of lakes through the active participation of resource users in management. In Indonesia, the national development plan endorses more active involvement of fishers in economic development. In addition, there is increasing support by local governments and NGOs to revitalize traditional resource management systems through co-management arrangements.

The primary stimuli for collective arrangements at the case study sites were socioeconomic and biological forces. To date, co-management arrangements have existed for several years. Among the 10 case study sites, six sites have had 6-10 years of co-management. Two sites have more than 10 years of co-management, while the other two sites have 1-5 years.

A common denominator of all co-management sites is the existence of property rights and rules. These define resource access, resource uses and harvesting (withdrawal) methods. In all case studies, the rights of access, withdrawal, management and exclusion are present. Normally, access to the waters comes with a license from the government (Philippines, Bangladesh, and Thailand) or church authorities (Maluku, Indonesia). Resource user associations that oversee marine reserves, guard marine sanctuaries, install artificial reefs and care for mangrove areas often exercise exclusion and management rights. In these areas, some groups are deliberately kept out and are not allowed to extract resources. At case study sites where mangrove rehabilitation has been pursued, transfer rights allow the steward/contract holder to pass on his privileges and responsibilities to his heir.

Co-management usually involves arrangements for monitoring and enforcement of fishery-related rules and the imposition of penalties for rule infractions to enforce compliance among resource users. At all co-management sites, rules exist on where, when and how to harvest fish, on characteristics of the fish to be harvested, punishment for non-rule compliance, procedures in decision-making, and settlement of disputes, among others.

Across co-management sites, the legitimacy of local leadership is a shared attribute. This legitimacy comes either with election by constituents or with tradition, where lineage is honored. In Indonesia, culture and tradition are closely linked to legitimacy of leadership at the village level. In other countries, a formal election to positions of authority confers legitimacy to the new leadership.

In certain cases, however, the empowerment of new leaders undermined the influence of traditional leaders who were used to making decisions for the fishers in the past and who enjoyed most of the returns from the fishery. This holds true for Bangladesh. Tension and internal conflicts within the user organization resulted from the emergence of new leaders, requiring the intervention of third parties to diffuse the conflict and prevent the disintegration of the group.

### 6.5 Exogenous Events

Various exogenous events have taken place at the co-management sites, both negative and positive. Negative events are linked to the occurrence of natural calamities (i.e., floods, typhoons and diseases) that adversely affected the returns from the fishery. Other negative events are the integration of the village economy into external markets, which accelerated resource exploitation, and in-migration of people who brought in destructive methods, which led to resource degradation.

Positive events include the introduction of new policies by the government, arrival of external change agents, and pursuit of new projects to improve socioeconomic conditions and to avert resource degradation. These have triggered a chain of events that dramatically altered resource management practices at the sites and paved the way for the establishment of co-management arrangements.

## 7.0 Synthesis

The Asian case studies affirm that there is no single blueprint for co-management. They portray the operation of various partnership arrangements and degrees of power sharing. Thus, co-management may be viewed as a flexible management strategy where the level of responsibility and authority in resource management varies.

Co-management in the Asian context initially reflects a search for better management methods, largely shaped by the dynamic interaction among contextual variables. It ushered in new management processes and arrangements in support of the objectives of sustainability, equity and efficiency.

Co-management is not static. Partnerships are redefined at various times in the co-management process. It adjusts to changing conditions over time and addresses aspects of democratization, social empowerment, and power sharing. The process, in some instances, may disturb the *status quo*. It may upset existing arrangements or undermine the influence of traditional leaders, as in the case of Bangladesh. It requires conflict management, given multiple stakeholders and multiple interests.

The case studies show that co-management can work in diverse aquatic environments. Dependence on the resource, threats to livelihood and survival and the desire to improve socioeconomic conditions are strong motivating factors in the decision of resource users, stakeholders and government to collaborate. The existence of homogeneous groups and a prior tradition of collective action are desirable in co-management regimes. They foster harmony and consensus building. However, their absence is not a deterrent to the establishment of co-management arrangements, as the case studies show.

With co-management, new paths were charted in resource management. This was evident in the introduction of new and non-destructive technologies, delineation of boundaries of areas to be managed, enforcement of property rights and rules, capacity building, development of new local leaders, and availability of mechanisms for resolving conflicts, among others. Supportive policies, enabling legislation and law enforcement, moreover, provided legitimacy to co-management arrangements.

In terms of outcomes, positive changes are associated with co-management regimes in various Asian countries. Perceived changes before and after co-management generally indicate significant improvements in equity indicators such as participation in resource management, access to resources, resource control, benefits from the managed area, and overall well-being of the household. Gains were also perceived in efficiency indicators such as conflict resolution and ease in collective decision-making. Moreover, perceptions of positive changes were linked to sustainability indicators, which include overall well-being of resources, rule compliance, information exchange, and knowledge of resource management. Resource users perceived that significant

changes have taken place after co-management arrangements were established.

In conclusion, co-management in the context of the Asian experience represents a joint effort to rehabilitate aquatic resources, reverse destructive practices, and provide equitable resource access. It is a concrete response to deteriorating resource conditions that accompanied open access to aquatic resources. It is also a demonstration that partnerships between the government and the community of resource users can succeed in diverse environments. Co-management, in some cases, is an attempt to grant resource users and stakeholders a voice in planning and decision-making as well as to equip them for their role as responsible resource managers. Thus, resource management has ceased to be a concern of the government only or of the resource users only. It is a collective responsibility that demands the commitment and valuable support of various stakeholders.

**Table 23. TYPOLOGY OF THE CASE STUDIES: PHYSICAL, TECHNICAL AND BIOLOGICAL CHARACTERISTICS**

| Characteristics | Philippines | Bangladesh | Indonesia | Vietnam | Thailand | Total |
|---|---|---|---|---|---|---|
| *Classification of aquatic resource system* | | | | | | |
| • Coral reef | XX | | X | | | 3 |
| • Marine | X | | X | | | 2 |
| • Mangrove | X | | | X | X | 3 |
| • Lake/river | | XX | X | | | 3 |
| *Type of species* | | | | | | |
| • Multi-species | XXXX | XX | XX | X | X | 10 |
| • Single species | | | | | | |
| *Type of fishery resources* | | | | | | |
| • Sedentary fishery | | XX | | | | 2 |
| • Migratory fishery | X | | | | | 1 |
| • Both sedentary and migratory | XXX | | XX | X | X | 7 |
| *Site location* | | | | | | |
| • Island | XX | | XX | | | 4 |
| • Along the bay/gulf | XX | | | X | X | 4 |
| • Inland | | XX | | | | 2 |
| *Level of stock exploitation* | | | | | | |
| • Declining harvest | XXXX | XX | XX | X | X | 10 |
| • Stable harvest | | | | | | |
| *Status of habitat before co-management* | | | | | | |
| • Deteriorating | XXXX | XX | X | X | X | 9 |
| • Healthy | | | | | | |
| *Type of gear* | | | | | | |
| • Multiple gear fishery | XXXX | XX | XX | X | X | 10 |
| • Single gear fishery | | | | | | |
| *Classification of fishery* | | | | | | |
| • Artisanal | XXX | XX | XX | | X | 8 |
| • Industrial fishery | | | | | | |

| Characteristics | Philippines | Bangladesh | Indonesia | Vietnam | Thailand | Total |
|---|---|---|---|---|---|---|
| • Combination of artisanal and indiustrial | X | | | X | | 2 |
| *Boundaries* | | — | | | | |
| • Clearly defined | XXXX | XX | XX | X | X | 10 |
| • Unclear | | | | | | |
| *Main Types of Fishing Gear* | | | | | | |
| • Traditional (hook and line, fish pots ,fish corrals.) | XX | | XX | X | X | 6 |
| • Others (bagnet, seine, trawl, *muro-ami*, etc.) | XXX | XX | XX | X | X | 9 |
| *Fishing patterns* | | | | | | |
| • Dispersed | XXX | | XX | X | X | 7 |
| • Localised | X | XX | X | | | 4 |

NOTE: one x = one site or area.

**Table 24. TYPOLOGY OF THE CASE STUDIES: MARKET ATTRIBUTES**

| Characteristics | Philippines | Bangladesh | Indonesia | Vietnam | Thailand | Total |
|---|---|---|---|---|---|---|
| *Orientation* | | | | | | |
| • Subsistence | | | _X | | | 1 |
| • Market-oriented | XXXX | XX | XX | X | X | 10 |
| *Market destination of fishery products* | | | | | | |
| • Domestic | XXX | XX | _X | X 1/ | X | 8 |
| • International | | | | | | |
| • Both domestic and international | X | | X_ | | | 2 |
| *Power relation between buyers and sellers* | | | | | | |
| • Buyers have more control over price determination | XXXX | | | | | 4 |
| • Fishers have more control over price determination | | XX | XX | X | X | 6 |
| *Role of women* | | | | | | |
| • Active | XXX | XX | _X | X | | 7 |
| • Not active | | | | | | No data |

NOTE: one x = one site or area.
1/ for fresh fish only.

**Table 25. TYPOLOGY OF THE CASE STUDIES: SOCIOECONOMIC AND CULTURAL ATTRIBUTES**

| Characteristics | Philippines | Bangladesh | Indonesia | Vietnam | Thailand | Total |
|---|---|---|---|---|---|---|
| *Degree of homogeneity* | | | | | | |
| • Homogeneous | XXX | X | _X | X | X | 7 |
| • Heterogeneous | X | X | X_ | | | 3 |
| *Tradition of collective action in resource management* | | | | | | |
| • Absent | XXXX | X | X_ | X | X | 8 |
| • Present | | X | _X | | | 2 |
| *Dependence on the fishery for livelihood* | | | | | | |
| • High (60% and above) | XXX | X | XX | | X | 7 |
| • Medium (30-59%) | X | X | | | | 2 |
| • Low (below 30%) | | | | X | | 1 |
| *Ownership of fishing gear* | | | | | | |
| • Primarily owned | XXXX | XX | XX | X | X | 10 |
| • Rented/borrowed | | | | | | |
| *Motivation of fishers* | | | | | | |
| • Subsistence | | | XX | | | 2 |
| • Commercial | XXX | XX | | X | X | 7 |
| *Attitude toward collective action* | | | | | | |
| • Positive | XXXX | XX | _X | X | X | 9 |
| • Negative | | | | | | |
| • Neutral | | | | | | |
| *Attitude toward the sharing of responsibility for resource management between the government and the village* | | | | | | |
| • Favorable | XXXX | -- | _X | X | X | 7 |
| • Unfavorable | | – | | | | |
| • Neutral | | -- | | | | |
| *Knowledge of fisheries management prior to co-management* | | | | | | |
| • High | | | _X | | | 1 |
| • Medium | | X | | | | 1 |
| • Low | XXXX | X | | X | X | 7 |

**Table 26. TYPOLOGY OF THE CASE STUDIES: INSTITUTIONAL AND ORGANIZATIONAL ARRANGEMENTS**

| Characteristics | Philippines | Bangladesh | Indonesia | Vietnam | Thailand | Total |
|---|---|---|---|---|---|---|
| *Main initiative for collective action* | | | | | | |
| • NGO-driven | XXXX | XX | | | X | 7 |
| • Government-driven | | | X | X | | 2 |
| • Donor-driven | | | | | | |
| • Village-driven | | | | | | |
| • Tradition-driven | | | X | | | 1 |
| *Primary stimulus for co- management* | | | | | | |
| • Socioeconomic | XXX | XX | X | X | X | 8 |
| • Biological | X | | X | X | | 3 |
| • Cultural | | | | | | |
| • Political | | | | | | |
| *Duration of co-management arrangements* | | | | | | |
| • 1-5 years | X | X | | | | 2 |
| • 6-10 years | XXX | X | X | X | | 6 |
| • More than 10 years | | | X | | X | 2 |
| *Primary role of government 1* | | | | | | |
| • Instructive | | | | | | |
| • Consultative | | | X | X | | 2 |
| • Advisory | X | | X | | X | 3 |

1 **Instructive:** there is minimal information exchange between the government and the resource users. The mechanisms exist for dialogue with users, but the process itself tends to be government informing users on the decisions they plan to make.

**Consultative:** mechanisms exist for government to consult with users but government makes all decisions.

**Advisory:** mechanisms exist for government to interact with resource users. Users advise government of decisions to be taken and government endorses these decisions.

**Cooperative/active partner:** the government and the resource users/stakeholders are partners in decision-making and actual implementation of resource management interventions/initiatives.

**Informative/delegated:** government has delegated authority to make decisions to user groups who are responsible for informing government of these decisions.

Note: These categories were largely adopted from S. Sverdrup-Jensen and Jesper Nielsen (1997).

| Characteristics | Philippines | Bangladesh | Indonesia | Vietnam | Thailand | Total |
|---|---|---|---|---|---|---|
| • Cooperative/active partner | XXX | XX | | | | 5 |
| • Informative | | | _X | | | 1 |
| *Leadership/power structure of user groups* | | | | | | |
| • Formal/legitimate | XXXX | XX | XX | X | X | 10 |
| • Informal | | | | | | |
| *Existence of property rights* | | | | | | |
| • Access rights | XXXX | XX | XX | X | X | 10 |
| • Withdrawal rights | XXXX | XX | XX | X | X | 10 |
| • Management | XXXX | XX | XX | X | X | 10 |
| • Exclusion | XXXX | XX | XX | X | X | 10 |
| • Transfer | _X_X | __ | _X | X | _ | 4 |
| *Decision-making process* | | | | | | |
| • Democratic/participatory | XXXX | XX | XX | | X | 9 |
| • Autocratic | | | X | X | | 2 |
| *Existence of rules on fisheries management* | | | | | | |
| • Operational rules | XXXX | XX | XX | X | X | 10 |
| • Collective choice rules | XXXX | XX | XX | X | X | 10 |
| • Constitutional rules | XXXX | XX | XX | X | X | 10 |
| *Rule enforcement* | | | | | | |
| • Existence of enforcement arrangements | XXXX | XX | XX | X | X | 10 |
| • Absence of enforcement arrangements | | | | | | |
| *Level of representation of user groups in the decision-making process* | | | | | | |
| • Village level | XXX | XX | XX | X | X | 9 |
| • Municipal level | X | | | | | 1 |
| • Provincial level | | | | | | |
| • National level | | | | | | |
| | | | | | | |

NOTE: one x = one site or area.

Table 27. TYPOLOGY OF THE CASE STUDIES: EXOGENOUS EVENTS

| Characteristics | Philippines | Bangladesh | Indonesia | Vietnam | Thailand | Total |
|---|---|---|---|---|---|---|
| *Natural calamities* | | | | | | |
| • Flood | | XX | | | | 2 |
| • Typhoon | | | X | X | | 2 |
| • Disease (i.e., Epizootic Ulcerative Syndrome, red tide, insect infestation of mangrove,etc.) | X | X | | X | | 3 |
| *Arrival of external change agents* | XXXX | XX | XX | | X | 9 |
| *Introduction of new projects* | XXXX | XX | XX | X | X | 10 |
| *Introduction of new fishery-related policies* | XXX | XX | XX | X | | 8 |
| *Introduction of mangrove-related policies* | | | | X | | 1 |
| *Integration of the village economy into external markets* | XX | | XX | | | 4 |
| *Introduction of new technologies* | XXXX | | X | X | | 6 |
| *In-migration* | X | X | | X | | 3 |
| *Arrival of commercial mangrove cutters and commercial fishers from other areas* | X | | | X | | 2 |
| | | | | | | |
| | | | | | | |
| | | | | | | |

NOTE: one x = one site or area.

## References

Baticados, D. and R. Agbayani. 1998. Case study of institutional arrangements in the fisheries co-management of Malalison, Island, Central Philippines, 1-94. Southeast Asian Fisheries Development Center (SEAFDEC). Working Paper No. 34 of the Fisheries Co-management Research Project. Manila: International Center for Living Aquatic Resources Management (ICLARM).

International Center for Living Aquatic Resources Management (ICLARM) and Institute of Fisheries Management (IFM). 1996. Analysis of fisheries co-management arrangements: a research framework, 1-28. Working Paper No. 1 of the Fisheries Co-management Research Project. Manila: ICLARM.

Katon, B., R. Pomeroy, and A. Salamanca. 1997. The marine conservation project for San Salvador: a case study of fisheries co-management in the Philippines, 1-95. Working Paper No. 23 of the Fisheries Co-management Research Project. Manila: ICLARM.

Katon, B., R. Pomeroy, M. Ring and L. Garces. 1998. Mangrove rehabilitation and coastal resource management of Mabini-Candijay: a case study of fisheries co-management arrangements in Cogtong Bay, Philippines, 1-149. Working Paper No. 33 of the Fisheries Co-management Research Project. Manila: ICLARM.

Khan, M.S. and N.A. Apu. 1998. Fisheries co-management in the Oxbow lakes of Bangladesh, 1-61. Chittagong University. Working Paper No. 35 of the Fisheries Co-management Research Project. Manila: ICLARM.

Masae, A., A. Nissapa and S. Boromtanarat. 1998. An analysis of fisheries co-management arrangements: the case of Ban Laem Makham, Sikao District, Trang Province, South Thailand. 1-70. Prince of Songkia University. Working Paper No. 37 of the Fisheries Co-management Research Project. Manila: ICLARM.

Nikijiluw, V. 1996. Co-management of coastal resources in Bali Island, Indonesia, 1-18. Research Institute for Marine Fisheries. Working Paper No. 7 of the Fisheries Co-management Research Project. Manila: ICLARM.

Nikijuluw, V. 1998. Identification of indigenous coastal fisheries management system in Sulawesi, Maluku and Irian Jaya. *Pesisir and Lautan*: 1 (2): 1-14.

Novaczek, I. and I. Harkes. 1998. Institutional analysis of *sasi* in Central Maluku, Indonesia. Working Paper No. 39 of the Fisheries Co-management Research Project. Manila: ICLARM.

Pham, V. and H.G. Phung. 1999. Case Study of community-based coastal resource management in Vietnam, 1-74. Institute of Fisheries Economics and Planning, Vietnam. Working Paper of the Fisheries Co-management Research Project. Manila: ICLARM.

Thompson, P.M., S.M.N. Alam, M. Hossain and A.B. Shelly.1998. Community-based management of Hamil Beel: a case study of fisheries co-management in Bangladesh, 1-55. Working Paper No. 36 of the Fisheries Co-management Research Project. Manila: ICLARM.

Van Mulekom, L. and E. Tria. 1999. Community-based coastal resource management in Orion, Bataan, Philippines: a case study on the development of a municipal-wide community-based fisheries co-management system, 1-93. Working Paper No. 38 of the Fisheries Co-management Research Project. Manila: ICLARM.

# Chapter Ten
# Key Conditions and Principles for Successful Fisheries Co-management

As stated in Chapter One of this report, the overall purpose of the project is to determine the prospects for successful implementation of fisheries co-management strategies. The project will systematically and comparatively document and assess models and processes of co-management at national government and community levels and their results and impacts. General principles and conditions which facilitate successful implementation of fisheries co-management will be identified.

It is the last sentence of the paragraph above which is the subject of this chapter. The purpose of this chapter is to present results of the research; specifically, key principles and conditions which facilitate the successful implementation of co-management as identified through the project's research activities in Asia. These research results represent just one set of results from the various activities of the project. The chapter will begin with a discussion of the strategy and data sources used in the research. As a foundation for the research, the project utilized key conditions for successful common pool resources institutions as identified by Ostrom (1990, 1992). These will be revisited in the second section and assessed in light of their applicability for fisheries co-management in Asia. New conditions and principles identified through the research will be discussed in section three.

## RESEARCH STRATEGY AND DATA SOURCES

Data for this chapter comes from research undertaken by ICLARM staff and NARS partners in the Philippines, Vietnam, Thailand, Malaysia, Indonesia, and Bangladesh over the last five years. Over twenty-five individual research projects and activities have been undertaken during the life of the project. These research projects include: (1) reviews of community-based coastal resource management and co-management experiences in Vietnam (Thong et al 1997 and Thong and Thieu 1998); Philippines (Carlos and Pomeroy 1996), Indonesia (Nikijuluw 1996), and Thailand (Tokrisna et al 1997); (2) case study analysis in Bangladesh (Khan and Apu 1998 and Thompson et al 1998), Thailand (Masae, et al 1998), Indonesia (Nikijuluw 1996 and Harkes et al 1998), Vietnam (Van and Hai 1998), and Philippines (Pomeroy and Pido 1995, Katon et al 1997, Katon et al 1998, Agbayani et al 1998, and van Mulekon 1998); (3) impact evaluation of co-management arrangements (Pomeroy et al 1997); (4) hypothesis testing of advantages or benefits of co-management (Kuperan et al 1996, Kuperan et al 1998, Novaczek and Harkes 1998); (5) government legal, institutional and policy analysis (University of the Philippines 1996, Fellizar et al 1997, and Torell et al 1998); and (6) meetings and workshops (Foltz et al 1996 and Pido et al 1996). This paper is a synthesis of some of the findings from this body of research. In addition to the above research projects, selected secondary publications were used as references.

## REVISITING ELINOR OSTROM'S KEY CONDITIONS

As mentioned above, this project made use of key conditions for successful common pool resource institutions developed by Elinor Ostrom (1990, 1992) as working hypotheses for the research. The analysis of co-management falls in the area of common property theory (Pomeroy and Berkes 1997). These 11 key

conditions, described in Pomeroy and Williams (1994) and presented in Chapter Two, served as the starting point for analyzing the emergence and institutional sustainability of co-management arrangements. Each of these conditions will now be reexamined based on the knowledge and experience gained from this research project in Asia. The importance of each condition to the successful implementation of fisheries co-management will be scored based on a scale of high, medium and low. (Note that the score for each condition will be presented in parentheses after the condition title.) A score of high indicates that the condition was identified as being critically important for success in more than fifteen of the research reports and workshop or meeting papers of the project. A score of medium indicates that the condition was found to be important for success in eight to fifteen of the research reports and workshop or meeting papers. A score of low indicates that the condition was identified as being of low importance for success in less than eight research reports and workshop or meeting papers of the project.

1. Clearly defined boundaries. (High) The social, physical and biological boundaries of the area to be managed should be distinct so that the fishers can have accurate knowledge of them. The boundaries should be based on an ecosystem that fishers can easily observe and understand. It should also be of a size that allows for management with available technology. The research found that boundaries were of high importance to successful implementation of co-management. In Bangladesh, the Oxbow Lakes were of a size that could be easily managed and monitored by the fishers (Khan and Apu 1998). In San Salvador Island and Malalison Island, Philippines, the marine sanctuary had boundaries identified with buoys to inform outsiders of its existence and to allow fisher organization members to more easily monitor the area (Katon, Pomeroy and Salamanca 1997; Baticados and Agbayani 1998).

2. Membership is clearly defined. (High) The individual fishers or households with rights to fish in the bounded fishing area and participate in area management should be clearly defined. The numbers of fishers or households should not be too large so as to restrict effective communication and decisionmaking. The research found that clearly defined membership was of high importance to successful implementation of co-management. In Bangladesh, membership in the lake fisheries teams of the Oxbow Lakes was clearly defined to include those fishers living around the lake (Khan and Apu 1998).

3. Group cohesion. (High) The fisher group or organization permanently resides near the area to be managed. There is a high degree of homogeneity, in terms of kinship, ethnicity, religion or fishing gear type, among the group. The research found that group cohesion, especially in terms of group homogeneity, was of high importance to successful implementation of co-management. There were many communities in Vietnam, Thailand, Indonesia and the Philippines where successful co-management was dependent on the high level of socioeconomic and cultural homogeneity of the community. This does not mean, however, that co-management projects cannot succeed in socioeconomically and culturally heterogeneous communities (Pomeroy et al. 1996). In the Oxbow Lakes of Bangladesh, Muslim and Hindu fishers were able to work together on the lake fisheries teams (Khan and Apu 1998). In the village of San Salvador in Zambales, Philippines, successful co-management occurred despite marked differences in ethnicity and fishing gear (Katon et al. 1997).

4. Existing organization. (Low) The fishers have some prior experience with traditional community-based systems and with organizations, where they are representative of all resource users and stakeholders

interested in fisheries management. The research found that this condition was of medium importance to successful implementation of co-management. While it was useful for fishers to have had some prior experience with traditional resource management systems and with organizing for collective action, it was not necessary for success. There were many cases in the Philippines, Thailand and Bangladesh where co-management was successful despite the fact that fishers had no previous experience with organizing or collective action (Nikijuluw 1996; Katon et al. 1997; Katon et al. 1998; Baticados and Agbayani 1998; Masae 1998; Khan and Apu 1998; van Pham and Phung 1999).

5. Benefits exceed costs. (High) Individuals have an expectation that the benefits to be derived from participation in and compliance with community-based management will exceed the costs of investments in such activities. This condition was found to be of high importance for success of co-management. In the Philippines, NGOs spend a great deal of time in "social preparation"; that is, educating the fishers about the benefits and costs of co-management and the economic implications of choosing among different management and development strategies (Foltz, Pomeroy and Barber 1996; van Mulekom 1998). People may take responsibility for resource management only if it is clear that they will benefit and that they can be effective in their role as managers.

6. Participation by those affected. (High) Most individuals affected by the management arrangements are included in the group that makes and can change the arrangements. Decisions about management arrangements are made by the same people that collect information on the fisheries. This condition was found to be of high importance for the successful implementation of co-management. In the Oxbow Lakes of Bangladesh, the lakes fisheries teams allowed all members to have equal voting rights in making management decisions (Khan and Apu 1998). In San Salvador Island and Malalison Island, Philippines, all members of the fisher organization were involved in making and changing the rules (Katon et al. 1997; Baticados and Agbayani 1998).

7. Management rules enforced. (High) The management rules are simple. Monitoring and enforcement are effected and shared by all fishers. The research found that enforcement of management rules was of high importance for success of co-management. In San Salvador Island, Philippines, the fishers shared responsibility for guarding the marine sanctuary which led to high levels of enforcement of rules (Katon et al. 1997).

8. Legal rights to organize. (Medium) The fisher group or organization has the legal right to organize and make arrangements related to its needs. There is enabling legislation from the government defining and clarifying local responsibility and authority. This condition was found to be of medium importance for successful implementation of co-management. In the Philippines, for example, NGOs assisted in organizing fishers to take responsibility for resource management before there was any formal legislation from the government. The responsibility and authority of local fisher organizations for resource management in the Philippines has now been formally clarified under the Local Government Code of 1991 and the Fisheries Code of 1998. In Thailand a similar situation exists in that fishers have been organized for co-management without any legal right from the government. The new Thailand constitution supports the right for fishers to organize. In both cases while no legal right to organize exists, the government does not stop fishers from organizing.

9. Cooperation and leadership at community level. (High) There is an incentive and willingness on the part of fishers to actively participate, with time, effort and money, in fisheries management. There is an individual or core group who takes responsibility for the management process. The research found that this condition was of high importance for successful implementation of co-management. In the Philippines, a research project evaluating the impacts of community-based management projects concluded that communities where fishers had positive levels of cultural values and attitudes toward collective action were consistently related to perceptions of positive change and were more successful (Pomeroy et al. 1996). In all cases examined it was found that strong local leadership was critical for success.

10.Decentralization and delegation of authority. (Medium) The government has established formal policy and/or laws for decentralization of administrative functions and delegation of management responsibility and/or authority to local government and local group organization levels. This condition was found to be of medium and low importance for successful implementation of co-management. Throughout the Asian region, co-management has been successfully implemented without the formal policy support of government. Only recently have governments, the Philippines and Thailand being notable cases, developed and implemented policies for decentralization and delegation of authority to local fishers organizations for resource management. It should be noted that the existence of formal policies and laws for decentralization does increase the chances of success for co-management (Katon et al. 1997; Katon et. al 1998; Baticados and Agbayani 1998). (See Chapter Three and Four for more discussion.)

11. Coordination between government and community. (Low) A coordinating body is established, external to the local group or organization and with representation from the fisher group or organization and government, to monitor the local management arrangements, resolve conflicts and reinforce local rule enforcement. This condition was found to be of medium and low importance for the successful implementation of co-management. In some cases such a formal coordinating body does exist, such as the San Miguel Bay Management Authority in San Miguel Bay, Philippines (Pomeroy and Pido 1995), but it is not common. In other cases, coordination between the government and community is informal. This is done primarily through networking, dialogues, meetings and consultations.

A reexamination of Ostrom's eleven key conditions for successful common pool resource institutions based on knowledge and experience gained on fisheries co-management in Asia has found that six of the eleven conditions were of high importance for the successful implementation of fisheries co-management.

## CONDITIONS AND PRINCIPLES FOR SUCCESSFUL CO-MANAGEMENT

Through the research activities a number of conditions and principles, in addition to those discussed above, which facilitate the successful implementation of fisheries co-management were identified. Some of these conditions and principles are already known (Pinkerton 1989, 1993, 1994, 1995), while others are new. It should be noted that this is not a definitive list of conditions and principles, but is hopefully another step forward in identifying those conditions and principles that can lead to successful implementation of fisheries co-management. The same scoring system of high, medium and low as used in the previous section will also be used to score the conditions and principles in this section.

1. Individual incentive structure. (High) The success of co-management hinges directly on an incentive structure (economic, social, political) that induces various individuals to participate in the process. Such individuals may include a resource user, a resource stakeholder, or a politician. Individuals must have a sense that the rules in place are equitable and there must be sharing of costs and the benefits. The co-management process often involves giving up individual short-term benefits for real and perceived longer-term benefits. For the individual, the costs of decision-making, especially in terms of the time involved, cannot be too high or participation will fall. Often, the short-term costs are high in terms of lost income or voluntary labor. For a poor fisher with a family to feed, the incentive structure to support and participate in co-management must be clear and large. Risk is involved for the individual in changing management strategy. The fisher must understand and agree to the co-management arrangements. The fisher must recognize an incentive for co-management before the process begins and/or need information to further develop their understanding and recognition of the incentive. The recognition of resource management problems may take the form of a progressive decrease in fish catch, disappearance of valuable species, declining mangrove stands, and existence of resource use conflicts. An impetus is needed to propel co-management forward (Pomeroy and Berkes 1997). In successful cases of co-management in the Philippines, awareness of resource-related problems prompted stakeholders to enter into collective action, particularly in communities that are heavily dependent on coastal resources and are vulnerable to non-sustainable resource uses (Katon et al. 1997; Katon et al. 1998; Baticados and Agbayani 1998). This is largely due to the threats to survival, economic livelihood and food security that deteriorating resource conditions bring about.

The incentive may start as simply as hope for a better tomorrow, but usually "matures" as the individual gains more information and as the process develops over time. It is often easier and faster to implement co-management arrangements where the resource user recognizes an incentive for participation on their own and undertakes action rather than when an incentive is presented to a resource user by an external agent. One method to measure that an incentive structure for participation and action does exist in a community is when the community members invest their own resources (labor, money) in the project.

Different incentive structures appeal to different individuals. For an individual resource user, the incentive may be economic, primarily in terms of higher income, food availability or protection of livelihoods (Thompson et al 1998; Khan and Apu 1998). It may also be social, in the form of higher prestige among peers or legitimate access to coastal resources (Segura-Ybanez 1996; Katon et al. 1997; Baticados and Agbayani 1998). Co-management arrangements that offer an improvement in these areas are likely to be appealing. Economic incentives are also important to resource stakeholders, such as fish traders and processors, who are directly dependent on a steady supply of fish products for their livelihood. For resort owners, dive tour operators and managers of tourist-related businesses, the preservation of coastal ecosystems and the maintenance of clean coastal waters are vital because these have a direct bearing on the earnings they derive from those who patronize their businesses.

Other resource stakeholders may be motivated by different incentives. The concern for stable ecosystems, food security for present and future generations, improved living conditions, and equitable property rights often underlie the motivation of development advocates, external agents, and individual members of resource management councils. The reduction of conflicts and the streamlining of plans and policies through co-

management arrangements may motivate government administrators, planners and policy-makers to support co-management.

For politicians, the incentive to support co-management may be rooted in the desire to be recognized for their achievements in goverance and resource management. Such achievements strengthen their capacity to win more votes from a broader base of constituents and improve their chances of being re-elected to positions of power and influence.

2. Leadership. (High) Local leadership is a critical and necessary condition for success of co-management. Local leaders set an example for others to follow, set out courses of action, and provide energy and direction for the co-management process. While a community may have leaders, they may not be the correct or appropriate leaders for co-management. Local elites may be the traditional leaders in a community, but they may not be the appropriate leaders for a resource conservation and management effort. Leaders may need to be drawn or developed from the ranks of resource users. These individuals may be more acceptable and respected by their peers. In Bangladesh, the local leaders of the *baors* were identified and elected by the fishers. Leader's term of office were limited so as to give others the chance to gain leadership skills and to reduce the possibility of corruption (Khan and Apu 1998). Reliance on one individual as a leader can be a problem. In certain Philippine cases, projects failed when the leader died, left political office, or left the area because there was no one to take the leader's place (Katon et.al. 1998). The external change agent must not act as leaders because the community will become dependent upon them. The community must look inward to develop local leadership itself. Training and education efforts must strive to build and develop leadership skills among a variety of individuals in the community so that th co-management activity does not become dependent on any one person.

Core group formation is strategic in identifying and developing leaders (Buhat 1994). The members of the core group may be drawn from committed individuals who consistently participate in co-management activities and who share a concern for sustainable resource management. Core groups normally take responsibility for the initial implementation of co-management strategies. From their ranks, capable leaders often emerge to guide present and future undertakings. Documented experiences affirm that locally recruited and trained leaders, both formal and informal, are a potent force in mobilizing residents for collective endeavors, spearheading awareness campaigns and outreach efforts, and motivating stakeholders to take action (Pomeroy et al. 1996; Katon et al. 1997).

3. Stakeholder involvement.(Medium) Partners in co-management need to recognize that the stakeholder community is broader than the local resource user community. There needs to be equitable representation of different stakeholder groups in the management process. Stakeholders are defined as organizations, social groups and individuals that possess a specific, direct and significant stake or interest in the resource and area (IUCN 1996). They are motivated to take action on the basis of their interests and values. Stakeholders include, but are not limited to, part-time resource users, resource users from other communities who are dependent on the same resource, traders and business people, boat owners, tourist resort operators, and advocates of resource management. A well-balanced representation of stakeholders tends to facilitate a politically neutral process. The process of involving stakeholders is time consuming, but may be expected to lead to more acceptable and sustainable arrangements. There should be clearly identified benefits and

costs to all stakeholders, both short- and long-term, to participating as a partner in co-management. It should be recognized that coastal communities are not homogeneous and that there are different viewpoints among the stakeholders. Reaching a consensus on issues can be difficult even in small communities. Issues may need to be addressed on both a community-wide and a resource or species or gear specific basis (Baticados and Agbayani 1998).

Many co-management projects have failed because the target audience of the project was only the fishers. The projects failed to consider and/or include the other resource stakeholders in the process. In the Philippines, for example, early community-based management projects focused their activities only on fishers. While this proved useful for the fishers, it often alienated other stakeholders, such as fish traders with whom the fishers had a credit-marketing relationship. Through this relationship the fish traders could often control the actions of the fishers. The alienation of the fish traders led them to coerce the fishers to less actively support the project and this led to eventual breakdown of the organizational and institutional arrangements made under the community-based management project (Carlos and Pomeroy 1996).

For a co-management arrangement to work, it is essential for stakeholders to have a good understanding of each other's positions, needs and apprehensions. The conduct of informal consultations at the outset helps create interest in common issues and allows stakeholders to express their views on alternative management options. Establishing rapport with stakeholders from an early stage is important. This is facilitated by: meeting with leaders of stakeholder groups; showing a genuine interest in local issues; explaining the reasons for touching base with a wide group of people and groups; ensuring that the host community understands the reasons for talking to other stakeholders; and clarifying unrealistic assumptions expressed by community members.

4. Empowerment. (High) The marginalization of coastal communities has led to the problems of poverty and resource degradation. Addressing marginalization would require empowerment or the actual transfer of economic and political power from a few to the impoverished majority. By transferring the access and control of resources from a few to the community at large, the community is gradually empowered in the economic realm. Simultaneously, political empowerment ensues as community management and controls over the resource are effectively operationalized (Addun and Muzones 1996). Empowerment allows communities to be free from many of the bureaucratic requirements of governments central administrative agencies.

Individual and community empowerment is a central element of co-management. Empowerment is concerned with capability-building of individuals and community in order for them to have greater social awareness, to gain greater autonomy over decision-making, to gain greater self-reliance, and in establishing a balance in community power relations. Empowerment covers a range of actions including enhancing community access to information and services, ensuring community participation, developing critical consciousness or consciousness raising of the people, and gaining control over the utilization and management of natural resources. Empowerment can be considered as an individual and a community desire to change something. Empowerment is undertaken at individual and community levels. Individual empowerment leads to community empowerment. The empowerment process must be balanced since it may have differential impacts on the community leading to not a balance of power but simply a redistribution of

power elites. There is a tendency for rural power structures to gain control over resources. The shifting power holders can easily hijack co-management. Empowerment reduces social stratification and allows groups in the community to work on a more equal level with the local elite (Thompson et al 1998; Khan and Apu 1998).

Empowerment is only functional if it is based on the socio-cultural and political context of the community. The co-management process needs to adopt a gender-balanced perspective, and must acknowledge the position of women. Women should be given the opportunity to develop themselves and actively participate in the co-management process (Foltz et al. 1996).

Individual and collective empowerment are enhanced by capability building through education and training efforts that raise the level of knowledge and information of those involved in the co-management process. If you empower communities but do not invest in building their capacity, you are condemning them to failure. Co-management often requires a conscious effort to develop and strengthen the capability of the partners for collective action, cooperation, power sharing, dialogue, leadership and sustainable resource management. Coastal villagers may not always have a tradition of collective action. Functioning organizations of resource users may not be in place. Moreover, the range of skills and knowledge required to address the complex dimensions of resource management might not be adequate. In these cases, capability building is a must.

To reverse the effects of destructive fishing practices, change non-sustainable practices, or provide viable alternatives; people must learn new management skills and new technologies. Partners need to be equipped with knowledge, skills and attitudes to prepare them to carry out new tasks and meet future challenges (Pomeroy et al. 1996). Capability building must address not only technical and managerial dimensions but also attitudes and behavioral patterns. Training and education may include leadership, situation analysis and problem-solving, consensus building, value reorientation, basic biology and ecology, technology application, livelihood and enterprise management, conflict management, advocacy, facilitation, networking, ecological and socioeconomic monitoring and evaluation, and legal/para-legal, among others. In the Philippines and other Asian countries, the experience affirms that capability building strengthens the confidence and sense of empowerment of resource users and partners. Providing opportunities to visit communities with successful resource management projects also helps create the enthusiasm and the motivation to embark on similar activities in their own community (Katon et al. 1997). Capability building, moreover, enables local residents to sustain resource management interventions and pursue new initiatives.

5. Social preparation and value formation. (High) Linked to empowerment is social preparation and value formation. The inability to sustain co-management may be partly attributed to the insufficient time allocated to the social preparation phase of the process and to rapport-building and value formation in the community. Social preparation should always precede technical and material interventions. Cutting corners during the social preparation phase to yield to pressures to produce material accomplishments is likely to weaken the foundation for self-reliance in the community. Good social preparation is manifested in positive attitudes toward collective action and in the readiness of community members to take on responsibility for resource management and decisionmaking (Pomeroy et al. 1996).

6. Trust between partners. (High) No co-management arrangement can survive unless a relationship of trust and mutual respect is developed and maintained between the partners. The establishment of trust between partners usually takes a long time to develop and takes concerted effort by the partners. There is some risk involved by the partners in participating in co-management. Fishers usually have a low level of trust of government, for example. Trust will require the development of good communication channels and open and ongoing dialogue. Meeting objectives and mutually agreed targets enhances trust. These actions reduce risk and stimulate partner cohesion that will have a positive effect on building trust. This can be started in the early stages of the co-management process and strengthened over time. At the Oxbow Lakes of Bangladesh, trust was developed among the fishers by upholding the rules. Those individuals who consistently disobeyed the rules were dismissed from the fisher organization (Khan and Apu 1998).

Providing forums for discussion are fundamental to developing trust among partners. A process must be developed to understand needs and expectations of all partners. Decisions must be made in a context of mutual respect where the partners respect each other's concerns needs and knowledge. In some cases, needs and expectations may not be straightforward. Values held by different groups, including cultural, religious and traditional beliefs, must be respected. Public discussions that encourage a free and non-threatening exchange of information foster effective communication. Dialogue clarifies an understanding of needs, expected roles, extent of responsibility sharing among partners and expected benefits and costs in the short-term and long-term, among others (Baticados and Agbayani 1998).

7. Property rights over the resource.(High) Property rights, either individual or collective, should address the legal ownership of the resource and define the mechanisms (economic, administrative, collective) and the structures required for allocating use rights to optimize use and ensure conservation of resources, and the means and procedures for enforcement. The case studies in the Philippines show that when user rights are specified and secure (such as with a mangrove certificate of stewardship contract), there is a change in the behavior and attitude of the resource user toward conservation and a much greater chance that the intervention will be maintained. Without legally supported property rights, resource users have no standing to enforce their claim over the resource against outsiders. In most cases, local initiatives require active collaboration with government to protect and enforce user rights (Pomeroy et al. 1996). Local interventions were sustained where property rights existed, were clear, and were enforced (Pomeroy et al. 1996).

8. Local political support. (Medium) The cooperation of the local government and the local political "power structure" is necessary to support and participate in the co-management arrangements. As discussed above, there must be an incentive for the local politicians to support co-management. There must be political willingness to share the benefits, costs, responsibility and authority for co-management. Co-management will not flourish if the local "power structure" is opposed in any way to the arrangements. The case studies in the Philippines show this quite clearly. In those communities where the local political "power structure" was not included in the process or was opposed to the project for some reason, the community-based management interventions failed to be sustained after the project ended (Pomeroy et al. 1996).

Resource users may lack the confidence and political skills to effectively interact with political officials. It will take time to break down these barriers to allow for partnership. In the Philippines, some fisher organizations take a "no political alliance" policy and build informal ties with all political parties in a

community to "spread the bet" and protect them from political change (van Mulekom 1998).

9. Organizations. (High) Co-management requires the existence of legitimate organizations that have a clearly defined membership. These organizations should have the legal right to exist and to make arrangements related to their needs. The organization must be allowed to be autonomous from government and political pressure. They are vital channels for representing resource users and stakeholders, asserting property rights and rules, and influencing the direction of policies and decisionmaking. The organization will need to be recognized as legitimate by the community members, resource users and stakeholders to be able to carry out its mandate. The organization or organizations should also represent the majority of resource users in the community.

In the Philippines, the formal recognition by the government of the role of resource users as valuable partners in development confers legitimacy to the establishment of co-management organizations and favors the pursuit of co-management arrangements. People's organizations are formally allowed to enter into partnerships with local government units on a broad range of concerns, such as promotion of ecological balance, local enterprise development, delivery of basic services, capability building and enhancement of the economic and social well-being of the people (Katon et al. 1997). The more successful community-based co-management projects in the Philippines were those where organizing is not a prerequisite, but rather the community organization evolves after the people recognize the need for it (Sandalo 1994).

10. Conflict management mechanism. (High) Arbitration and resolution of disputes are imperative when conflicts arise over co-management and institutional arrangements. If resource users are to follow rules, a mechanism for discussing and resolving conflicts and infractions is a must. There is a need for a forum for resource users to debate and resolve conflicts and to appeal decisions. Conflict management should be conducted at the local level where solutions can be found quickly. It is often useful to have a mediator who can objectively assess and propose solutions to the conflict. While the government can act as an outside mediator for local conflicts and as an appeal body, heavy reliance on the government to resolve conflicts is not good. Co-management thrives in a situation where forums and appeal bodies are available for deliberation and conflict resolution. The Philippine and Bangladesh experiences show that conflict management tends to be less problematic when the resource users are involved in rule formulation and enforcement and when sanctions are imposed on the rule violators (Katon et al. 1997; Katon et al. 1998; Khan and Apu 1998).

11. External agents. (High) Co-management often needs external change agents to expedite the process. These external agents assist in defining the problem: provide independent advice, ideas and expertise; guide joint problem-solving and decisionmaking; initiate management plans; and advocate appropriate policies. The external agent should be objective and serve a catalytic role in the development process. The external agent should not directly interfere in the process, but may guide or provide information on how to proceed in the process or with a policy. Documented experiences underscore the role of external agents in setting in place a process of discovery and social learning. These catalysts open the eyes of resource users, stakeholders and partner organizations to pressing issues, urge them to search for appropriate solutions, and challenge them to take collective action (Katon et al. 1997; Katon et al. 1998; Baticados and Agbayani 1998; van Mulekom and Tria 1999). Change agents may come from NGOs, academic or research institutions, project

teams and other groups (Kahn and Apu 1998; Masae et al. 1998; Thompson et al. 1998; Nikijuluw 1996). The external agent should have a temporary relationship with the co-management process, serving their particular function and then phasing out.

In the Philippines and other Asian countries, it is not unusual for coastal communities to be aware of deteriorating resource conditions. However, these communities normally need assistance from external agents in carrying out a thorough situation analysis and digging deeper into the root causes of problems. External agents fill a special role in terms of drawing out insights with a participatory style of facilitation, processing the insights, and guiding the community in reaching its goals. Their willingness to spend long hours in the community to work with local people, ability to focus on community objectives and their linkages with donors and other supportive organizations are among the factors which favor their catalytic role.

However, the recruitment of external agents, such as NGOs, may not always be ideal in establishing co-management. The staff may be young and may not readily be accepted by traditional societies. Some of them may have ideological views on development that may not be acceptable to the community or the government. Others may be reluctant to involve the government and the business community even though they are stakeholders in resource management. They may also lack funds to finance continuing operations.

12. Clear objectives from a well-defined set of issues. (Medium) The clarity and simplicity of objectives helps steer the direction of co-management. Partners need to understand and agree on the issues to be addressed, know what must be achieved, where the activities are headed and why. Clear objectives developed from a well-defined set of issues are essential to success. Those involved in the co-management process must see and agree that the issues are important to their daily existence. The co-management process may involve multiple objectives and multiple implementation strategies. These should be prioritized, and linked where possible.

Fundamental to co-management is a common understanding of the situation, comprehension of the root causes of the problems and the issues, and an agreement on appropriate solutions to the identified problems. Fisheries tend to be better managed when resource users, stakeholders and partner organizations have a good grasp of why they are managing the resource and what results are envisaged (Katon et.al 1997).

One of the major reasons for failure of certain community-based management projects in the Philippines is lack of problem recognition by resource users. This may sound like a simple issue but due to the top-down approach of many co-management projects, the resource users are really not active but passive recipients of project interventions. The project objectives are conceptualized outside the community and without true community participation. As such, the resource users may not fully recognize the problem in the same way as the external change agent. The resource user may also work with the project only for what they can get out of it, not fully participating for long term success. Of course, this is not always the situation. In some cases, the resource users recognize that there is a problem and take the initiative for action themselves.

13. Networking and advocacy. (Medium) Networking is the bringing together of information and expertise in support of co-management. The development of a network of community organizations is a powerful tool

for implementing co-management. Networking of communities involved in similar resource management issues provides opportunities to learn from others, deepen insights into actual experiences and inspire new initiatives at other sites (Katon et al. 1997; Baticados and Agbayani 1998).

Networks may take many forms: alliances of support groups, organizations of stakeholders and federations of resource users. They may be formal or informal. Networking is closely associated with the establishment of four types of linkages: 1) with other communities and projects involved in similar co-management initiatives; 2) with sources of power and influence; 3) with NGOs and business groups; and 4) with donors and government agencies.

Networking is closely associated with advocacy. Advocacy argues the case for a particular course of action or situation. It is the political struggle for the recognition of people's rights at various levels (Addun and Muzones 1996). At the local level, it involves a campaign directed at resource users and stakeholders, formal and informal organizations, and local seats of decisionmaking. At the national level, it involves working towards a federation of fishers through networking, as well as pushing for relevant policy and legislative reform. If the co-management arrangement is to withstand competing demands that have negative repercussions on fisheries, advocacy is imperative. Advocacy, however, must be consistent with the culture and political context in which it is used.

14. Enabling policies and legislation.(Medium) Co-management cannot work effectively in a vacuum where there are no supportive policies and legislation. If co-management initiatives are to be successful, basic issues of government policy to establish supportive legislation, rights and authority structures must be addressed. Policies and legislation need to spell out jurisdiction and control, provide legitimacy to property rights and decisionmaking arrangements and clarify the rights and responsibilities of partners. The legal process formalizes rights and rules and legitimizes local participation in co-management arrangements.

If supportive legislation and policies are in place, partners tend to have less difficulty in asserting their rights and roles, particularly if the judicial system is fair and objective. The legal basis for the resource user's participation in resource management is vital and must address fundamental concerns, which include: 1) who has the right to use the resource; 2) who owns the resource; and 3) what is the legal framework for implementing co-management arrangements. The arrangements may be undermined in the absence of a legal basis. The role of the government in establishing conditions for co-management is crucial, particularly in the creation of legitimacy and accountability for institutional arrangements and the delineation of power sharing and decisionmaking.

In the Philippines, the enactment of the Local Government Code of 1991 (LGC) ushered in the formal devolution of powers and responsibilities from the central government to the local government units and people's organizations. The changed administrative arrangements resulting from the LGC have created a supportive environment for co-management to prosper (Katon et al. 1997). An administrative power shift placed coastal local governments at the forefront of resource management (Katon et al. 1998). At the local level, the passage of complementary ordinances and the integration of sustainable resource management in local policies and plans have further enhanced co-management efforts.

15. Adequate financial resources/budget. (High) Co-management requires financial resources to support the process. Funds need to be available to support various operations and facilities related to planning, implementation, coordination, monitoring and enforcement, among others. Funding, especially sufficient, timely and sustained funding, is critical to the sustainability of co-management efforts (Segura-Ybanez 1996). In many instances, resource user organizations are unable to continue existing programs or start new ones due to limited financial resources that members can raise on their own. Often co-management projects which are initiated and funded from outside sources fail when the project finishes due to the inability of the partners to fund the activities. Funds also need to be made available on a timely basis to sustain and maintain interventions. The co-management arrangements must be supported and accepted so those partners will be confident enough in the process to invest their own funds and time. Co-management must be designed from the start with a secure internal budget source. Community members will need to invest their own financial resources in the process. Too much dependence on external sources will impact upon sustainability of the arrangements (Carlos and Pomeroy 1996).

16. Government agency support. (Medium) Effective links between government agencies like fisheries departments, local fisheries service, research institutions, extension service and environmental agencies enhance co-management arrangements. Government agencies need to be capable and willing to partner, support and interact with other stakeholders in the co-management process.

The government agencies provide assistance and services (administrative, technical and financial) to support the local organizations and co-management arrangements. The cooperation of the government must always be stimulated, solicited and nurtured by the partners, as without this support the co-management arrangements may have difficulty being implemented (Calumpong 1996).

Government agencies can serve to oversee local arrangements and deal with abuses of local authority, conflict management, appeal mechanism and applying regulatory standards. Government fisheries administrators may be reluctant to share power with fishers. They may fear infringement by local resource users and their representatives upon what they consider their professional and scientific turf. The authority, responsibility and functions of government agencies should be specified in the co-management contractual agreement.

17. Fit with existing and traditional social and cultural institutions and structures of the community. (Medium) New co-management plans and strategies should be based on (sometimes-diverse) local social and cultural institutions and structures and contribute to strengthening or revitalizing these institutions and structures. The needs and expectations of the community may not always be straightforward due to the social and cultural value system.

In many coastal communities, there exist traditional or informal systems of resource management. These systems have often worked well at meeting management objectives of the community and at achieving ecological sustainability, social equity and economic efficiency. Co-management can be based on these traditional or informal systems such as in Indonesia (Nikijuluw 1996) or on strong family or community relationships such as in Thailand (Masae 1998). Local indigenous knowledge of ecological processes is an important cultural resource that can guide and sustain co-management. Reluctance to acknowledge and

utilize local knowledge can act as a severe constraint in the development of viable resource management strategies.

18. Partnerships and partner sense of ownership of the co-management process. (High) Active participation of partners in the planning and implementation process is directly related to their sense of ownership and commitment to the co-management arrangements. Partners involved in co-management need to feel that the process not only benefits them, but that they have a strong sense of participation in, commitment to and ownership of the process. External agents working to plan and implement the co-management arrangements must allow the partners to recognize themselves as the owners and directors of the process. Early and continuous participation of partners in planning and implementation of co-management is related to success (Pomeroy et al. 1996). It allows partners to demonstrate their commitment to the process. Not only does this type of involvement serve to adapt activities to local needs, but partners also gain a better understanding of the problems involved in implementation and a greater sense of empowerment and confidence. Objectives need to be developed jointly by the partners and external change agents.

Partnerships in co-management must grow out of a mutual sense of commitment (Segura-Ybanez 1996). Adequate coordination, communication and consultation are necessary, especially with multiple partners. It is important to have clarification about each other's role, goals, purpose, operation, style and limitations (Carlos and Pomeroy 1996). The process of clarification must take place through equitable dialogue and partnerships. When the actions of collaborating partners are not synchronized and consistent, resource users see too many role "players" and this may lead to misconceptions and wrong expectations, and eventually hamper success. Thus, an appropriate operational structure and agreement should always be developed based on the needs of co-management arrangement so that coordination between partners will be effective without being too costly to the structure.

19. Effective enforcement. (High) Vigorous, fair and sustained law enforcement requires the participation of all partners. Enforcement can be carried out separately by an enforcement unit, or in collaboration between local informal or traditional enforcers (church, senior fishers, local leaders) and formal enforcers (police, coast guard). Community sanctions – teaching, example, social pressure – are important and can be useful in increasing compliance. Local enforcement efforts may need to be backed up by government enforcement bodies to ensure objectivity. It may be necessary to have government law enforcement agencies involved in dealing with outsiders in order to have better cooperation.

The motivation to comply with regulations depends upon rational decisions where the expected benefits of violating the rules are measured against the risk of getting apprehended and fined. It is also linked to socio-cultural mechanisms that regulate behavior (fear of ancestral spirits, social exclusion, moral obligation). A key variable for determining compliance is the individual perspective of the fairness and appropriateness of the law and its institutions (Kuperan et al. 1996). The willingness to comply is linked to the perceived legitimacy of the authorities charged with implementing the regulations. Local enforcers (*bantay dagat* in the Philippines, *kewang* in Indonesia) can be very effective provided they are formally legitimized. Rules should be simple so those affected by them can easily understand and comply. There needs to be good communication between the enforcement unit and the resource user group. The co-management process is put in jeopardy if even one partner fails to comply, even in part, with the agreement.

20. Overlap of interests. (Medium) Co-management is most likely to be successful where there are significant overlapping interests among the partners, where the partners are affected in similar ways by the arrangements, and where there will be no big winners or losers (Mitchell 1995). It is a prerequisite to have a clear sharing system and a mechanism for recirculating back into the communities some of the wealth generated by co-management arrangements (Thompson and Shelly 1997).

21. Flexibility. (Medium) Co-management arrangements should be flexible enough so that partners have the ability to change plans in response to new issues, needs, problems and opportunities (Yap 1996; Calumpong 1996). Rules, management structures and agreements will need to change and evolve as partners learn how co-management works. A flexible approach towards the development and formalization of the rules and regulations should be adopted recognizing the cultural and traditional patterns of utilization of resources in the community. Mechanisms to accumulate knowledge and experience about resource and human use relationships, through scientific and ecological knowledge, need to be in place. There should be flexibility to cope with the unexpected, e.g. failure of communication and coordination, unplanned decisions. Unexpected reactions to rules can develop as they are implemented. If the rules and rules making system are too rigid and incapable of adapting to change, resource users will not comply with the rules.

22. Appropriate scale. (High) The scale for co-management arrangements may vary a great deal but should be that appropriate to the area's ecology, people and level of management. This includes the size of the physical area to be managed and how many members should be included in an organization so that it is representative but not too large as to be unworkable. Decisions on physical scale include not only the boundaries of the area to be managed but also the species or ecosystem level to be managed. The scale of the management unit should be appropriate to human resources and the ecology of the area. The boundaries should be based on an ecosystem that the resource users can easily observe and understand. In terms of members, it is observed that small groups are more manageable than larger groups (Cimagala 1996). In co-management where are great number of people are involved, it is wise to divide them into smaller groups to facilitate and enhance supervision, control and management. In general, a limited scale (both in terms of membership and jurisdiction) will support participatory democracy and therefore enhance co-management given that the management structure has appropriate stature and power to initiate the process. Expansion of scale is easier once initial activities succeed and are sustained, that is, start small and simple and show results early (Buhat 1994).

23. Species. (Low) Successful co-management is not necessarily associated with sedentary aquatic species such as reef fish, crustaceans and mollusks in nearshore waters. At most case study sites, fishers catch a combination of sedentary and migratory species. The only exception is Bangladesh, where small-scale fishers stock inland waterbodies with carps (Thompson et al 1998; Khan and Apu 1998).

24. Coordinating body and agreements. (Medium) Adequate coordination is particularly important when several partners are involved or when more than one intervention is taking place in a single area (Foltz et al. 1996). An independent body with representatives from the different partners can function to systematize the co-management arrangements (Baticados and Agbayani 1998). The aim is to facilitate quick and efficient decisionmaking, conflict resolution, planning and cooperation. The coordinating body can serve to manage

"turf" issues between partners or government agencies. Poor coordination can lead to confusion, unnecessary duplication of efforts, or activities at cross-purposes or in conflict (Foltz et al. 1996). An appropriate operational structure should always be developed based on the needs of the co-management arrangements so that coordination between partners will be effective. The coordinator of the process must be experienced in interest-based planning. It is very important to establish at the very beginning the actual mode of coordination. The coordinating body can act as an appeal body for those who question decisions made by local management and enforcement bodies. In the Philippines, the creation of fisheries and aquatic resources management councils at the village level act to coordinate, give guidance and bring consensus in planning, implementation and enforcement. The members of the management councils include resource users, NGOs, the private sector, and local government (Fellizar et al. 1997).

To develop mutual understanding between the partners and to strengthen compliance with the co-management arrangements, it is useful to have a written contract of the co-management agreement. This contractual agreement, developed jointly by the partners, would specify the aims, role, function, authority, responsibility, financial, conflict management mechanisms and rights, among other requirements, between the partners in the co-management arrangement. Partners may initially enter into an informal working agreement as they develop the co-management arrangements and find out about each other, but this agreement must be supported later by a formal contract to be used during the implementation process. A clear understanding of the long-term goals of power-sharing is established in which the differing interests and needs of the partners are reconciled. There should be flexibility in the agreement so that changing arrangements and relationships over time can be accommodated.

25. Technology. (Medium) Co-management tends to be more successful in small-scale fisheries than commercial fisheries. The small-scale fishers operate closer to the shore in coral reefs, sea grass and mangrove resource systems, use simpler fishing technology, and may target sedentary species (Thompson et al 1998; Khan and Apu 1998).

26. Accountability. (High) Co-management means having a process in which business is conducted on an open and transparent manner. All partners must be held equally accountable for upholding the co-management agreement. The partners have common access to information. Venues are provided for public discussion of issues and to reach consensus. There needs to be accepted standards for evaluating the management objectives and outcomes. Without strong accountability, decisionmaking can become corrupt and arbitrary (Sandalo 1994; Yap 1996). A body outside of the community, such as government or an NGO, may need to monitor and evaluate the co-management process. This outside body can serve to provide checks and balances to make the process more accountable in a formal way. Formal agreements will require a structure for legal accountability among the partners.

## POLICY IMPLICATIONS FOR FISHERIES CO-MANAGEMENT

The conditions discussed in the section above are those that have been identified from Asian experience for the successful implementation of community-based co-management. These conditions are meant to serve as a guide in the planning and implementation of co-management.
The conditions must be viewed in the distinct political, biological, cultural, technological, social and

economic context of the Asian region and the individual countries. We need to bear in mind the role these unique characteristics play in shaping the process and implementation of co-management in Asia. They are different than in Western societies and reflect the so-called "Asian values." Resource management systems must be viewed in the context of the complex interactions of these characteristics that have shaped past and present situations and that have a capacity for influencing the future. These characteristics include the small-scale, subsistence based fisheries, the local community traditions, the social and political structures, the political and economic restructuring that is occurring in the region, and the need for food security.

Some of the conditions can be met by means internal to the community, while others require external assistance. The number and variety of conditions illustrates that the planning and implementation of co-management must be conducted at several levels. These levels include the individual (i.e., individual incentive structure); the stakeholder (i.e., stakeholder involvement, local political support); the community (i.e., fit with existing and traditional social and cultural institutions and structures of the community); the partners (i.e., partnerships, coordinating body and agreements); the government (i.e., government agency support, enabling policies and legislation); the external agent; and the overall process (i.e., trust, networking and advocacy, leadership, organization, financial resources).

None of the conditions exist in isolation, but each supports and links to another to make the complex process and arrangements for co-management work. In addition, all of the parties (resource users, stakeholders, external agents, government) have different but mutually supportive roles to play in co-management. The role of government in co-management is often associated with the passage of enabling policies and legislation, vigilant and effective enforcement, arbitration of disputes among partners when these cannot be resolved by the parties themselves, provision of financial and technical assistance to sustain co-management activities and promotion of a stable political and social environment. The role of the external agent involves initiating a process of discovery and social learning, guiding problem-solving, building local capabilities and advocating appropriate policies. Resource users and stakeholders are largely responsible for the day-to-day management of resources, participation in consultations, design of appropriate resource management measures and assistance in monitoring and law enforcement. The fulfillment of these complementary roles is crucial to the operation and sustainability of co-management.

Implementation is often a balancing act to meet these conditions as timing and linkages in the co-management process and arrangements are important. For example, developing trust between partners is associated with effective communication and come before the development of contractual agreements between partners. The recognition of resource management problems is associated with the development of clear objectives from a set of well-defined issues.

## REFERENCES

Addun, R. and D. Muzones. 1997. Community-based coastal resource management:: Tambuyog's e.:perience in the Philippines. In G. Claridge and B. O'Callaghan (eds), *Proceedings of the international conference on wetlands and development at Kuala Lumpur*, 219-230. Wetlands International.

Ahmed, M., A.D. Capistrano, and M. Hossain. 1997. Experience of partnership models for the co-management of Bangladesh fisheries. *Fisheries Management and Ecology* 4: 233-248.

Baticados, D. and R. Agbayani. 1998. Case study of institutional arrangements in the fisheries co-management of Malalison, Island, Central Philippines, 1-94. Southeast Asian Fisheries Development Center (SEAFDEC). Working Paper No. 34 of the Fisheries Co-management Research Project . Manila: International Center for Living Aquatic Resources Management (ICLARM).

Bissdorf, H.G. 1996. The Banica River Watershed Development Project: NGO-PO-GO Partnership. In C. Foltz, R.S. Pomeroy and C. Barber (eds), *Proceedings of the Visayas-wide conference on community-based coastal resources management and co-management*, 76-77. Fisheries Co-management Research Project Working Paper No. 4. Manila: ICLARM.

Buhat, D. 1994. Community-based coral reef and fisheries management, San Salvador Island, Philippines. In White, A., L. Hale, Y. Renard, and L. Cortesi (eds), *Collaborative and community-based management of coral reefs*, 33-49. Connecticut: Kumarian Press.

Calumpong, H. 1996. Landscape approach to coastal management in Bais Bay, Negros Oriental. In C. Foltz, R.S. Pomeroy and C. Barber (eds.), *Proceedings of the Visayas-wide conference on community-based coastal resources management and co-management*, 50-57. Working Paper No. 4 of the Fisheries Co-management Research Project. Manila: ICLARM.

Carlos, M. and R.S. Pomeroy. 1996. A review and evaluation of CBCRM projects in the Philippines: 1984-1994, 1-101. Research Report No. 6 of the Fisheries Co-management Research Project. Manila: ICLARM

Claridge, G. and B. O'Callaghan (eds). 1997. Proceedings of the international conference on wetlands and development at Kuala Lumpur, 1-230. Wetlands International.

Fellizar, F.P., R.G. Bernardo and A.P.H. Stuart. 1997. Analysis of policies and policy instruments relevant to the management of fisheries/aquatic resources with emphasis on local level issues and concerns, 1-69. Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA). Working Paper No. 25 of the Fisheries Co-management Research Project. Manila: ICLARM.

Foltz, C., R.S. Pomeroy and C. Barber (eds.). 1996. Proceedings of the Visayas-wide conference on community-based coastal resources management and co-management, 1-115. Working Paper No. 4 of the Fisheries Co-management Research Project. Manila: ICLARM.

International Center for Living Aquatic Resources Management (ICLARM) and Institute of Fisheries Management (IFM). 1996. Analysis of fisheries co-management arrangements: a research framework, 1-28. Working Paper No. 1 of the Fisheries Co-management Research Project. Manila: ICLARM.

IUCN. 1996. Collaborative management of protected areas: tailoring the approach to the context, 6-11. Gland, Switzerland: Social Policy Group of the IUCN.

Katon, B., R. Pomeroy, and A. Salamanca. 1997. The marine conservation project for San Salvador: a case study of fisheries co-management in the Philippines, 1- 95. Working Paper No. 23 of the Fisheries Co-management Research Project. Manila: ICLARM.

Katon, B., R. Pomeroy, M. Ring and L. Garces. 1998. Mangrove rehabilitation and coastal resource management of Mabini-Candijay: a case study of fisheries co-anagement arrangements in Cogtong Bay, Philippines, 1-149. Working Paper No. 33 of the Fisheries Co-management Research Project. Manila: ICLARM.

Khan, M.S. and N.A. Apu. 1998. Fisheries co-management in the Oxbow lakes of Bangladesh, 1-61. Chittagong University. Working Paper No. 35 of the Fisheries Co-management Project. Manila: ICLARM.

Kuperan, K. N. Mustapha, I. Susilowathi, and C. Tacao. 1997. Enforcement and compliance with fisheries regulations in Malaysia, Indonesia and the Philippines, 1-38. Research Report No. 5 of the Fisheries Co-management Research Project. Manila: ICLARM.

Masae, A. 1998. An analysis of fisheries co-management arrangements: the case of Ban Laem Makham, Sikao District, Trang Province, South Thailand, 1-70. Prince of Songkia University. Working Paper No. 37 of the Fisheries Co-management Research Project. Manila: ICLARM.

Mitchell, D.A. 1995. Management of the intertidal clam resource. A British Columbia experiment in limited entry and local participation. School of Public Administration, University of Victoria.

Mitchell, D.A. 1995. Co-operative management: can we get the incentives right? Presentation to the Maritime Awards Society of Canada. University of Victoria.

Nikijiluw, V. 1996. Co-management of coastal resources in Bali Island, Indonesia. Fisheries Co-management Research Project Working Paper No. 7, 1-18. Research Institute for Marine Fisheries. Working Paper No. 7 of the Fisheries Co-management Research Project. Manila: ICLARM.

Novaczek, I and I. Harkes. 1998. Institutional analysis of sasi laut in Maluku, Indonesia, 1-325. Working Paper No. 39 of the Fisheries Co-management Research Project. Manila, ICLARM.

Ostrom, E. 1990. Governing the commons: the evolution of institutions for collective action. Cambridge:

Cambridge University Press.

Ostrom, E. 1992. Crafting institutions for self-governing irrigation systems. San Francisco: Institute for Contemporary Studies Press.

Pham, V. and H.G. Phung. 1999. Case study of community-based coastal resource management in Vietnam, 1-74. Institute of Fisheries Economics and Planning, Vietnam. Working Paper of the Fisheries Co-management Research Project. Manila: ICLARM.

Pinkerton, E. (ed.). 1989. Co-operative management of local fisheries: new directions for improved management and community development, 1-133. Vancouver: University of British Columbia.

Pinkerton, E. 1993. Local Fisheries Co-management: A Review of International Experiences and Their Implications for Salmon Management in British Columbia. School of Community and Regional Planning, University of British Columbia, Vancouver.

Pinkerton, E. 1994. Summary and Conclusions. Chapter 12 in C.L. Dyer and J.R. McGoodwin (eds.). Folk Management in the World's Fisheries. University of Colorado Press, Boulder.

Pinkerton, E. and M. Weinstein. 1995. Fisheries That Work: Sustainability Through Community-Based Management. A Report to the David Suzuki Foundation. Vancouver, British Columbia, Canada.

Pomeroy, R.S. and M. Williams. 1994. Fisheries co-management and small-scale fisheries: a policy brief, 1-15. Manila: ICLARM.

Pomeroy, R.S. and M. Pido. 1995. Initiatives towards fisheries co-management in the Philippines: the case of San Miguel Bay. *Marine Policy* 19(3): 199-211.

Pomeroy, R., R. Pollnac, C. Predo and B. Katon. 1996. Impact evaluation of community-based coastal resource management projects in the Philippines, 1-282. Research Report No. 3 of the Fisheries Co-management Research Project. Manila: ICLARM.

Pomeroy, R.S. and M. Carlos. 1997. CBCRM projects in the Philippines: a review and evaluation of programs and projects, 1984-1994. *Marine Policy* 21(2): 1-19.

Pomeroy, R. and F. Berkes. 1997. Two to tango: the role of government in fisheries co-management. *Marine Policy* 21 (5): 465-480.

Sandalo, R.M. 1994. Community-based coastal resources management: the Palawan experience. In R.S. Pomeroy (ed.), *Community management and common property of coastal fisheries in Asia and the Pacific: concepts, methods and experiences*, 165-181. Manila: ICLARM.

Segura-Ybanez, M. 1996. Sustainability of community-based resource management in the Central Visayas

Regional Project – Phase I. In C. Foltz, R.S. Pomeroy, and C. Barber (eds), *Proceedings of the Visayas-wide conference on community-based coastal resources management and fisheries co-management*, 84-92. Fisheries Co-management Research Project Working Paper No. 4. Manila: ICLARM.

Thompson, P.M. and A.B. Shelly. 1997. Community-based management of Hamil Beel, Bangladesh, 1-58. Working Paper No. 36 of the Fisheries Co-management Research Project. Manila: ICLARM.

Thompson, P.M., S.M.N. Alam, M. Hossain and A.R. Shelly.1998. Community-based management of Hamil Beel: a case study of fisheries co-management in Bangladesh. Working Paper No. 36 of the Fisheries Co-management Research Project. Manila: ICLARM.

Thong, H. X. and Thieu. 1998. Traditional organizations in fishing communities of small-scale fisheries in Vietnam, 1-93. Institute of Fisheries Economics and Planning, Vietnam. Research Paper No. 8 of the Fisheries Co-management Project. Manila, ICLARM.

Tokrisna, R., P. Boonchuwong and P. Janekarnkij. 1998. A review of fisheries and coastal community-based management regime in Thailand. Unfinished working paper. Fisheries Co-management Project. Manila, ICLARM.

Torell, M. 1998. Institutional, Legal and Policy Perspectives on the Management of Aquatic Resources and the Aquatic Environment in Wetlands, Floodplains, Lakes and Rivers in the Mekong River Basin. Paper presented at the 7th Conference of the International Association for the Study of Common Property, Vancouver, British Columbia, Canada, 10-14 June.

University of the Philippines. 1996. Study on the management of fisheries/aquatic resources at the local level. 1-260. Research Report No. 7 of the Fisheries Co-management Project. Manila, ICLARM.

White, A., L. Hale, Y. Renard and L. Cortesi (eds). 1994. Collaborative and Community-Based Management of Coral Reefs, 120p. Connecticut: Kumarian Press, Inc.

Yap, N. 1996. Community organizing in Leyte: the Labrador experience. In C. Foltz, R.S. Pomeroy and C. Barber (eds.), *Proceedings of the Visayas-wide conference on community-based coastal resources management and fisheries co-management*, 70-74. Working Paper No. 4 of the Fisheries Co-management Research Project. Manila: ICLARM.

# Chapter 11
## Fisheries Co-management in Asia: Prospects for the Future

The Fisheries Co-management research project had the overall purpose of determining the prospects for successful implementation of fisheries co-management strategies. The project systematically and comparatively documented and assessed strategies and processes of fisheries co-management implementation in Asia, particularly at the national and community levels. This was accomplished largely through comparative case studies, country research and networking.

Over the five-year life of the project (1994 -1998), insights and experience were gained into co-management approaches, methods, processes and impacts. Research activities were undertaken with national research partners in six Asian countries – Philippines, Vietnam, Thailand, Malaysia, Indonesia and Bangladesh. A number of research reports, working papers, workshop proceedings, policy briefs, scientific journal articles, popular publication articles, a web site, and an e-mail list server attest to the varied output of the project. These outputs were prepared for several audiences including policy-makers and government officials, development practitioners, resource users, academics and researchers.

Other project accomplishments include the strengthening of the capacities of research partners to understand the theoretical and conceptual foundations of co-management and to undertake research in this area A number of training courses and workshops on various social and economic methods and on co-management were organized to improve the capacity of research partners.
Many partners undertook not only empirical research, but also policy relevant research on co-management. The expansion of linkages with other organizations in the region and worldwide, such as non-governmental organizations, research institutions, professional organizations, policy research centers, development projects and universities, provided for the sharing of information and knowledge. Technical assistance in policy and in the planning and implementation of co-management projects was provided in the Philippines and Vietnam, as well as in the Caribbean. Again, this provided for the sharing of information and knowledge on co-management.

Overall, the Project has been instrumental in raising the awareness of co-management strategies and arrangements among government, fishers, non-governmental organizations, academic and research institutions, fisher organizations and other resource stakeholders. A number of development practitioners have replaced community-based coastal resource management strategies with the broader strategy of community-based co-management, in part, as a result of interactions with the project. The project, through its publications, training and networking, has been instrumental in reshaping government polices to support co-management. For example, an important policy of the Ministry of Fisheries in Vietnam is the development of fisheries management based on the principle of co-management. The Ministry of Fisheries is also supporting the establishment of a co-management pilot site in order to gain experience and knowledge. Both qualitative and quantitative methods have been employed to substantiate research results. The measurement, for instance, of the biological and socioeconomic outcomes of marine reserves and other coastal resource management projects under co-management arrangements offers concrete examples of co-management as a successful strategy for safeguarding the well-being of coastal resources, promoting sustainable resource use, and assuring livelihood for coastal resource users.

**Prospects for the Future**

The overall purpose of the Fisheries Co-management Project was to determine the prospects for successful implementation of fisheries co-management strategies. Thus, a central question to be asked at the end of the project is: Is co-management a viable fisheries management strategy for Asia? The answer is not unequivocal. The research has shown that under certain conditions fisheries co-management can be an equitable, efficient and sustainable resource management strategy. The research has also shown that co-management will not work or be successful in every situation. However, in general the answer to the question must be yes. Co-management can be a viable fisheries management strategy for Asia.

The five countries of Southeast Asia, on which the research of the co-management project focused, share common aquatic resource characteristics, both human and ecological, and issues. The countries, Indonesia, Malaysia, Philippines, Thailand, and Vietnam, have a population of approximately 448 million, of whom approximately 35 percent live below the poverty line. The population of these five countries is expected to reach 633 million by the year 2020. The average fish consumption for the region is relatively high at 22 kg per capita per year and is higher in coastal communities. In some countries and coastal communities, fish provides the primary source of animal protein. Fishing and the extraction of coastal resources provides the main livelihood for millions of families. The increasing marine catches noted for the region between 1988 and 1994 are unlikely to be maintained. It is now almost universally accepted that many of the coastal fisheries are overfished. Excess capacity, both labor and capital, exists in most fisheries. Coastal resources and ecosystems are degraded and in decline from a variety of factors. The governments of these countries are working to attain sustainable development of coastal and marine resources and to improve the socio-economic conditions of coastal communities. However, funds and other resources for these purposes are limited. This is not new information. However, new actions must be taken to deal with these issues. With limited government resources, the people will need to take more responsibility for finding solutions to their problems and needs. The resource users must be involved in making management and development decisions. The resource users will need to be educated, informed and empowered to take action. New governance arrangements for fisheries must be examined and put into place. Fisheries policies must shift from a use orientation to a conservation and resource management orientation.

The research has shown that co-management provides a strong institutional structure to address these issues. The advantages and disadvantages of co-management have already been discussed in the chapters above, and will not be reiterated here. However, there are several key arguments to justify the use of co-management. One of the key arguments for co-management is that it attempts to use fisheries management systems that are well adapted for local conditions and problems. It recognizes different needs, interests and concerns involved in resource management. It allows for a more active and important role and responsibility for civil society. It also links community-based initiatives with government legal, policy and administrative structures. Another key argument is that it allows fishers and fisher organizations to participate in the planning and management process of the fishery and in community development. The commitment of fishers and other stakeholders to a resource management initiative will be stronger if they feel that they have been active in the process. A third key argument for co-management is that it seeks equity in resource management. Co-management involves issues of local power relations and power sharing. Empowerment affects the content and form of social relationships in the community and, in turn, power relations among individuals and groups. The multi-use, multi-user nature of coastal resources breeds conflict. A fourth key argument for co-management is that it involves the process of managing conflicts among resource users. Through a process of dialogue and

negotiation the resource users and stakeholders can explore various options for agreement and select the option which best suits their needs.

The research has shown that the implementation of co-management is costly, complex and long. An enabling legal, policy and administrative structure from government should support co-management. There needs to be a true partnership between the resource users and stakeholders and the government. Trained professionals are needed to work with the community to plan and implement co-management.

The research has identified several key factors of communities with successful community-based co-management. These are:

- clear and recognized boundaries for the area to be managed
- high dependence on the fishery for livelihood
- individual incentive structure to participate
- benefits of participation exceed costs of investment in activities
- fishers are identified with their fishing area
- existence and enforcement of property rights and rules
- leadership is acceptable and credible
- fishers are unwilling or unable to move out of their fishing area
- those who are affected by management decisions are able to participate in the decision-making
- fishers are able to declare management rights, whether informal or formal
- information is made available to and shared among partners; information is power

Can co-management ensure a well-managed fishery? Yes, it can. As the case studies in Chapter Nine illustrate, community-based co-management can lead to maintaining or improving both the quality and quantity of fish stocks and coastal ecosystems. Standard of living of fishers and their families can be improved. Fishers can manage their fishery with no or limited outside (government) assistance. Fishers can be empowered to take control of management and development of the fishery and community. Will co-management ensure a well-managed fishery all of the time. No. There are no guarantees of success. The research has identified more failures than successes of co-management (Pomeroy and Carlos 1997). Co-management will not work in every community. The conditions for successful implementation and sustainability of co-management are not present in every community. However, the chances of success and sustainability of co-management are increased when people are informed, can participate, and are empowered.

Is there a prospect for fisheries co-management in Southeast Asia? Yes. The research has shown that the Philippines, Thailand, Indonesia, Vietnam and Malaysia all have an active or planned policy and/or program of co-management. Strong central control of fisheries management is giving way to either active implementation or experiments with community-based management and co-management. Many governments are making a clear commitment to decentralization, the sharing of resource management power between the national government, local government, and fisher and fisher organizations. The process of decentralization is being led by the Philippines. This is in contrast to 1994, when Kuperan and Mustapha (1994) concluded that "The prospects for adoption of the co-management approach among the countries of Southeast Asia are, however, varied with only the Philippines having good prospects for co-management adoption."

## A Research Agenda

There are still a number of research issues on co-management which need to be addressed in order to generate more specific information for policy and practical application. These include case studies; empirical studies/hypothesis testing; studies of issues related to process and management systems; legal, policy and institutional analysis; and national policy development.

### Case Studies of Co-management

During the project a number of case studies of fisheries co-management were undertaken in Asia using the institutional analysis research framework. These case studies provided valuable information on conditions and factors that lead to successful co-management and a better understanding of the process of co-management. New case studies should be undertaken but the selection of cases should be dependent on what new information the cases can provide in terms of implementation, process, impact and performance. Selection of the cases should be based on the criteria that the case fills a "gap" in missing information or that the case is of a type (resource system, type of fishery, approach to implementation) that has not yet been studied.

In addition to new case studies, it would be useful to monitor the existing case studies on a periodic basis. Since co-management is a relatively new management strategy in Asia, long term monitoring of the case can provide a great deal of useful information.

### Empirical Studies/Hypothesis Testing

A number of hypotheses exist concerning the advantages of co-management, especially as co-management compares to a centralized management strategy. A number of these issues were addressed in the project (see Chapter 8). Additional research on these issues is warranted. Priority areas to be examined include:

- legitimacy: increased authority of the organization, regulations, management system
- transaction costs: overall reduction
- incentives: behavior modification
- enforcement and compliance: improvement
- institutional resiliency: flexibility and adaptation of institutional and organizational arrangements
- conflict management: improvement
- ecosystem health: biological improvement
- rationality: increased knowledge, data and information sharing
- democracy (empowerment, representation, choice): reduced political and equity problems
- stewardship: improvement

### Studies of Issues Related to Process and Management Systems

A number of crosscutting issues related to co-management exist which are felt to be independent of resource system or other conditions. These include:

- gender: roles in management and organization
- organizational form: most appropriate and effective
- scale: of institutional and organizational arrangements, ecosystem, community
- process: institutional and organizational arrangements evolution over time (dynamics)
- structure and content of co-management agreements
- impact: measurement of short and long term impacts

Legal, Policy and Institutional Analysis

During the project, a series of legal, policy and institutional analyses were carried out in several Asian countries including the Philippines, Thailand, Vietnam, Cambodia, Bangladesh and Indonesia to evaluate constraints and opportunities for and to make recommendations in support of co-management. These studies were a mix of legal, public administration and economic analysis. Further research in this area is needed with an emphasis on legal and institutional constraints and opportunities for co-management at the local level; to monitor and review changes in national laws and policies; to evaluate administrative and bureaucratic structures of government; and to evaluate the political and social context for co-management. The research should be expanded into other Asian countries such as Malaysia and Laos.

National Policy Development

With increased experience and knowledge about co-management from research and practice, there is a need to develop applied policy analysis in support of co-management initiatives at national government levels. Policy relevant research must be undertaken and linked to the needs of government policy makers and resource managers. Research results should be translated into policy briefs that can be understood and useful to policy makers and managers. A focus of research should be on factors that motivate governments to implement co-management.

Networking/Capacity Building

Capacity building of research partners and policymakers should be an ongoing activity. There should be a coordinated network of information exchange, meetings, workshops, publications, training and partner exchange. Since some research partners in certain countries are not as strong scientifically as those in other countries, it may be necessary to conduct training to develop their understanding and scientific capacity to conduct research on co-management. The project web site, www.co-management.org, can be used to provide news and information to partners. The e-mail list server, FISHCOM, can be used to exchange information not only among partners but researcher, practitioners and policymakers worldwide.

## References

Kuperan, K. and N. Mustapha Raja Abdullah. 1994. Small-scale coastal fisheries and co-management. Marine Policy. Vol.18, No.4, pp.306-313.

Pomeroy, R.S. and M.B. Carlos. 1997. Community-based coastal resource management in the Philippines: A Review and Evaluation of Programs and Projects 1984-1994. Marine Policy. Vol.21, No. 5, pp.445-464.

## Appendix 1

**ICLARM-Institute for Fisheries Management**
**Worldwide Collaborative**
**Fisheries Co-Management Project**

### FISHERIES CO-MANAGEMENT PROJECT PUBLICATIONS
**(As of 8 July 1999)**

**Reprint**

1. Pomeroy, R.S. Community-Based and Co-Management Institutions for Sustainable Coastal Fisheries Management in Southest Asia. Ocean and Coastal Management. 1995, Vol. 27, No. 3, pp 143-162.

2. Sen S. and J. Raakjaer Nielsen. Fisheries Co-Management: A Comparative Analysis. Marine Policy 1996, Vol. 20, No. 5, pp 405-418.

3. Kristiansen, A. and E. Polosse. Co-management of Beach Seine Fisheries in Mozambique: A Case Study. 1996. NAGA, The ICLARM Quarterly, October 1996, pp 3-9.

4. Pido, M.D., R.S. Pomeroy, L.R. Garces and M.B. Carlos. A Rapid Appraisal Approach to Evaluation of Community-Level Fisheries Management Systems: Framework and Field Application at Selected Coastal Fishing Villages in the Philippines and Indonesia. Coastal Management. 1997, Vol. 25, No. 2, pp 183-204.

5. Pomeroy, R.S. and M.B. Carlos. Community-Based Coastal Resource Management in the Philippines: A Review and Evaluation of Programs and Projects, 1984-1994. Marine Policy. 1997, Vol. 21, No. 5, pp 445-464.

6. Pomeroy, Pomeroy R.S. and F. Berkes. Two to Tango: The Role of Government in Fisheries Co-Management. Marine Policy. 1997, Vol.21, No. 5, pp 465-480.

7. Pomeroy, Pomeroy, R.S., R.B. Pollnac, B.M. Katon and C.D. Predo. 1997. Evaluating Factors Contributing to the Success of Community-Based Coastal Resource Management: the Central Visayas Regional Project-1, Philippines. Ocean and Coastal Management. Vol. 36, Nos. 1-3, pp 97-120.

8. Pomeroy, R.S.. 1998. A Process of Community-Based Fisheries Co-management. NAGA, The ICLARM Quarterly, Vol. 21, No. 1, pp 71-76.

9. Katon, B.M., R.S. Pomeroy, M.W. Ring and L. Garces. 1998. Mangrove Rehabilitation and Coastal Resource management: A Case Study of Cogtong Bay, Philippines. NAGA. The ICLARM Quarterly. Vol 21, No. 2, pp 45-62.

10. Nikijuluw, V.P.H. Management of Coastal Areas by Villagers of Jemluk, Bali Iland, Indonesia. Jurnal Pengeloban Sumberdaya Pesisir Dan Lautan Indonesia. Voll (1): pp 21-30.

11. Katon, B.M., R.S. Pomeroy, A. Salamanca and L. Garces. 1998. Fisheries Management of San Salvador Island: A Shared Responsibility (forthcoming, Society and Natural Resources Journal).

12. Katon, B.M., R.S. Pomeroy, M. Ring and L. Garces. 1998. Rehabilitating the Coastal Resources of Cogtong Bay, Philippines (under review by the Coastal Management Journal).

13. Nikijuluw, V.P.H. Identification of Indigenous Coastal Fisheries Management (ICFM) System in Sulawesi, Maluku and Irian Jaya. Pesisir and Lautan. 1998, Vol. 1, No. 2, pp 1-14.

14. Brown, D.N. and R.S. Pomeroy. 1999. Co-management of Caribbean community (CARICOM) Fisheries. Marine Policy.

15. Mustapha R.A.N., K.K. Viswanathan and R.S. Pomeroy. Transaction Costs and Fisheries Co-management. Marine Resource Economics. 13 p. 103-114.

16. Agbayani, R.F., Baticados, D.B. and Siar, S,V, 1999. Community Fishery Resources Management on Malalison Island, Philippines: R&D Framework, Interventions and Policy Implications. Coastal Management.

17. Khan, M.S. 1999. Case Study of Co-management in Oxbow Lakes of Bangladesh Under OLPII: An Assessment of Performance. In H.A.J. Middendorp, P.M. Thompson and R.S. Pomeroy (eds.) Sustainable Inland Fisheries Management in Bangladesh. ICLARM Conf. Proc. 58. IN PRESS

18. Harkes, I.H.T. 1998 Project Success: Different Perspectives. Paper Presented at the "Workshop on Participatory Natural Resource Management in Developing Countries', April 6-8, 1998 in Oxford, U.K. To be published in Participatory Natural Resource Management: Analytical Perspectives, Macmillan Publishers.

19. Novaczek, I. and I.H.T. Harkes (in press) Marine Resource Management in Central Maluku, Indonesia. To be published in Cakalele, the journal of Maluku studies, University of Hawaii.

**Working Paper**

1. Analysis of Fisheries Co-Management Arrangements: A Research Framework. ICLARM/IFM core staff.

2. Fisheries Co-Management: A Worldwide, Collaborative Research Project. R. Pomeroy, S.Sverdrup-Jensen and J. Raakjaer-Nielsen. 1994

3. Fisheries Co-Management Workshop on Research Strategy, Methodologies, Field Experiences of Partners and Exchange of Information: Proceedings. North Sea Center. 1995

4. Proceedings of the Visayas-wide Conference on Community-Based Coastal Resources Management and Fisheries Co-Management. 1996

5. Research Initiative on Fisheries Co-Management in Central and Southern Africa: Report on the Regional Workshop. 1996.

6. Fisheries Co-Management: A Literature Review and Comparative Analysis. S. Sen and J. Raakjaer Nielsen. 1996

7. Co-Management of Coastal Resources in Bali, Indonesia. V. Nikijuluw. 1996

8. Approved as Research Report No. 7.

9. Lake Malombe and Upper Shire River Fisheries Co-Management: An Assessment. W. Chirwa. 1997.

10. An Analysis of Emerging Co-Management Arrangements in the Zambian and Zimbabwean Inshore Fisheries in Lake Kariba. P. Hachongela, J. Jackson, I. Malasha, W. Muriritirwa, K. Nyikahadzo, S. Sen. 1996.

11. Final Report on the Development of Management Plan for El Nido Marine Reserve, Palawan, Philippines. Villavicencio and Baling. 1995.

12. The Traditional Management of Artisanal Fisheries in Côte d Ivoire: The Case of Aby Lagoon, G. Kponhassia and A. Konan. June 1996.

13. Trends in the Management of Continental Fisheries in Benin: the Case of Lake Nokoue. C. Atti-Mama. 1996.

14. Study of Co-Management Systems in the Beach Seine Fisheries in Inhassoro, Inhambane Province, Mozambique. A. Kristiansen and E. Poiosse, M. Machava, P. Santana and J. Meisfjord. 1995.

15. Transaction Costs and Fisheries Co-Management. Kuperan, Mustapha and Pomeroy. 1996

16. Institutional Arrangements in the Fisheries Co-Management on Malalison Island, Culasi, Antique: A Process Documentation Research Methodology. R. Agbayani and A. Babol. 1997.

17. From No Management Towards Co-Management? A Case Study on Artisanal Fisheries in Angoche Districts, Nampula Province, Mozambique. S. Lopes, E. Poiosse, J. Wilson, J.L. Kromer, L. Manuel, C. Cululo and A.R. Pinto. 1997.

18. Creation of a New Fisheries Policy in South Africa: the Development Process and Achievements. R. Martin and J. Raakjaer Nielsen. 1997.

19. A Review of Community-Based Fisheries Management in Eastern Indonesia. V. Nikijuluw. 1996

20. A Review of Natural Resource Laws and Policies in Indonesia and its Prospect for Fisheries Co-Management. I. Susilowati. 1996

21. A Review of Coastal Fisheries Management Strategies and a Baseline Socio-Economic Survey of Small-Scale Fishing Households and Communities in Vietnam. H.X. Thong, P.T. Hong Van, P.G. Hai and R.S. Pomeroy. 1996

22. Honda Bay, Puerto Princesa City, Palawan, Philippines: A Fisheries Co-Management Pilot Site. ICLARM, SEARCA, SEAFDEC AQD, and Tambuyog Development Center. 1997.

23. The Marine Conservation Project for San Salvador: A Case Study of Fisheries Co-Management in the Philippines. B. Katon, R.S. Pomeroy and A. Salamanca. 1997.

24. Co-Management of Living Coastal Resources in ASEAN: Theory, Practice and Implications for Vietnam. Ministry of Fisheries, Vietnam-Canada Ocean and Coastal Cooperation Program and ICLARM. 1995.

25. Analysis of Policies and Policy Instruments Relevant to the Management of Fisheries/Aquatic Resources with Emphasis on Local Level Issues and Concerns in the Philippines. SEARCA. 1997.

26. Proceedings of the National Conference on the Role of Communities in Coastal Resource Management in Indonesia. 1996.

27. Fisheries Co-Management in Malawi: Case Study of Lake Chiuta Fisheries. S. Donda. 1997

28. An Analysis of Emerging Co-Management Arrangements for the Olifants River Harder Fishery, South Africa. M. Sowman, J. Beaumonth, M. Bergh, G. Maharaj and K. Salo. 1997.

29. Opportunities for Co-Management: the Application of a Research Framework to a Case Study from South Africa. T. Hutton and S.J. Lamberth. 1997.

30. Present State and Perspectives of Marine Fisheries Resources Co-Management in West Africa. B. Horemans and A. Jallow. 1997.

31. Artisanal Fisherfolks Involvement in Fishery Rehabilitation in Senegal: Co-Managament Perspectives. M. Kebe. 1997.

32. A Review on Fisheries and Coastal Community-Based Management Regime in Thailand. R. Tokrisna, P. Boonchuwong and P. Janekarnkij. 1997.

33. Mangrove Rehabilitation and Coastal Resource Management Project of Mabini-Candijay: A Case Study of Fisheries Co-Management Arrangements in Cogtong Bay, Philippines. 1998. B.M. Katon, R.S. Pomeroy. M.W. Ring and L. Garces.

34. Case Study of the Institutional Arrangements in the Fisheries Co-Management on Malalison Island, Culasi, Antique. 1998. D.B. Baticados and R.F. Agbayani.

35. Fisheries Co-Management Study in the Ox-bow Lakes of Bangladesh. 1998. M.S. Khanh and N.A. Apu.

36. Community-Based Management of Hamil Beel: A Case Study of Fisheries Co-management in Bangladesh. 1998. P. Thompson, S.M. Alam, M. Hossain and A.B. Shelly.

37. An Analysis of Co-management Arrangements: A Case of a Fishing Community in Southern Thailand. A. Masae, A. Nissapa and S. Boromtanarat. 1998.

38. Community-Based Coastal Resource Management in Orion, Bataan, Philippines: A Case Study on the Development of a Municipal-Wide Community-Based Fisheries Co-management System. L. van Mulekom and E. Tria. 1999.

39. An Institutional Analysis of Sasi Laut in Maluku, Indonesia. I. Novaczek and I. Harkes. 1998.

40. Measuring Transaction Costs of Fisheries Co-management. K.K. Viswanathan, N.M.R. Abdullah, R.S. Pomeroy and E. Genio. 1998.

41. Economics of Regulatory Compliance in the Fisheries of Indonesia, Malaysia and the Philippines. Indah Susilowati. 1998.

42. Welfare Impacts and Transaction Costs of Fisheries Co-management at Oxbow Lakes in Bangladesh. Khonder Murshed-e-Jahan. 1999.

43. An Assessment of the Status of Coral Reefs and Reef Fish Abundance in San Salvador Island Marine Reserve, Philippines. Len Garces and I. Dones. 1998

Project Document

1. Project Steering Committee Minutes 1, 2, 3, 4, 5, 6, 7,8,9,10
2. Project Proposal
3. Project Manual
4. Project Progress Report and Workplan 1995
5. Project Progress Report and Workplan 1996
6. Midterm Internal Project Evaluation Report, 3-4 July 1996
7. Progress Report 1997
8. Progress Report 1998

Newsletter

1. January 1995
2. July 1995
3. February 1996
4. July 1996
5. January 1997
6. August 1997
7. May 1998

**Research Reports**

1. Fisheries Co-Management and Small-Scale Fisheries: A Policy Brief. R. Pomeroy and M. Williams. 1994

2. A Handbook for Rapid Appraisal for Fisheries Management Systems (Version 1). M. Pido, R. Pomeroy, M. Carlos and L. Garces. 1996

3. Impact Evaluation of Community-based Coastal Resource Management Projects in the Philippines. R. Pomeroy, R. Pollnac, C. Predo and B. Katon. 1996

4. The Management Systems of Marine Fisheries and other Coastal Resources in Palawan, Philippines: Concepts, Experiences and Lessons. R. Pomeroy, M. Pido, B. Katon, M.Carlos and A. Sandalo. 1996

5. Enforcement and Compliance with Fisheries Regulation in Malaysia, Indonesia and Philippines. K. Kuperan et. al. 1996

6. A Review and Evaluation of Community-based Coastal Resources Management Projects in the Philippines, 1984-1994. M. Carlos and R. Pomeroy. 1995

7. Study on the Management of Fisheries/Aquatic Resources at the Local Level in the Philippines. University of the Philippines (Diliman) - College of Public Administration. 1996

8. Fisheries Co-management in Africa. 1997. Proceedings of a Regional Workshop on Fisheries Co-management Research. A.K. Normann, J.R. Nielsen and J. Sverdrup-Jensen. 1997.

9. Traditional Organizations in Fishing Communities of Small-Scale Fisheries in Vietnam. H.X. Thong and N.D. Thieu, Institute of Fisheries Economics and Planning. 1998.

Appendix 2

Fisheries Co-management Research Project
Research Activities Conducted by ICLARM and NARS in Asia as of July 1999

**1994**

1. Fisheries Co-management literature review. IFM and ICLARM staff. Disk and hard copy available.

2. Study on the Management of Fisheries/Aquatic Resources at the Local Level in the Philippines. UP College of Public Administration. Research Report No. 7.

3. A Review and Evaluation of Community-based Coastal Resource Management Programs and Projects in the Philippines, 1984-1994. Melvin B. Carlos and R. S. Pomeroy. Research Report No. 6. Journal article in Marine Policy. Reprint 5.

4. A Review of Coastal Fisheries Management Strategies and a Baseline Socio-economic survey of Small-Scale Fishing Households and Communities in Vietnam. H.X. Thong, P.T.H. Van and P.G. Hai, Institute of Fisheries Economics and Planning, Ministry of Fisheries, Vietnam. Working Paper 20.

5. Enforcement and Compliance with Fisheries Regulations in Malaysia, Indonesia and Philippines. Kuperan et al. Research Report 5.

6. Co-management of Coastal Resources in Bali, Indonesia. V. Nikijuluw. Working Paper 7.

7. Workshop on Experiences and Case Studies on Coastal Resource Community-based Management and Co-management in Palawan, Philippines. ICLARM staff. Research Report No. 4.

8. A Handbook for Rapid Appraisal for Fisheries Management Systems. ICLARM staff. Research Report 2. Journal article Reprint 4.

9. Fisheries Co-management and Small-Scale Fisheries: A Policy Brief. Pomeroy and Williams. Research Report 1.

10. Fisheries Co-management Project brochure.

11. Institutional Arrangements in the Fisheries Co-management in Malalison Island, Culasi, Antique, Philippines: A Process Documentation Research Methodology. SEAFDEC. Working Paper No. 15.

12. Development of a Management Plan for El Nido Marine Reserve, Palawan, Philippines. Foundation for the Philippine Environment and DENR. Working Paper No. 10.

1995

13. Analysis of Co-management Arrangements in Fisheries and Related Coastal Resources: A Research Framework. ICLARM/IFM core staff. Working Paper No. 1. Revised 1998.

14. Fisheries Co-management newsletters.

15. Visayas-wide Conference on Community-based Coastal Resources Management and Fisheries Co-management. ICLARM staff and partners. Working Paper No. 4.

16. Workshop on Co-management of Living Coastal Resources in ASEAN: Theory, Practice and Implications for Vietnam. Ministry of Fisheries, VCOP and ICLARM. Working Paper No. 24.

17. Transaction Costs and Fisheries Co-management. UPM. Working Paper No. 14. Journal article.

1996

18. Impact Evaluation of Community-based Coastal Resource Management Projects in the Philippines. ICLARM staff and Pollnac. USAID funding. Research Report No. 3. Journal article.

19. Pilot Site Activities in Honda Bay, Puerto Princessa City, Palawan, Philippines. SEAFDEC, SEARCA, Tambuyog and ICLARM. Working Paper no. 22. (Resource and Ecological Assessment of Honda Bay, Palawan. Len Garces and Dan Bonga)

20. A Review of Community-based Fisheries Management in Eastern Indonesia. V. Nikijuluw. Working Paper No. 18.

21. A Review of Natural Resource Laws and Policies in Indonesia and its Prospects for Fisheries Co-management. I. Susilowati. Working Paper No. 19.

22. A Review of Fisheries and Coastal Community-based Management Regime in Thailand. Tokrisna, Boonchuwong and Janekarnkij. Draft. Working Paper No. 32.

23. The Traditions and Organizations in Fishing Communities in Vietnam. Thong and Thieu. Research Report No. 9.

24. Analysis of Policies and Policy Instruments Relevant to the Management of Fisheries/Aquatic Resources with Emphasis on Local Level Issues and Concerns in the Philippines. SEARCA. Working Paper No. 25.

25. Evaluation of Co-management Arrangements in Small-Scale Tropical Fisheries. Mike Pido. PhD Dissertation support.

26. Seminar and Workshop on the Role of Communities in Coastal Resource Management in Indonesia. Yayasan Hualopu Foundation. Working Paper No. 26.

27. Case Study of San Salvador, Masinloc, Zambales, Philippines. Haribon Foundation. Working Paper No. 23.

28. Fisheries Co-management Case Study in the Oxbow Lakes of Bangladesh. Khan and Apu. Working Paper No. 35.

29. Case Study of the Institutional Arrangements in the Fisheries Co-management on Malalison Island, Culasi, Antique, Philippines. SEAFDEC. Working Paper No. 34.

1997

30. Case Studies of Community-based Coastal Resources Management in Vietnam. P.T.H. Van.

31. Measuring Transaction Costs for Fisheries Co-management Systems. Kuperan and Mustafa.

32. An Institutional Analysis of the Sasi Laut System in Maluku Province, Indonesia. Yayasan Hualopu Foundation. Working Paper No. 39.

33. An Analysis of Fisheries Co-management Arrangements: A Case of a Fishing Community in Southern Thailand. CORIN. Working Paper No. 37.

34. Asian Regional Workshop, 21-23 October, Phuket, Thailand. ICLARM staff.

35. Enforcement and Compliance with Fisheries Regulations in Malaysia, Indonesia and the Philippines. I. Susulowati. PhD dissertation.
Working Paper No. 41.

1998

36. Community-based Coastal Resource Management in Orion, Bataan, Philippines: A Case Study on the Development of a Municipal-Wide Community-Based Fisheries Co-management System. L. van Mulekom and E. Tria. Working Paper No. 38.

37. Welfare Impacts and Transaction Costs of Fisheries Co-management at Oxbow Lakes In Bangladesh. Khondher Murshed-e-Jahan. Working Paper No.42.

38. Mangrove Rehabilitation and Coastal Resource Management Project of Mabini-Candijay: A Case Study of Fisheries Co-management Arrangements in Cogtong Bay, Bohol, Philippines, ICLARM staff. Working Paper No. 33.

39. Policy Shifts in Fisheries Management in Malaysia. Kuperan.

40. Application of Participatory Methods for Co-management in Vietnam. Thong.

41. Coastal Resources Co-management Research Project-Phase 2 Planning Meeting for NARS-Asia Partners, 9 November, Chiang Mai, Thailand.

42. Project website www.co-management.org.

43. An Assessment of the Status of Coral Reefs and Reef Fish Abundance in San Salvador Marine Reserve, Philippines. L. Garces and I. Dones. Working Paper No. 43.

44. Management of Fisheries, Coastal Resources and the Coastal Environment in Southeast Asia and Bangladesh: Institutional, Legal and Policy Perspectives. M. Torell and A. Salamanca.

45. FISHCOM (Fisheries Co-management Network) e-mail list server.

1999

46. Co-management of Fisheries in Diverse Aqua-ecosystems of Southern Laos. Choulamany Xaypladeth.

47. Case Study on Community-based Fisheries Co-management in Phang Nga Bay, Thailand. Jate Pimoljinda.

48. An Analysis of Fisheries Co-management in West Sumatra Province, Indonesia: A Case Study of Ikan Larangan. Indah Susilowati.