Fisheries and Coastal Resources Co-management in Asia:

Selected Results from a Regional Research Project

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FOREWORD

During the last decade, there has been a shift in the governance of fisheries and coastal resources to a broader approach that recognizes fisher's participation, local stewardship, and shared decision-making in the management of fisheries. Through this process, fishers and resource users are empowered to become active members of the resource management team, balancing rights and responsibilities, and working in partnership with government, rather than antagonistically. This approach is called co-management.

It is becoming increasingly clear that governments, with their finite resources, cannot solve all fishery and coastal resource problems. Local communities will need to take more responsibility for solving local problems. In order to do this, however, communities must be empowered and provided with the resources to make decisions locally, and to take actions that meet local opportunities and problems. The assistance and support of government will still be needed to achieve these results, although the role and responsibilities of the government will also need to change. The concept of co-management has gained acceptance among governments, development agencies and development practitioners as an alternative fisheries management strategy to the top-down, centralized government management approach.

The Fisheries Co-management Research Project was the first global study of this management strategy. It was a unique partnership between the WorldFish Center, the Institute of Fisheries Management, and national partners in Asia and Africa. The results produced from the project were innovative and wide ranging. Overall, the project has been instrumental in raising the awareness of co-management strategies and arrangements among governments, 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 activities and networking, has been instrumental in reshaping government policies to support co-management.

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There were so many people involved with the project over its ten-year life that it is difficult to acknowledge and thank all of them individually. However, special thanks should be rendered to our partners at the Institute for Fisheries Management in Denmark, including Sten Sverdrup-Jensen, Jesper Raakjaer-Nielsen, Poul Degnbol and Doug Wilson. We would also like to acknowledge all of our national research partners in Asia (Bangladesh, Indonesia, Malaysia, Philippines, Thailand, Vietnam) and Africa (Benin, Cote d'Ivoire, Malawi, Mozambique, Senegal, South Africa, Zambia, Zimbabwe), with whom we shared insights and learned so much. We would also like to thank all the fishers and coastal resource users who answered our questions and provided valuable information and experience.

We also appreciate the dedication and efficiency of the co-management project team at ICLARM/WorldFish Center who guided the project, including Chingkel Juan, Brenda Katon, Mike Pido, Chel Gamo, Melvin Carlos, Emmanuel Genio, Canesio Predo, Ingvild Harkes, Magnus Torell, Len Garces, and Usha Kanagaratnam.

The first phase of the project was led by Robert Pomeroy and the second phase by K. Kuperan Viswanathan.

Abstract

This report presents the results of a ten-year Fisheries Co-management Research Project in Asia. The project was a collaboration of the WorldFish Center, the Institute for Fisheries Management (Denmark), and national research partners in Bangladesh, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam. Phase 1 ran for five years from 1994 to 1998 and Phase 2 ran for another five years from 1999 to 2003. The project was based on a mutual interest to gain practical experience in research on fisheries co-management; to evaluate 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 has identified the principles and conditions for implementation of fisheries co-management as a sustainable, equitable and efficient management strategy. The prospects for successful implementation were also assessed.

Summary

The Fisheries Co-management Research Project had the overall purpose of evaluating the prospects for the 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.

The research has shown that co-management provides a strong institutional structure to address fisheries and coastal resource management. However, the implementation of co-management is costly, complex and long. An enabling legal, policy and administrative structure from the government is required to support co-management. There needs to be a true partnership between the resource users/stakeholders and the government. This project has identified several key factors which communities with successful community-based co-management possess.

The case studies illustrate that community-based co-management can indeed promote a well managed fishery that maintains or improves both the quality and quantity of fish stocks and coastal ecosystems. Living standards of fishers and their families can be improved, and fishers can manage their fishery with no or limited outside (government) assistance. Fishers can also be empowered to take control of management and development of the fishery and community. However, there are no guarantees of success. Co-management will not necessarily work in every community. The chances for success and sustainability of co-management increase when people are informed, empowered, and are willing to participate.

LIST OF ACRONYMS

ADF – Antique Development Foundation (NGO)
AEA – Agro-ecosystem analysis
AFDEC – Andaman Sea Fisheries Development Center, Thailand
AM – Area manager of BRAC, Bangladesh
ANIAD – Antique Integrated Area Development Project
AR – Artificial reef
AQD – Aquaculture Department, SEAFDEC, Philippines
BBRMCI – Banate Bay Resources Management Council Inc., northern Iloilo, Philippines
BFAR – Bureau of Fisheries and Aquatic Resources, Philippines
BFARMCS – Barangay (village) Fisheries and Aquatic Resources Management Council, Philippines
BMC – Beel Management Committee, Indonesia
BRAC – Bangladesh Rural Advancement Committee (NGO partner of the CBFM project)
CBFM – (1) Community-based fisheries management
CBFM – (2) Community Based Fisheries Management Project, Bangladesh
CBM – Community-based management
CBRM – Community-based resource management
CBCRM – Community-based coastal resource management
CFRM – (1) Community fisheries resource management
CFRM – (2) Community Fishery Resource Management Project on Malalison Island, Philippines
CIDA – Canadian International Development Agency
CMPs – Co-management processes
CSC – Certificate of Stewardship Contract, Philippines
CVRP – Central Visayas Regional Project, Philippines
DA – Department of Agriculture, Philippines
Danida – Danish International Development Agency
DENR – Department of Environment and Natural Resources, Philippines
DGF – Directorate General f Fisheries, Indonesia
DILG – Department of Interior and Local Government
DMS – Development Management Scheme, Bangladesh
DOF – Department of Fisheries
EUS – Epizootic Ulcerative Syndrome disease
FAD – Fish aggregating device
FAMI – Fishermen's Association of Malalison Island, Philippines
FAO – Food and Agriculture Organization of the United Nations
FFG – Fish Farming Group, Bangladesh

FLA	– Fishpond Lease Agreement, Philippines
FSP	– Fisheries Sector Program, Philippines
GNP	– Gross national product
IAD	– Institutional analysis and development
ICLARM	– International Center for Living Aquatic Resources Management (in Manila, Philippines, prior to February 2000)
ICM	– Integrated coastal management
IFM	– Institute for Fisheries Management and Coastal Community Development, North Sea Centre in Hirtshals, Denmark
IDRC	– International Development Research Centre of Canada
IFAD	– International Fund for Agricultural Development
IMC	– Integrated Municipal Council, Philippines
IPC	– Institute of Philippine Culture
KUD	– Cooperative, Indonesia
LFT	– Lake Fishing Team, Bangladesh
LGA	– Line government agency
LGSP-CIDA	– Loca Governmet Support Program of CIDA
LGU	– Local government unit, Philippines
LIPASECU	– Libertad, Pandan, Sebaste and Culasi, Philippines
LMD	– Village government, Indonesia
LMG	– Lake Management Group, Bangladesh
LTK	– Local island organization, San Salvador, Philippines
MBEF	– Management Board for Protected and Environmental Forest, Vietnam
MCPSS	– Marine Conservation Project for San Salvador, Philippines
MFARMCS	– Malalison Fisheries and Aquatic Resources Management Council, Philippines
MO	– Municipal Ordinance
MOF	– Ministry of Fisheries, Vietnam
MOL	– Ministry of Land, Bangladesh
MPA	– Marine protected area
MRCRMP	– Mangrove Rehabilitation and Coastal Resource Management Project, Philippines
MSY	– Maximum sustainable yield
NARS	– national research partners
NFMP	– New Fisheries Management Policy (Bangladesh and Indonesia)
NGO	– non-governmental organization
NFINS	– Number of days a fisher has fished in the prohibited zone/inshore areas
NNARMC	– Northern Negros Aquatic Resources Management Council, Sagay, Philippines
OLP	– Ox-bow Lake Co-management Project, Bangladesh

OLPI – Ox-bow Lakes Project, Bangladesh (funded by the World Bank)

OLPII – Ox-bow Lakes Small-scale Fishermen Project, Bangladesh

PCA – Principal component analysis

PD – Process documenter

PDR – Process Documentation Research

PO – People's organization

PRA – Participatory rural appraisal

PRRM – Philippine Rural Reconstruction Movement (NGO)

PROCESS – Participatory Research Organization of Communities and Education toward the Struggle for Self-Reliance Foundation (NGO), Philippines

RAFMS – Rapid Appraisal for Fisheries Management Systems (also, Rapid appraisal approach to evaluation of community-level fisheries management systems)

REA – Resource and ecological assessment

RIMF – Research Institute for Marine Fisheries, Indonesia

RRA – Rapid rural appraisal

RRDP – Rain-fed Resources Development Project, Philippines (funded by USAID)

SEAFDEC – Southeast Asian Fisheries Development Center

SIDA – Swedish International Development Cooperation Agency

SPSS – Samahang Pangkaun-laran ng San Salvador, Philippines

SRDDP – Sustainable Rural District Development Program, Philippines (program of the NGO PRRM)

SSI – Semi-structured interviews

SUGPO – Samahan at Ugnayan ng Pangisdaan sa Orion, Bataan, Philippines

TFO – Thana Fisheries Officer, Bangladesh

TMFA – Tunas Mekar Fishers Association, Indonesia

TURFs – Territorial use rights of fisheries

UPV – University of the Philippines in the Visayas

USAID – United States Agency for International Development

VCOCCP – International Institute for Rural Reconstruction, Cavite, Philippines

VIOLT – Violation decision variable

YFA – Yadfon Association (NGO), Thailand

CHAPTER ONE

Introduction

In 1994, the WorldFish Center*, located in Penang, Malaysia, and the Institute for Fisheries Management and Coastal Community Development (IFM) at the North Sea Centre in Hirtshals, Denmark, in collaboration with national research partners (NARS) in several countries in Asian (Philippines, Vietnam, Thailand, Malaysia, Indonesia, Bangladesh) and Africa (Malawi, Zambia, Zimbabwe, Mozambique, South Africa, Benin, Cote d'Ivoire, Senegal), initiated the ten-year Fisheries Co-management Research Project. The project was implemented in two phases. Phase 1 ran for five years from 1994 to 1998 and Phase 2 ran for another five years from 1999 to 2003.

The collaboration between the WorldFish Center, IFM, and NARS was based on a mutual interest to gain practical experience in research on fisheries co-management to evaluate 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 was funded by the Danish International Development Agency (Danida). Additional funding was obtained for project activities from the United States Agency for International Development (USAID), the International Development Research Centre of Canada (IDRC), the Netherlands Development Cooperation, and the Swedish International Development Cooperation Agency (SIDA).

The purpose of this publication is to present a synthesis of the findings from the various research activities of the project in Asia and the outputs of NARS partners in particular. More specifically, 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 presents the results of the project research activities in Asia over its ten-year life span.

1.1 Project overview

The purpose of this section is to allow the reader to gain an overall understanding of the project in order to be able to put the various research activities undertaken by the project into perspective, and to better evaluate its accomplishments, outputs and research results. The two phases will be discussed separately.

1.1.1 Project objectives and expected benefits

Phase 1 of the project had both a development and an immediate objective (ICLARM 1993). The global development objective to which the Fisheries Co-management Research Project is to contribute is: 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 regionally or nationally applicable fisheries co-management models developed and applied to selected aquatic resource systems in several countries and pilot sites in Asia and Africa.

* The WorldFish Center (formerly known as the International Center for Living Aquatic Resources Management (ICLARM)) was headquartered in Manila, Philippines prior to February 2000.

During Phase 1, the project tested the applicability of the fisheries co-management model as an alternative fisheries management strategy under varying conditions (political, social, cultural, economic, biophysical, and technological) worldwide. General principles and propositions that facilitate successful fisheries co-management were identified and documented at both the national government and community/fisher organization levels.

The research project established in what situations co-management can be a sustainable, equitable and efficient management strategy and recommended how it can be successfully implemented. Specific methodologies and guidelines for implementing fisheries co-management at the national government and community/fisher organization levels are now available for use by the target beneficiaries. Several of the partner countries have taken action at both the national government and community/fisher organization levels to implement fisheries co-management strategies.

The second phase of the project was based on the need to continue with the research activities started in Phase 1 and to develop new research directions in order to generate more specific information for policy development and practical applications (ICLARM 1998). The main objective of Phase 2 was to discern the benefits and weaknesses of the co-management approach in terms of three outcome criteria – sustainability, efficiency and equity; and to discover under what conditions these benefits and weaknesses are manifest (IFM/ICLARM-World Fish Center 2001).

1.1.2 Project Strategy

The project strategy for both phases of the project was to conduct research on a variety of aquatic resource systems and countries around the world (ICLARM 1993, 1998). The selection of various aquatic resource systems (coastal, coral reef, lake, river/floodplain) and certain countries in which to implement the project was to test under what conditions fisheries co-management can be an alternative fisheries management strategy. Asia and Africa were selected as the two regions of focus for both phases of the project based on priority regions for fisheries research identified by the WorldFish Center's strategic plan (ICLARM 1992). The partner countries selected to conduct the project were given priority based on a number of criteria. These criteria included:

1. number of beneficiaries to be affected by the research results,
2. magnitude of impact on beneficiaries,
3. extent of potential use by NARS and host government,
4. extent to which results would strengthen national programs,
5. interest of NARS and host government in the project,
6. contribution of project results to sustainable, equitable and efficient fisheries resource management in the country,
7. probability of achieving research objectives, and
8. potential for methodological and paradigm transfer to other countries, NARS and resource user groups.

Partner countries in Asia during Phase 1 were the Philippines, Vietnam, Thailand, Malaysia, Indonesia and Bangladesh. During Phase 2, Cambodia was also included in the project. Partner countries in Africa included South Africa, Malawi, Mozambique, Zimbabwe, Zambia, Senegal and Benin.

The research activities of Phase 1 of the project were conducted through three components (ICLARM 1993):

1. comparative case studies of fisheries co-management;

2. country research; and

3. information exchange.

The first component, comparative case studies, made 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 the national government and community levels. This research component has resulted in a publication by Sen and Raakjaer-Nielsen (1996). The second component, country research, was a comparative assessment to evaluate and document the approaches and processes of fisheries co-management implementation at the community/fisher organization level and the 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 was to gain detailed and practical understanding and experience into the approaches, institutional arrangements, performance, and legal and policy factors affecting the implementation of fisheries co-management. The country research made use of a variety of 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 was conducted at both the national government and community/ fisher organization levels, and was done in collaboration with NARS partners. The third component, information exchange, was a networking and training activity among and between the research partners.

The research activities under Phase 2 had a multi-site, multi-method research design in which comparisons were made among various co-management programs (IFM/ICLARM-World Fish Center 2001). Three research strategies were employed with different emphases given the needs of respective partners:

1. case studies used to test hypotheses by making comparisons both between the same case at different times and between cases;
2. identifying best practices; and
3. special studies that examine methodological or background issues.

A number of hypotheses concerning the advantages of co-management were tested under Phase 2. These 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; and
- conflict management: improvement.

A number of cross-cutting issues were tested in Phase 2 including:

- gender: roles in management;

- organizational form: most appropriate and effective;
- scale: institutional and organizational arrangements, ecosystem, users
- process: institutional and organizational arrangements, evolution of time (dynamics);
- structure and content of agreements; and
- impact: measurement of short and long term impacts of co-management.

1.1.3 Project research framework

Both phases of the research project made use of a comparative analytical approach, relying on a common research strategy and framework for use in each partner-country and resource system, in order to integrate and improve the understanding and implementation of co-management strategies (ICLARM 1993, 1998).

In Phase 1, an institutional analysis research framework was developed that provided for a structured approach to examine and document the origin, current status, operation and performance of fisheries co-management systems. Institutional analysis, which examines how institutional arrangements and the set of rights and rules by which a community organizes activities affect user behavior and incentives, provided the basic research framework for studying fisheries co-management institutions. The research framework was designed to be specific enough to provide guidance in case study settings, yet general enough for use in a range of situations, and useful in both documentation and implementation of fisheries co-management systems. This framework was used in all the three research components of Phase 1. The use of a common framework allowed data to be collected and analyzed in a standardized format, the results to be compared, and generalizations to be made about fisheries co-management systems for use within the country and shared with others worldwide.

In Phase 2, however, emphasis was put on relationships between the institutional analysis research framework, and specifically on the context variables (demographic and political economy; biological, physical and technical attributes; market attributes; external institutional and organizational arrangements), the attributes of the co-management process (size, structure, history, embeddedness, representation, enforcement) and conflict, and certain dependent variables (transactions costs, equity, resilience) (IFM/ICLARM-World Fish Center 2001). Three hypotheses were developed as areas of investigation that could add new knowledge to the overall understanding of co-management.

More information on the research framework used in both phases of the project is presented in Chapter 3.

1.2 Data sources

The focus of this publication is the research undertaken by the NARS partners, in some cases working with WorldFish Center staff, in the Philippines, Vietnam, Thailand, Cambodia, Malaysia, Indonesia, and Bangladesh over the last ten years. Selected outputs of NARS partners are highlighted. Over fifty researchers worked with the project and over sixty individual research projects and activities were undertaken during the life of the project (see Appendix 1 for a list of project publications). The NARS partners and WorldFish Center staff prepared annual research work plans in order to sequence and coordinate research activities in each country and the region.

The research projects and activities include the following:

a) Reviews of community-based coastal resources management and co-management experiences

   Vietnam (Thong et al. 1996; Ministry of Fisheries/VCOCCP/ICLARM 1995; Thong and Thieu 1998)

   Philippines (Carlos and Pomeroy 1996)

   Indonesia (Nikijuluw 1996a + b)

   Thailand (Tokrisna et al. 1998)

   Asia (Pomeroy 1995)

b) Case study analysis

   Bangladesh (Khan and Apu 1998; Thompson et al. 1998)

   Thailand (Masae et al. 1998; Pimoljinda and Boonraksa 2000)

   Indonesia (Nikijuluw 1996; Novaczek and Harkes 1998; Novaczek et al. 2001; Susilowati 2000)

   Vietnam (Pham and Phung 1999)

   Philippines (Pomeroy and Pido 1995; Villavicencio and Baling 1995; Agbayani and Babol 1997; Katon et al. 1997; Baticados and Agbayani 1998; Katon et al. 1998; van Mulekom and Tria 1999; Garces and Done 1998).

c) Methodology development (Pido et al. 1996a + b; Agbayani and Babol 1998; Pomeroy et al. 1996; and Harkes 2001).

d) Hypothesis testing of advantages or benefits of co-management (Kuperan et al. 1996; Kuperan et al. 1997; Kuperan et al. 1998; Murshed-e-Jahan et al. 1999; Susilowati 1998; Baylon 2002; Siar et al. 2004; Susilowati 2002; Masae et al. 2002; Siason 2002; Harkes 2001; Fernandez and Carnaje 2002; Nao Thuok et al. 2003; Thompson et al. 2000)

e) Government legal, institutional and policy analysis (University of the Philippines 1996; Susilowati 1996; Fellizar et al. 1997; Pomeroy and Berkes 1997; Torell 1998; Purwaka and Sunoto 1999; Ehsanul 1999; La Vina 1999)

f) Meeting and workshops (Pomeroy 1994; Foltz et al. 1996; Institute of Fisheries Management 1995; ICLARM 1996; Pido 1996a; Middendorp et al. 1999; Viswanathan et al. 2000; Viswanathan et al. 2004).

g) Pilot site (ICLARM/SEARCA/SEAFDEC-AQD/Tambuyog 1997).

h) Other publications (Pomeroy and Williams 1994; Sen and Nielsen 1996; Pomeroy 1998; Brown and Pomeroy 1999; Pomeroy et al. 2000; Pomeroy et al. 2001; Viswanathan et al. 2003; Wilson, Nielsen and Degnbol 2003; Nielsen et al. 2004; Pomeroy and Rivera-Guieb 2005)

It is important to note that many research outputs from the project, primarily from WorldFish and IFM staff, have appeared elsewhere in scientific journal articles, books, conference proceedings and other publications over the last decade. It was felt that it was not necessary to duplicate these outputs in this publication. It was more important to highlight the outputs of the NARS partners, most of which have only appeared as project reports and have not been widely circulated.

1.3 Publication outline

This research report has seven chapters. The first three chapters serve as background information about the project and about co-management. Starting with chapter four, new information and results generated from this research project are presented. Following the introductory Chapter 1, Chapter 2 discusses the definition of co-management, the theoretical concepts behind co-management, and its advantages and disadvantages, as well as the institutional analysis research framework used. Chapter 3 describes the research framework used in the two phases of the project. In implementing the fisheries co-management project, it became necessary to develop new research methods and to further refine existing methods. In Chapter 4, four methods for research on co-management - rapid appraisal, process documentation, impact and performance evaluation, and measuring success are elaborated. 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. Five of these hypotheses – lower transaction costs, improved enforcement and compliance, scaling up, participation, and institutional resilience – were tested during the research project. The results of the research are presented in Chapter 5. A summary of a number of co-management case studies from around Asia, all conducted using the institutional analysis research framework, are presented in Chapter 6. The final chapter, Chapter 7, is a discussion of lessons learned from the project and the future prospects for fisheries co-management in Asia.

CHAPTER TWO

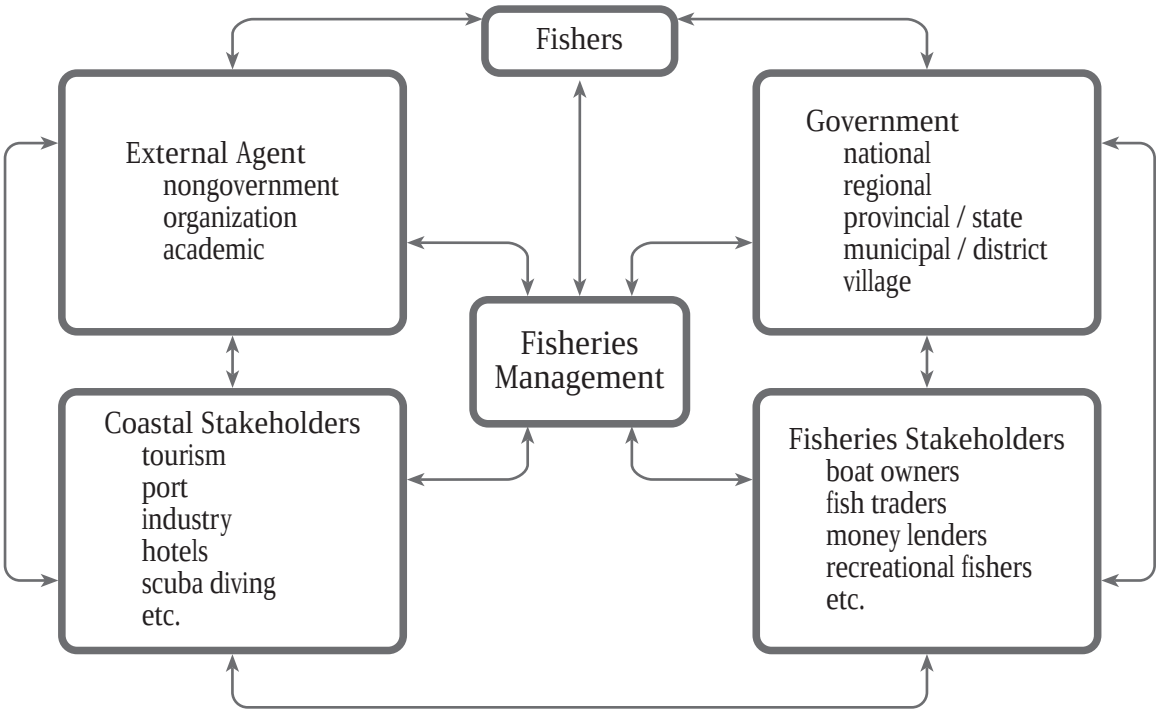
Fisheries and Coastal Resources Co-management

This chapter discusses concepts and definitions concerning fisheries and coastal resources co-management.

2.1 Co-management defined

Cooperative management or co-management can be defined as a partnership arrangement in which the community of local resource users (fishers), government, other stakeholders (boat owners, fish traders, boat builders, business people, etc.) and external agents (non-governmental organizations, academic and research institutions) share the responsibility and authority for the management of the fishery (Figure 1). Through consultations and negotiations, the partners develop a formal agreement on their respective roles, responsibilities and rights in management; referred to as "negotiated power". Co-management is also called participatory, joint, stakeholder, multi-party, or collaborative management.

Figure 1. Fisheries Co-management is a partnership



Fisheries Co-management is a partnership

Co-management covers various partnership arrangements and degrees of power-sharing and integration of local (informal, traditional, customary) and centralized government management systems (Figure 2). Fisheries co-management can be classified into five broad types according to the role government and fishers play (Sen and Nielsen 1996):

Instructive: There is only minimal exchange of information between government and fishers. This type of co-management regime is only different from centralized management in the sense that the mechanisms exist for dialogue with users, but the process itself tends to be the government informing fishers on decisions they plan to make.

Consultative: Mechanisms exist for government to consult with fishers but all decisions are taken by the government.

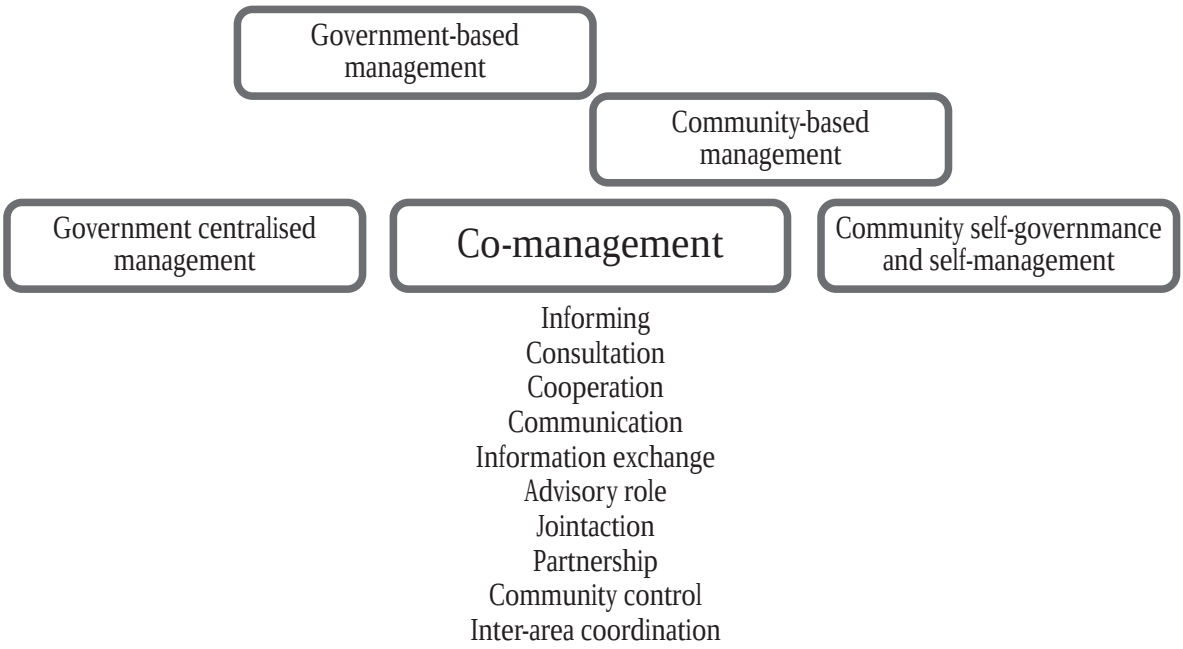
Cooperative: This type of co-management is where the government and fishers cooperate together as equal partners in decision-making.

Advisory: Fishers advise the government on decisions to be taken and the government endorses these decisions.

Informative: The government has delegated the decision-making authority to fisher groups who are responsible for informing government of the decisions made.

It is generally acknowledged that not all responsibility and authority should be vested at the community level (Box 2.1). The amount and types of responsibility and/or authority that the state level and the various community levels have will differ, and depend upon country and site-specific conditions. The substance of this sharing of responsibility and authority will be negotiated between community members and the government within the boundaries of government policy. Determining what kind of and how much responsibility and/or authority to allocate to the community level is ultimately a political decision in which the government will always play a more decisive role. However, the key to co-management is the negotiation and agreement between the state and non-state actors concerning an important factor in defining a common and acceptable balance in sharing power and allocating responsibilities.

Figure 2. Co-management integrates local and centralized government management systems



BOX 2.1: Community

The term "community" can have several meanings. Community can be defined geographically by political or resource boundaries, or socially as a community of individuals with common interests. For example, the geographical community is usually a village political unit (the lowest governmental administrative unit); a social community may be a group of fishers using the same fishing gear or a fisher organization. A community is not necessarily a village, and a village is not necessarily a community. Care should also be taken not to assume that a community is a homogeneous unit, as there will often be different interests in a community, based on gender, class, ethnic, and economic variations. Recently, the term "virtual community" or "community of interest" has been applied to non-geographically based communities of fishers. Similar to the "social community", this is a group of fishers who, while they do not live in a single geographical community, use similar gear or target the same fish species or have a common interest in a particular fishery.

2.2 Co-management as a process

There is no blueprint or model for co-management but rather a variety of arrangements from which to choose to suit a specific context. Co-management should be viewed not as a single strategy to solve all problems of fisheries management, but rather as a process of resource management, maturing, adjusting and adapting to changing conditions over time. A healthy co-management process will change steadily in response to changes in the level of trust, credibility, legitimacy, and success of the partners and the whole co-management arrangement. Co-management involves aspects of democratization, social empowerment, power sharing, and decentralization. Co-management attempts to overcome the distrust, corruption, fragmentation and inefficiency of existing fisheries management arrangements though collaboration. Co-management is adaptive; that is, through a learning process, information is shared among partners, leading to continuous modifications and improvements in management. Through co-management, the partners actively contribute and work together on fisheries management. They share the costs and benefits and the successes and failures.

Although regulations are used, co-management is not a regulatory technique. It is a participatory management strategy that provides and maintains a forum or structure for action on empowerment, rule making, conflict management, power sharing, social learning, dialogue and communication, and development among the partners. Co-management is a consensus-driven process of recognizing different values, needs, concerns and interests involved in managing the resource. Partnerships, roles and responsibilities are pursued, strengthened and redefined at different times in the co-management process, depending on the needs and opportunities, the legal environment, the political support, capacities of partners, and trust between partners. The co-management process may include formal and/or informal organizations of fishers and other stakeholders.

The establishment and operation of co-management can be complex, costly, time-consuming, and sometimes confusing. Research has shown that it may take three to five years to organize and initiate activities and interventions at the community level. It will also take this time for the partners to address concerns about legitimacy, trust, accountability and transparency.

Co-management can be considered as a middle course between the government's concern about social efficiency and equity and local concerns for active participation and self-regulation. Co-management involves a formal or informal agreement among partners to share power and to share the right to manage. Co-management can serve as a mechanism not only for fisheries management but also for community, economic and social development as it promotes fisher and community participation in solving problems and addressing needs. In some cases, co-management may be simply a formal recognition of a fisheries management system that already exists; some informal and customary community-based management strategies are already in place, operating side-by-side with formal state-level management strategies.

2.3 Stakeholder involvement

Other than fishers, stakeholders (individuals, groups or organizations who are in one way or another interested, involved or affected (positively or negatively) by a particular action) that derive economic benefit from the resource (for example, boat owners, fish traders, business suppliers, police, politicians, consumers) should also be considered in co-management (see Section 4). These stakeholders often hold considerable political and/or economic influence in the community and over resource use and

management. A proper balance of representation among stakeholders will prove crucial to the success of co-management (Box 2.2). A central question, however, is which stakeholders should be represented and involved and how those representatives should be chosen. While it is useful to have representation of all stakeholders, a line must be drawn or else the process will break down from the representation of too many interests. As will be discussed in Section 5, stakeholder analysis can help to identify those stakeholders who should be included in co-management. This question can be partially answered by determining the spatial scale at which co-management should operate. The best opportunity for co-management seems to occur at the local or "community" scale (although national level fisheries advisory bodies to government can also be effective).

Box 2.2: Community and stakeholders

The term "community" tends to abstract the diversity of interests among different groups of people. For example, some "community consultations" are mainly attended by men but the results are considered as the output of the "community." The invisibility of women, especially in fisheries, is disregarded because fisheries is often viewed in a limited sense, i.e. mainly from the capture of marine or aquatic produce. While women rarely fish, they play important roles in pre- and post-production activities in fisheries.

The term "stakeholders" could aggregate people too, with disregard for differential needs and interests. Stakeholders that only include the direct users of the coastal resources is a limiting conception. The non-recognition of women as direct users because they are not fishers (in the traditional sense) has resulted in their limited access, participation and benefits to coastal resource management projects and similar intervention focused on fisheries. The 1998 Philippine Fisheries Code has an initial recognition of women's interests in fisheries development even though it is limited in providing a single-seat for a women's organization in the fisheries council and still lacks an appreciation of women-specific issues in the agenda of the council. More work is definitely needed to better understand the contributions of women to fisheries.

Source: Tanyang, Gaynor. 2001. Women in Fisheries: A Review of Limited Literature. A paper commissioned by the NGOs for Fisheries Reform for the Workshop on Fisheries and Gender held on 25-26 September 2001.

2.4 Equity and social justice

Through co-management, equity and social justice in fisheries management are sought. Equity and the equitable sharing of power among and between government, fishers and other stakeholders in a community are often thorny issues in co-management. These issues are usually visible along social and economic divides in a given community, such as gender roles. Those fishers who will receive the costs (and benefits) of management and regulation need to have a voice in decision-making about fisheries management. Equity and social justice is brought about through empowerment and active participation in the planning and implementation of fisheries co-management. Responsibility means fishers have a share in the decision-making process and bear the costs and 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 regulations. The mutuality of interests and the sharing of responsibility among and between partners will help to narrow the distance between resource managers and fishers, bringing about closer compatibility of the objectives of management.

2.5 Co-management and common property

Co-management is based on the common property theory (Box 2.3). Co-management provides for the collective governance of common property resources. Common property regimes are forms of management based on a set of individually accepted rights and rules for the sustainable and interdependent use of collective goods. A collective good is defined as a resource that is managed and controlled by a group of users. A common property regime is composed of a recognized group of users, a well-defined resource that the group uses and manages, and a set of institutional arrangements for use of the resource. In some situations, the group may formalize the institutional arrangements with an organizational structure for management. Common property represents private property for the group of co-owners (Gibbs and Bromley 1989).

BOX 2.3: Property rights regimes

The literature on property rights identifies four ideal analytical types of property rights regimes:

- State property: with sole government jurisdiction and centralized regulatory controls;
- Private property: with privatization of rights through the establishment of individual or company-held ownership;
- Communal property: in which the resource is controlled by an identifiable community of users or collectively, and regulations are made and enforced locally; and
- Open access: absence of property rights.

In reality, many marine and coastal resources are held under regimes that combine the characteristics of two or more of these types. The four property rights regimes are ideal and 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, deriving their strength from them. Resource managers cannot function effectively unless they know the property rights regime they are dealing with.

Source: Bromley 1991

Common property resources share two key characteristics (Ostrom 1991). First, they are resources for which exclusion (or control of access) of potential users is problematic. Second, the supply is limited, that is, consumption by one user reduces its availability to others. It is also important to make a distinction between a resource unit and a resource system. A resource unit (what individuals take from the resource system such as fish) is not jointly used while the resource system itself, the fishery, is subject to joint use.

Co-management is a governance arrangement located between pure state property and pure communal property regimes. It should be noted that while state law can enforce or strengthen communal property, it might not always do so. The level of help from the state will depend on its willingness to support communal property systems.

2.6 Institutional arrangements and collective action

Common property regimes as collective resource management systems have been shown to develop when a group of individuals are highly dependent on a resource and when the availability of the resource is uncertain or limited (Runge 1992). If the resource problem is repeatedly experienced, such as low or no catch, and if it exists within a single community of users, the fishers are likely to develop

a collective institutional arrangement to deal with the problem. Institutional arrangements are sets of rights the fishers possess in relation to the resource and the rules that define what actions they can take in utilizing the resource. In the face of uncertainty in resource availability, fishers are more willing to group together to trade-off some benefit from individual use of the resource for the collective assurance that the resource will be used in a more equitable and sustainable manner (Gibbs and Bromley 1989). Institutions, through rights and rules, provide incentives for the group members to take certain actions to achieve a desired outcome. Institutional arrangements require an investment of time on the members' part to build. Coordination and information activities are initial aspects of building institutions. The transaction process of developing institutions will have costs. These transaction costs can be defined as the costs of: (1) obtaining information about the resource and what users are doing with it; (2) reaching agreements with others in the group with respect to its use; and (3) enforcing agreements that have been reached. For common property regimes, these costs are part of the collective decision-making process.

An individual member of the group relies on reciprocal behavior from other members of the group regarding their adherence to the agreed upon rules for management. An individual's choice of behavior in a collective action (action taken by a group - either directly or on its behalf through an organization - in pursuit of members perceived shared interests) will depend upon how he or she weighs the benefits and costs of various alternatives and their likely outcomes. An individual's choices are often affected by limited information that leads to uncertainty and by the level of opportunistic behavior (taking advantage of a situation in your own self-interest so as to get the benefit while bearing less of the cost) that individual resource users can expect from other resource users. Individuals also have differing discount rates (the value people put on the future benefits from the resource versus today); many poor fishers, for example, attributing less value to benefits that they expect to receive in the future, and more value to those expected in the present (Ostrom 1991).

In some situations, individuals may have incentives to adopt opportunistic strategies to circumvent the rules and to obtain disproportionate benefits at the cost of others. Three types of opportunistic behavior may occur: (1) free riding, (2) corruption, and (3) rent seeking. Free riders (holding back on one's contribution so as to get the benefit while bearing less of the cost) respond to incentives to engage in other activities while other members of the group work. Corruption can occur when incentives exist for rules to be changed for an individual through, for example, the provision of illegal payments. Rent seeking (the gaining of excess profits from the resource) can occur when an individual's assets, such as property rights, increase in value through special advantages (Ostrom 1992; Tang 1992). The imperative of the common property regime is to establish institutional arrangements that reduce or minimize transaction costs and counteract opportunistic behavior.

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. The collective group must overcome two broad classes of problems. The first, call appropriation problems, is concerned with how to allocate the resource units (i.e. fish) in an economically efficient and equitable manner among the resource users. The second, called provision problems, is focused on behavioral incentives to assigned duties to maintain and improve the resource over time.

Collective action does not occur where there is no organization that has authority to make decisions and to establish rules over the use of the resource. Note that institutions are not organizations. Organizations put into effect institutional arrangements (Bromley 1991). There can be a variety of organizational forms for governing the resource that may range from a government agency or enterprise to the fishers themselves. The common property regime will need to establish an agenda and goals to be achieved. This may include an identification of the problem or issue to be addressed, management and adjudication. The authority system to ensure that fishers' expectations are met is normally inherent in the organization.

However, membership within common property regimes is not always equal. Some members may have fewer or lesser rights than others. Access to the resources, for example, may change or rotate for members through the year. Corresponding duties may or may not vary accordingly. The rights and duties of members of the group must be clearly specified.

Collective action entails problems of coordination that do not exist in other resource regimes, such as private property. In order to organize the harvesting, for example, fishers must develop rules to establish how rights are to be exercised. Rules give substance to rights, structure a situation, define the behavior of the group's members, and reduce conflicts. Rules may create different incentive structures that affect cooperation or conflict among fishers (Tang 1992). The type of rules that are devised will depend upon the severity of the problem the fishers face, the level of information they possess, socio-cultural traditions, the extent of the bundle of rights they hold, the level of opportunistic behavior, and the ease with which actions can be monitored and enforced. Rules require, permit or forbid some actions or outcomes. Rules provide stability of expectations, and efforts to change rules can rapidly reduce their stability (Ostrom 1991).

The institutions and rules the fishers use may not always be the same as formal laws. The fishers may develop institutions and rules to meet their needs that are not legitimized by government.

For institutional arrangements to be maintained over time, it is important to develop workable procedures for monitoring the behavior of fishers, enforcing against non-conforming behavior with sanctions, and settling conflicts. The ease and costliness of monitoring rules devised to organize the fishing activity depend upon the physical nature of the resource, the rules-in-use, and the level of compliance with the rules (Ostrom 1990). The number of times that non-compliance must be measured affects the cost of monitoring. The ease and cost of monitoring will depend upon whether the fishers can monitor compliance themselves while fishing or through self-monitoring incentives, or if they must establish more elaborate arrangements or engage external authorities.

Fishers who violate the rules need to have sanctions imposed upon them. What constitutes an effective sanction will vary depending upon the nature of the group of fishers. In most cases, sanctions are likely to increase with the severity of the offense (Ostrom 1992).

Conflicts may arise within the common property regime and between users. The intensity and frequency of conflicts are likely to be closely related to the perceived relative scarcity of the resource. Conflict can arise due to several factors including: (1) absence of recognized rules, (2) divergence in the interpretation of the rule, and (3) outright trespass of a rule. Part of the institutional process must include a mechanism for discussing and resolving what is and is not a rule violation and how to settle the dispute. This can be done formally or informally. In general, for monitoring and sanctions to be

effective, the fisher must have a stake in the institutional processes and be involved in monitoring and enforcement (Townsend and Wilson 1987).

Common property regimes and their associated institutional arrangements need to be dynamic in order to adjust to new opportunities, internal growth, externalities, and institutional dissonance (Ostrom 1992). Institution building is a long-term process and often is based on trial and error. Allocation rules, for example, may need to change as a result of poor compliance. The structuring of institutions must be an ongoing process to meet the changing conditions.

Whether or not local, self-governing institutions can be developed is often dependent upon governmental policies. In countries that do not recognize the rights of local community organizations or do not create opportunities for communities to organize themselves in a de facto manner, it is more difficult for fishers to successfully find solutions to collective action problems. Many governments are not willing to give up management authority over resources or do not believe that self-governing organizations can be successful. There is no one single answer for how to resolve these differences.

2.7 Community-based management

Community-based management (CBM) is a central element of co-management. There is some debate over the similarities and differences between co-management and CBM. Community-based resource management, as explained by Korten (1987), includes several elements: a group of people with common interests, mechanisms for effective and equitable management of conflict, community control andmanagement of productive resources, local systems or mechanisms for capture and use of available resources, broadly distributed participation in control of resources within the community, and local accountability in management. Sajise (1995) has defined community-based resource management (CBRM) as "a process by which the people themselves are given the opportunity and/or responsibility to manage their own resources; define their needs, goals, and aspirations; and to make decisions affecting their well-being." Sajise further states that "CBRM as an approach emphasizes a community's capability, responsibility and accountability with regard to managing resources. It is inherently evolutionary, participatory and locale-specific and considers the technical, sociocultural, economic, political and environmental factors impinging upon the community. CBRM is basically seen as community empowerment for resource productivity, sustainability and equity."

According to Ferrer and Nozawa (1997), "community-based coastal resource management (CBCRM) is people-centered, community-oriented and resource-based. It starts from the basic premise that people have the innate capacity to understand and act on their own problems. It begins where the people are, i.e., what the people already know, and builds on this knowledge to develop further their knowledge and create a consciousness."

They further state that "… it strives for more active people's participation in the planning, implementation and evaluation of coastal resources management programs. CBCRM allows each community to develop a management strategy that meets its own particular needs and conditions, thus enabling a greater degree of flexibility and modification. A central theme of CBCRM is empowerment, specifically the control over and ability to manage productive resources in the interest of one's own family and community. It invokes a basic principle of control and accountability which maintains that control over an action should rest with the people who bear its consequences."

Fellizar (1994) writes, "CBRM can be looked at in various ways. It can be a process, a strategy, an approach, a goal or a tool. It is a process through which the people themselves are given the opportunity and/or responsibility to manage their own resources; define their needs, goals and aspirations; and make decisions affecting their well-being. A strategy for achieving a people-centered development, CBRM has a decision-making focus in which the sustainable use of natural resources in a given area lies with the people in the local communities. CBRM is an approach through which communities are given the opportunity and responsibility to manage in a sustained way the community resources, define or identify the amount of resources and future needs, and their goals and aspirations, and make decisions affecting their common well-being as determined by technical, sociocultural, economic, political and environmental factors. It is a tool that facilitates the development of multilevel resource management skills vital to the realization of potentials of the community. Also, CBRM stands for people empowerment and achieving equity and sustainability in natural resource management. The key concepts are community, resources, management, access and control over resources, viable organizations and availability of suitable technology for resource management and utilization."

Rivera (1997) states that the CBCRM approach has several characteristics. It is consensus-driven and geared toward achieving a balance of interests. The emphasis is on communities and at its core is the community organization. It is a process of governance and political decision-making and it is geared toward the formation of partnerships and power sharing. Rivera writes, "It can be argued that CBCRM is a politically negotiated process of making decisions on the ownership, control and overall policy directions of coastal resources. Questions of resource allocation, distribution of resource benefits and management arrangements among stakeholders will always have to be included. Moreover, CBCRMs central concern is the empowerment of groups and social actors and a sense of self-reliance at the micro-level that stimulates a more synergistic and dynamic linkage to the meso- and macro-levels. Further, it can be argued that CBCRM is the route to co-management. It is maintained that power issues are central to the formation of co-management schemes. Hence, partnerships between government and communities should take careful consideration of the capacities of communities in making and sustaining these partnerships." Rivera states that in the Philippines, much of the work of non-governmental organizations (NGO) on CBCRM can really be considered as co-management. Co-management is referred to by the NGOs as tripartite formation between the government, the community and the NGO. NGOs also refer to co-management as "scaling-up", i.e. the recognition that the state cannot be ignored in sustaining local actions. The scaling-up efforts of NGOs include project replication, expansion of the geographic scale of management efforts (i.e. single community to multi-jurisdictional), building grassroots movements, and influencing policy reform.

2.8 Community-based management (CBM) and co-management

The above definitions of community-based resource management show that while there are many similarities between co-management and CBM, there are differences in the focus of each strategy. These differences center on the level and timing of government participation in the process. CBM is people-centered and community-focused, while co-management focuses on these issues plus on a partnership arrangement between the government and the local community of resource users. The process of resource management is organized differently too. Co-management has a broader scope and scale than CBM with a focus both inside and outside the community. The government may play a minor role in CBM; co-management, on the other hand, by definition includes a major and active government role.

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. CBM practitioners sometimes view the government as an external player and adversary, to be brought into the process only at a late stage, if at all. This can lead to misunderstandings and lack of full support from the government. Co-management strategies, on the other hand, involve government agencies, resource managers and elected officials early and equally, along with the community and stakeholders, developing trust among the participants.

When CBM is considered an integral part of co-management, it can be called community-based co-management. Community-based co-management includes the characteristics of both CBM and co-management; that is, it is people-centered, community-oriented, resource-based, and partnership-based. Thus, community-based co-management has the community as its focus, yet recognizes that to sustain such action both a horizontal link (across the community) and a vertical one (with external agents outside the community organizations and institutions, such as the government) are necessary. Community-based co-management is most often found in developing countries because of their community's need for overall economic development and social empowerment, in addition to resource management.

One variation of community-based co-management is traditional or customary co-management. Such systems are or were used to manage 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 will be useful into the future, locally and nationally. Traditional or customary co-management is a formal recognition of the informal systems as done, for example, in Vanuatu and Fiji. 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 the government. It also involves a definition of shared powers and authority.

Stakeholder-centered co-management seems to be more common in developed countries, where the emphasis is to get the users participating in the resource management process. It can best be characterized as government-industry partnership that involves user groups in the making of resource management decisions. This category of co-management focuses on having fishers and other stakeholders represented through various organizational arrangements in management. Unlike community-based co-management, little or no attention is given to community development and social empowerment of fishers. Examples of stakeholder-centered co-management can be seen in several countries in Northern Europe and North America (Nielsen and Vedsmand 1995; McCay and Jentoft 1996).

It should be noted that co-management and integrated coastal management (ICM) share many similarities such as the coordination of various stakeholders at different levels and an active role of the government (Christie and White 1997).

2.9 Advantages and disadvantages

The potential advantages of co-management include:

1. A more transparent, accountable and autonomous management system.
2. A more democratic and participatory system.

3. More economical than centralized management systems, requiring less to be spent on management administration and enforcement, in the long run.
4. Through involvement in management, fishers take responsibility for a number of managerial functions.
5. Makes maximum use of indigenous knowledge and expertise to provide information on the resource base and to complement scientific information for management.
6. Improved stewardship of aquatic and coastal resources and management.
7. Management is accountable to local areas. Fishing communities are able to devise and administer management plans and regulatory measures that are more appropriate to local conditions. (Localized solutions to local problems).
8. By giving the fishers a sense of ownership over the resource, co-management provides a powerful incentive for them to view the resource as a long-term asset rather than to discount its future returns.
9. Various interests and stakeholders are brought together to provide a more comprehensive understanding of the resources.
10. Since the community is involved in the formulation and implementation of co-management measures, a higher degree of acceptability, legitimacy and compliance to plans and regulations can be expected.
11. Community members can enforce standards of behavior more effectively than bureaucracies can.
12. Increased communication and understanding among all concerned can minimize social conflict and maintain or improve social cohesion in the community.

Despite all these advantages, co-management has several disadvantages and problems, including:

1. It may not be suitable for every fishing community. Many communities may not be willing or able to take on the responsibility of co-management.
2. Leadership and appropriate local institutions, such as fisher organizations, may not exist within the community to initiate or sustain co-management efforts.
3. In the short-run, there are high initial investments in time, financial resources and human resources to establish co-management.
4. For many individuals and communities, the incentive(s) – economic, social, and/or political – to engage in co-management may not be present.
5. The risks involved in changing fisheries management strategies may be too high for some communities and fishers.
6. The costs for individuals to participate in co-management strategies (time, money) may outweigh the expected benefits.
7. Sufficient political will may not exist to support co-management.
8. Unease of political leaders and government officials to share power.
9. The community may not have the capacity to be an effective and equitable governing institution.
10. Actions by user groups outside the immediate community may undermine or destroy the management activities undertaken by the community.
11. Particular local resource characteristics, such as fish migratory patterns, may make it difficult or impossible for the community to manage the resource.

12. The need to develop a consensus from a wide range of interests may lengthen the decision-making process and result in weaker, compromised measures.
13. There may be shifts in "power bases" (political, economic, social) that are not in the best interests of all partners.
14. There are those who feel that co-management is too costly and time-consuming and that other alternatives, with stricter regulations, may be better.
15. There is always a possibility of unbalanced and inequitable sharing of power between the government and communities and the use of co-management by some political leaders solely for their own purposes.

CHAPTER THREE

Analysis of Co-management Arrangements in Fisheries and Coastal Resources: A Research Framework

Introduction

The research in both Phase 1 and 2 of the project was guided by the institutional analysis research framework that was developed by staff from ICLARM and IFM (ICLARM/IFM 1996). The purpose for having a common analytical framework was to enable comparison between the different research activities of the project and the activities in each country. This allowed data to be analyzed in a systematic way and permitted generalizations to be made about conditions that facilitate successful co-management. The original research framework was developed under Phase 1 and modified for use in Phase 2. This chapter presents a discussion on the research framework as used in both phases of the project.

3.1 Institutional analysis

In conducting research on coastal resources co-management, the interest is in understanding how rules affect the behavior of the resource users and other stakeholders, as well as 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 the government organize resource governance, management and use in collective action situations. The purpose of institutional analysis is to separate the underlying rules (institutions) from the strategy of the players (individuals and organizations). The 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.

3.1.1 Institutions

Institutions constitute the central element in co-management analysis. There are different definitions of institutions, depending on the discipline of social science. 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's (1990).

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

Berger and Berger (1972) have identified five basic characteristics of an institution: (i) Externality: an institutions is 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: an institution is perceived as possessing objectivity; (iii) Coerciveness: an institution has 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: an institution does not simply maintain itself by coercive power; it claims the right to legitimacy; and (v) Historicity: an institution has 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 rules 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 regulations, whereas, the lower part of the iceberg, which is not visible but exists, constitutes the informal and unwritten rules. 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.

3.1.2 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 structural 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 considered 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. Based on this, it might be an ethnocentric ideological stand on the part of the industrialized Western world to regard organizations at the local level (village level), as implied in the co-management model, as a universal panacea for improved fisheries management. Modernization, development and formal organization are products of a specific Western epistemological and institutional tradition.

3.1.3 Rights and rules

The terms "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, Bromley 1991). 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 there are 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 that may dictate the type of fishing gear used or the time of year when the 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 rules 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.

The sources of the rights of access, withdrawal, management, exclusion and transfer are varied. These rights may originate through a government that explicitly grants rights to resource users. These de jure rights are given formal and legal recognition. Rights may also originate through resource users. The 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 the 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 on the situation. In some situations, only one entity, e.g. a national fishers' association may be constituted to adopt and enforce its own collective-choice and operational rules. In other circumstances, multiple collective-choice entities at the 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 also overlap with customary or traditional practices. As a consequence, issues of coordination and control must be addressed when multiple levels of collective-choice entities are in place (Tang 1992).

3. Constitutional-choice rules 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 that establishes the national administrative and management structure, which legitimizes co-management arrangements.

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

3.2 Research framework: Phase 1

Based on the theoretical concepts described in Section 2, an analytical framework has been developed for use by project researchers on fisheries co-management. This analytical framework can be used to make generalizations about the type of co-management arrangements appropriate for different situations. In particular, the analysis will enable:

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

2. The identification of 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 geographic size of the area affected by co-management and also the numerical size of the groups involved. Level refers to the level of governance such as local, regional or national at which user groups are involved. Scale is related to level in the sense that different tasks can be carried out at different levels.

3. The identification of 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 identification of 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. Although 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 on Political Theory and Policy Analysis at Indiana University, USA. The research framework was discussed with NARS partners at a number of workshops resulting in refinements and application of the framework.

The framework, whose 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), the resource users (social, cultural, economic, political), and features of the resource harvesting and distribution system (technology and markets) with the institutional management arrangements (rights and rules). The contextual variables are each composed of a number of attributes. A cause and effect 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 arrangements established and the way they function.

2. Co-management performance analysis: The co-management arrangement results in outcomes. These outcomes will, in turn, affect contextual variables as well as the 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 and this may cause change in institutional arrangements that affects incentives, patterns of interaction and outcomes. The outcomes of co-management institutional arrangements can be evaluated in terms of management efficiency, equity, and sustainability of resource utilization.

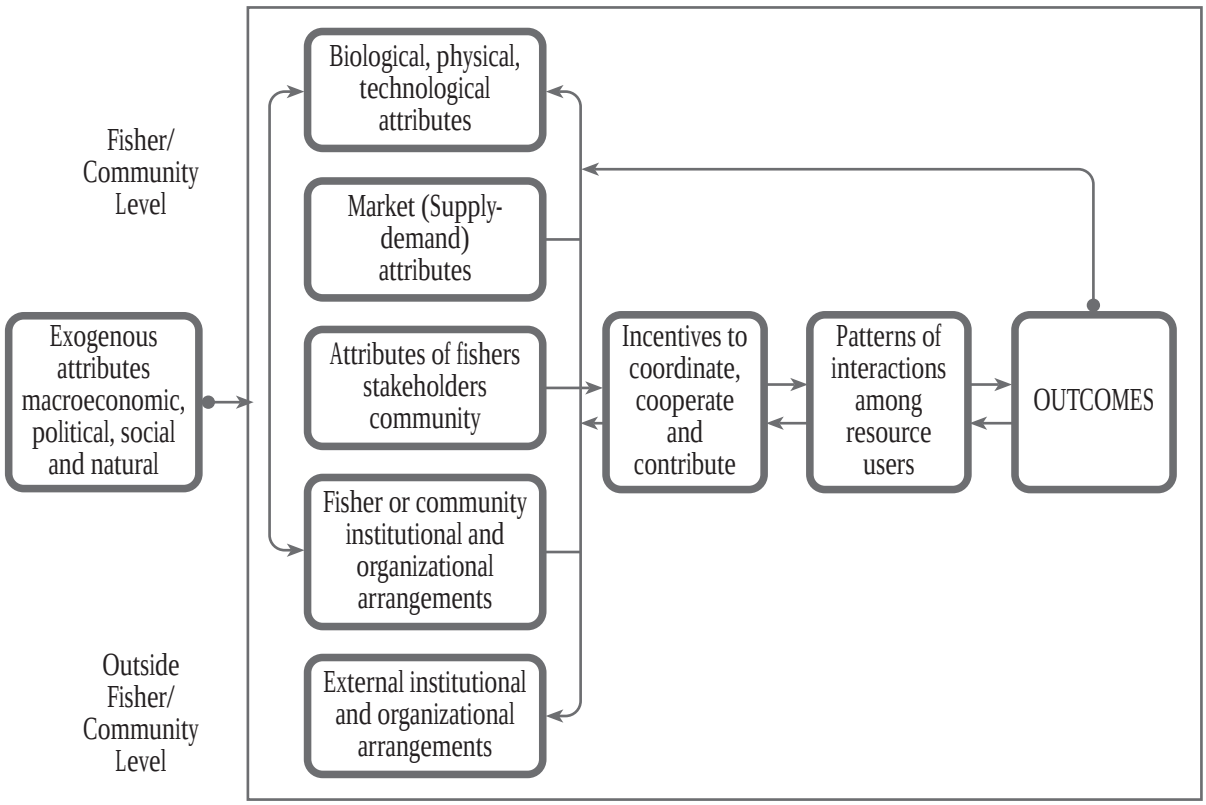
3. Characteristics of successful co-management institutional arrangements: The most important aspect of this analysis is the specification of what conditions and processes bring about successful, long-enduring fisheries co-management arrangements. A successful fisheries co-management arrangement can be characterized, at a minimum, as being economically efficient (the benefits of operating and maintaining the co-management arrangements exceed the full set of direct and indirect costs); equitable (participation of and fair treatment for the people involved in managing, governing and using the resource), institutionally sustainable (resilient and enduring co-management arrangement) and ensuring ecosystem sustainability (being ecologically healthy). From the above analysis, a list of principles and propositions about conditions and processes can be identified.

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 emerge 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 structural components 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 others weaker depending on the 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 effect on outcomes as they lead to changes in human behavior and choicethat affect interactions and sustainable outcomes (Oakerson 1992). Different combinations of these parts can be examined depending on the situation. These relationships can be analyzed forward or backward depending on whether 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). In this research project, the focus is on the second approach.

Figure 3. Research framework for institutional analysis



Adapted from Oakerson 1992
Fisheries Co-Management Project

3.3 Institutional arrangements analysis (applied to fisheries co-management)

3.3.1 Contextual variables

(a) Biological, physical and technological attributes

Problems and constraints over resource use often originate in the biological and physical attributes of the resource, for example, resource scarcity, 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 its availability 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 activities, 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, etc.).
2. Boundaries (physical, administrative, restrictions on access to fish resources).
3. Health status of fish habitats (spawning areas, nursery 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, etc.).
6. Final product forms of catch (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. Subtractability: 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. 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. Exclusion: The degree or relative ease with which access to the fishery is limited. 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, a fishery is characterized by high levels of inter-dependence among fishers. The action of one fisher affects the actions and outcomes of other fishers. These interactions can lead to conflicts among fishers over fishing grounds and the amount of fish (Schlager 1990).

3. Indivisibility: The spatial boundaries of the fishery, which determine the minimal scale on which effective coordinated resource management can occur. Physical boundaries having to do with divisibility of the fisheries derive from nature, human design and technology. Fishing gear type and terrestrial and oceanographic features often 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 one another in the fishing activities. Gear conflicts may occur or the placement of gear may interfere with the flow of fish, often referred to as crowding.

(b) Market (supply and demand) attributes

Resource problems are often market-based. Market attributes (price, structure, stability) can affect 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 fishers' and fish traders' relationships. The first of these comprises 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 (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 fishers and fishing communities

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 individually or in combination with others, each of these attributes potentially encourage or disencourage cooperation. 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 catch 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 suggests two key attributes that encourage cooperation (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 the 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 resources other than fish, e.g. tourism). The questions that are considered critical are given in Table 4.

Table 4. Institutional and organizational arrangements at the 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 partners (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 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 a community usually 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 the 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 systems; 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 levels).
3. Legal basis for co-management arrangements (enabling legislation, administrative decree, and others).
4. Government agencies outside the fisheries sector whose mandate and activities interfere with or impact on the fisheries.
5. Power structures outside the fishing communities that have impact on local power structures and leadership (e.g. influences of political leaders, and high ranking military or police chiefs).
6. Role of donor organizations in promoting/enabling co-management arrangements.
7. Impact of power structures or powerful actors on the fisheries management agency.

1 - 7 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, fishers and fishing community have an impact on fishers or community institutional arrangements. These are factors that are beyond the control of the fishers and community, and at times also beyond 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 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 times; major events that have an impact on the survival of institutions such as market liberalization).
2. Disasters caused by war/civil unrest, typhoons, earthquake, flooding, etc. that have an impact on the survival of institutions.

3.3.2 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 a group. The contextual situation and the institutional arrangements in place also make 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 a government agency to engage in co-management.
3. Origin and development of co-management initiatives; driving forces in the process.
4. Characteristics of a co-management arrangement in place (type of arrangement).
5. Ways and means of communication among the co-management partners.
6. Mechanisms in place for conflict resolution among the co-management partners.

3.3.3 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 are reflected in the pattern of interaction between the parties. For research on co-management arrangements, the analytical focus is 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 allows 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, for example, 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 among the co-management partners in action that determines 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.

3.3.4 Outcomes

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

The outcomes of co-management institutional arrangements can be evaluated in terms of performance, that is, the achievement 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 measures, 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, being more efficient 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, greater 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 the government. Performance evaluation is conducted to determine how well the objectives are met 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. The measurements of these criteria are further explained in Chapters 5 and 8.

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 economic 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. 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 a more centralized arrangement 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-maker/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 and the benefits may not become apparent for some years. However, co-management is likely to lead to lower implementation, monitoring and enforcement costs, as legitimacy of the regime is greater (Hanna 1996).

Equity

Equity (fair treatment for all people involved in managing, governing and using the resource) has four main components (Hanna 1996):

(a) Representation: an 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 (access to) the 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 is 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, and 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 changes in both the structure of the industry and the market (Hanna 1996).

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.

3.3.5 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 identify the most favorable arrangements 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 distinguish attributes that lead to successful co-management from those that 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 the success of co-management. They may be even 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 that can lead to successful development and maintenance of fisheries co-management institutional arrangements.

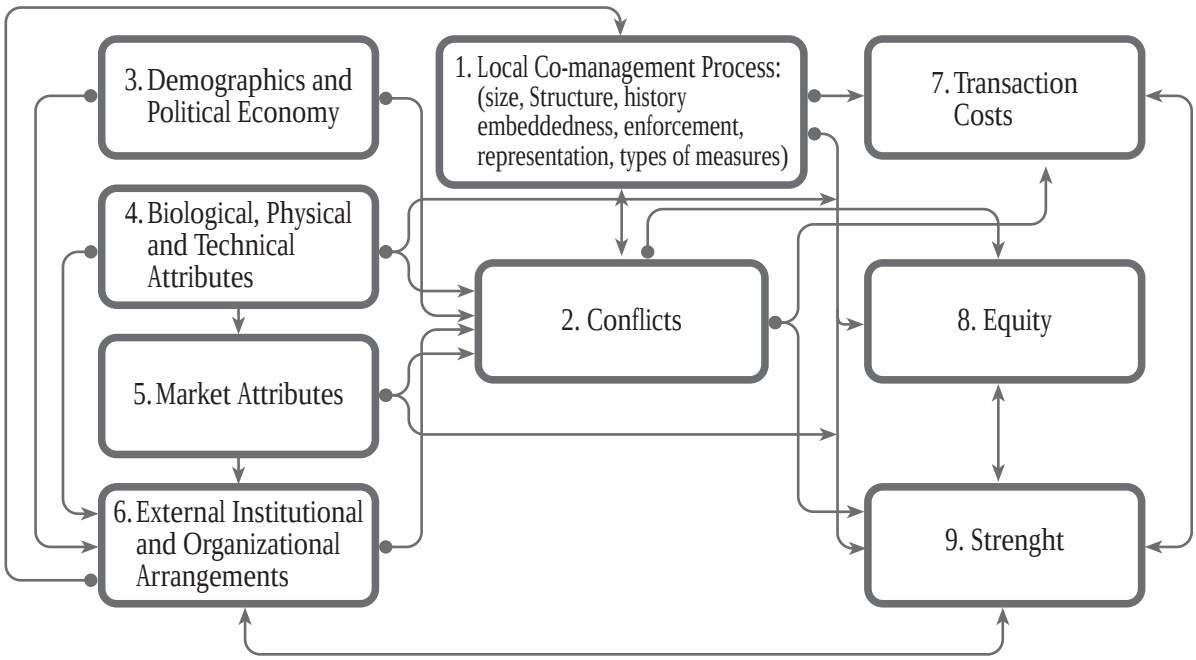
Over the last decade, research done at different locations around the world has documented many cases of co-management in fisheries and other natural resource systems. From the results, certain conditions are emerging that appear to be central to the chances of developing and sustaining successful co-management institutional arrangements. Ostrom (1990, 1992) and Pinkerton (1989, 1991, 1992, 1993, 1998) 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). However, these conditions should not be considered as complete as continued research is needed to reveal more about co-management arrangements and the factors leading to successful performance.

3.4 Research framework: Phase 2

Phase 2 built on Phase 1, through the addition of more hypothesis testing (IFM/ICLARM-World Fish Center 2001). The Phase 2 framework retained the contextual factors from the Phase 1 framework, but placed group processes and conflicts in the central role. The emphasis in Phase 2 was the evaluation of fisheries co-management in terms of its contribution to the sustainability of both the fisheries resources and fishing communities, the efficiency of resource management, and the equity of management outcomes. The main objective of Phase 2, as discussed above, was to discern the benefits and weaknesses of the co-management approach in terms of sustainability, efficiency and equity, and to discover under what conditions these benefits and weaknesses are manifest.

In Phase 2, the original institutional analysis research framework was modified in order to focus on the three outcome criteria of sustainability, efficiency and equity (Figure 4).

Figure 4. Relationship between the institutional analysis research framework and the dependent variables



The variables on the right side of Figure 4, namely demographic and political economy; biological, physical and technical attributes; market attributes; and external institutional and organizational arrangements, come from the original institutional analysis research framework. They set the context for the co-management program.

These variables are the dependent variables that describe the outcomes of the co-management program in terms of the three criteria of sustainability, efficiency and equity. Transaction costs measure the efficiency of the co-management program. Equity is the degree to which the outcomes of the co-management program are fairly distributed among the different groups with interest in the fishery. Institutional strength measures sustainability. It has four dimensions:

1. Legitimacy is the degree of social and cultural acceptance of the system of rules and understanding that regulate or purport to regulate the fishers' behaviors toward the resource.
2. Attitude towards measures or outcome legitimacy is the degree to which local people support particular management measures.
3. Compliance is the degree to which people engage in behaviors prescribed by or avoid behaviors proscribed by management institutions.
4. Robustness is the ability of an institution to provide stability and meaning to human behavior across a wide variety of situations.

Two variables occupy the key position between the contextual variables and this complex of dependent, outcome variables:

1. The attributes of the local CMP processes include a number of things identified as important both in Phase 1 and the general literature:
   a) The size of the process points simply to the number of people involved.
   b) The structure of the process is the way that decision-making processes exist in time and space, i.e. who meets and makes decisions and where and when they meet.
   c) The history of the process is the story of how they developed to the present day, including how they began and by whom they were initiated.
   d) The embeddedness of the CMP process is the degree to which they draw upon shared cultural meanings. The CMP process can make use of shared cultural resources through such actions as using traditional authority systems, having open dialogues, or making use of traditional ecological knowledge. One particularly important aspect of embeddedness is representation. This is the way in which the voices of the various groups that are concerned with the fishery are heard in the CMP decision-making process.
   e) Another key attribute of the process is the mechanisms provided for enforcement. These have at least two dimensions: surveillance and sanctions. Surveillance of fishing behavior is necessary for enforcement. Just as important, people need to know about the behavior of other people in order to decide on their own behavior (Ostrom 1990). People cooperate more when they see others cooperating (Sell and Wilson 1991). Seeing others, and being seen by them, lead to conforming to an institution; this is an independent and essential part of maintaining that institution. Sanctions can be defined as both the probability and severity of punishment for violations of the management institutions once they have been observed. Subjective reports of both of these things have been used successfully (Kuperan and Sutinen 1998).
2. Conflict is the other variable in this key central position between the contextual and outcome variables. A critical part of understanding co-management is producing descriptions of local conflicts and how they relate to the co-management project. We can identify several dimensions of conflicts

related to the co-management projects, such as the frequency , the intensity, the persistence of conflicts, and the degree to which conflicts spread. Co-management programs can be both a product of conflicts and a mechanism for their resolution.

3.4.1 General hypotheses for Phase 2

Several hypotheses that were felt to add new knowledge to the overall understanding of fisheries co-management were developed as areas of investigation for Phase 2. Their development was based on the general literature and results of Phase 1. These hypotheses, closely related to one another, are:

Hypothesis 1 : The relationship between the four institutional strength variables, i.e. legitimacy, attitudes towards management measures, robustness and compliance are all positive and that they are in turn dependent upon a management system charactierized by trust, authentic collaboration, and transparency.

Hypothesis 1A : The institutional strength of management is positively related to resource sustainability.

Hypothesis 1B : The institutional strength of management has a negative effect (i.e. lowers) on transaction costs while the co-management program itself has an independent positive effect.

Hypothesis 2 : More embedded co-management processes increase the strength of fisheries management institutions where scale of both resources and markets are low and the variability of the markets and resources are high.

Hypothesis 3 : Institutional strength is a result of the interactions between government policies, demographics, political and economic factors, and conflicts between stakeholders. Institutional strength is increased to the degree that the design of the co-management program is able to channel and resolve these conflicts.

Hypothesis 3A : Stronger co-management institutions will emerge in areas of demographic flux where local communities are seeking to use cooperation with the government as a way to exclude outsiders that they see as threatening to their access to the resource. The success of a co-management program in such an area will rest on its ability to channel these conflicts and/or contribute to their resolution. Alternatively, stronger institutions will emerge in homogeneous areas with a long tradition of cultural solidarity.

Hypothesis 3B : Co-management programs that are initially of the instructive and consultative types become cooperative only where the government: a) concretely demonstrates a willingness to respond positively to local policy desires, and b) provides support for building local organizational and knowledge capacity.

Hypothesis 3C : The institutional strength of co-management efforts is a function of the relationship between traditional and formal authorities reflected in the design of the program. This relationship, in turn, interacts with political and demographic factors in specific ways.

Three levels of comparison are used for testing each hypothesis. These are: a) resource/program as the basic unit of analysis of the co-management program; b) village as the smallest local unit for general administration or the smallest local unit for the co-management program; and c) comparison between individuals. The comparisons can be made across time in the same place or between different places.

A number of variables are suggested for measurement of each hypothesis. These include:

- Demographics.
- Scale of markets and resource.
- Variability of markets and resource.
- Motivations of fisheries agency.
- Processes involving age of program, relations with traditional authorities, representation, NGO participation, relations with other community/government groups, structure, enforcement, types of measure used, responsiveness to participation, transparency of co-management, trust of co-management, support for local co-management efforts, and ladder of co-management.
- Conflicts relating to ethnicity/race, class, gender, gear/species, theft, markets, multiple users, locals versus outsiders, etc.
- Resilience including legitimacy, attitudes towards management measures, robustness, compliance.
- Other outcome variables including equity, resource sustainability, transaction costs.

Where comparisons can only be made at the highest level, i.e. resource/program, in order to measure and compare variables and test the hypotheses, only two variables, the scale and variability of markets and resources, absolutely require comparisons for the hypotheses they test at the highest level. This is because it is very unlikely that variance can be observed within a particular program dealing with a particular resource. While it should be possible to find variance in market attributes, it is not possible, by definition, to find variance in resource attributes that attach to the program area as a whole. This does not mean, however, that variance for other variables of interest at the village and individual levels will always be found. It only means that it is possible to find such variance.

CHAPTER FOUR

Methods for Implementing and Assessing 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 partners and project staff to assess, evaluate and implement co-management. The methodologies highlighted in this chapter are: (a) Rapid Appraisal Approach to Evaluation of Community-level Fisheries Management Systems (RAFMS), (b) Process Documentation Research, (c) Impact Evaluation of Community-based Resource Management Projects, and (d) Measuring Success of Co-management Projects.

4.1. 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, is often anecdotal or written in a narrative format. As such, it lacks the specifics necessary for 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 policy-makers 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. 1996b) was developed for this purpose.

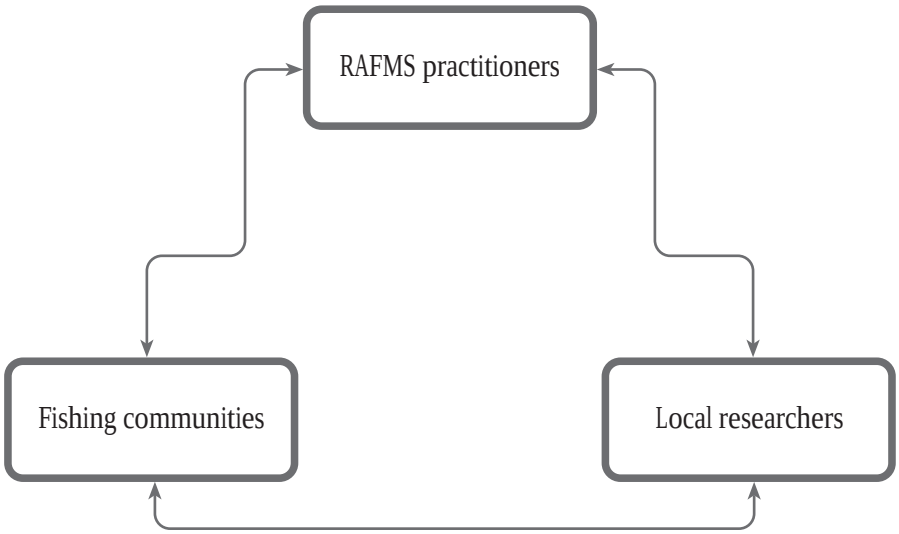
The RAFMS is primarily a topical Rapid Rural Appraisal (RRA), which is aimed at documenting and evaluating the existing informal and traditional fisheries management system(s) in a coastal community and its relationship with the more formal fisheries management system administered by the government. 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

[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".

in a two-way communication process during 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. The RAFMS' intended audience are fisheries managers and development workerswho 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 specialists are usually local or outside scientists, academicians or development specialists. Local researchers, on the other hand, are technicians or specialists, 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 the RAFMS does not rely solely on the existence of external experts, since the long-term goal of the RAFMS is to increase the technical capability of local researchers in order for them to continue the activity on their own.

Figure 5. Relationships among the RAFMS pratitioners, local researchers and the fishing communities



Although the 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 suitable for application at the village or community level, rather than a larger geographic or political area. Lastly, the success of the 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.

The 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 1996).

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) are the focus of the 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 the 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 a system relates to the broader social, cultural, technical, economic, biophysical and institutional environment. The report should have three substantive sections that include: (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 policy-making, research and development.

The essence of the RAFMS is the planning and policy-making 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 the RAFMS

The 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 agro-ecosystem analysis (AEA) and other RRA techniques. The other innovations of the 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 the RAFMS has 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 internal and external) and the local community.

Table 11. Long list of attributes (variables) of the RAFMS framework

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

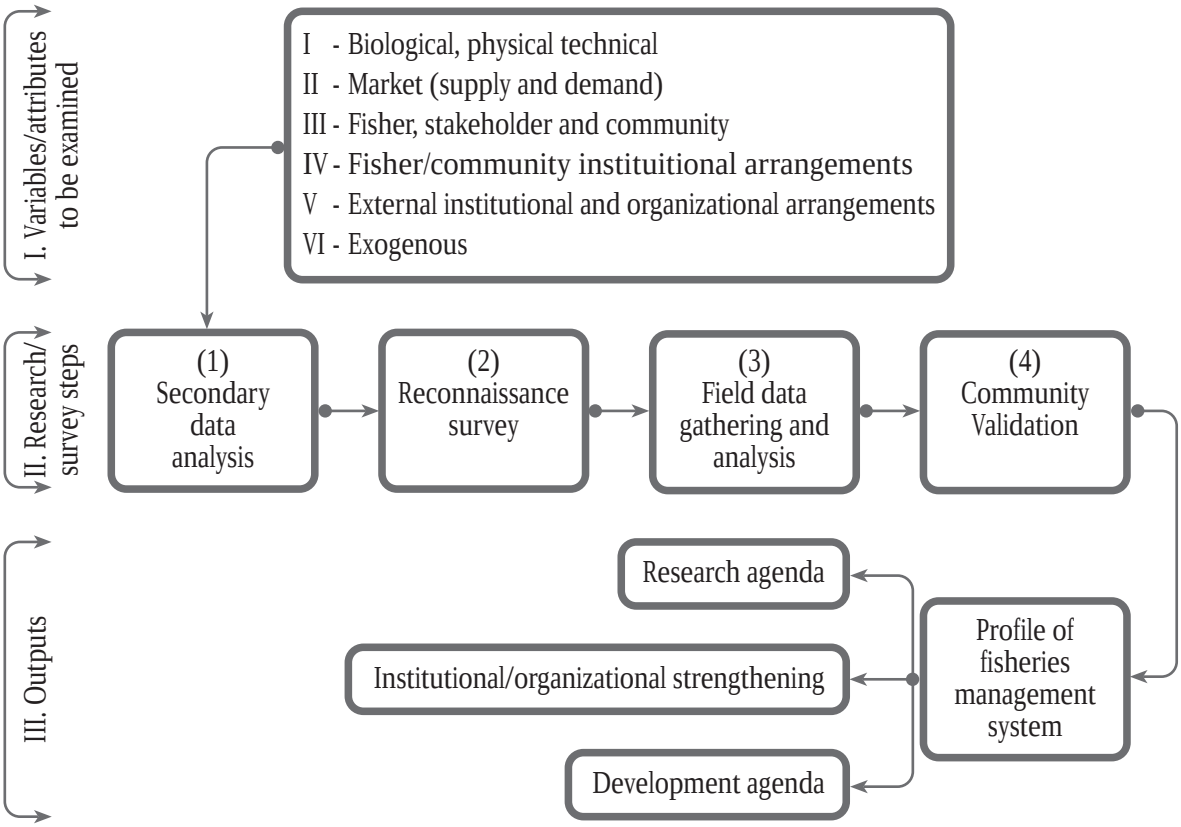
Group III. Characteristics of fisher/community stakeholders (6)
- Demography
- Tenure status
- Economic status
- Culture
- Livelihood (Occupational structure)
- Attitudes and outlook of fishers

Group IV. Fisher or community institutional and rganizational 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

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



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 at 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 fisher/community stakeholders and the institutional and organizational arrangements. The socio-economic 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 to the village headman and other officers from

[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" Coastal Management. 25:183-204.

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, fishers' spouses, moneylenders, fish traders, government officials) were identified or chosen during this activity. The next step was field data collection, which was the actual generation of 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. Then, each evening there was a brainstorming session 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 outputs

Ulugan Bay is located on the mid-western coast of Palawan some 47 km from the capital city of Puerto Princesa. It is a traditional fishing ground with mangroves, coral reefs, sea grass beds, and small islands. Surrounding the bay are five villages (barangays), with a population of about 5000 people in 1991. The majority of the workforce is engaged in fishing and farming. Binunsalian Bay is located some 20 km south-east of Puerto Princesa. The coastal stretch, with extensive coral reefs and mangroves, is bounded by two villages with a population of 1550 individuals in 335 households. Since 1986, fishers have harvested fish, shellfish, and mangroves year-round in the area.

Through the 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 that 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 to settle the conflict at the level of the sub-village head. There is an informal way, however, of settling the conflict through mediation 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 sub-village 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 gear within Manabore village at 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 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 devices 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 exist 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 the 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, Philippines

ADMINISTRA-TIVE LEVEL	(A) LINE GOVERNMENT AGENCIES (LGAs)	(B) LOCAL GOVERNMENT UNITS (LGUs)	(C) NON-GOVERNMENTAL ORGANIZATIONS (NGOs)	(D) PEOPLE'S ORGANIZATIONS (POs)
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 Elementary/ High School	o Mangingisda Brgy. Council	o Ligaya ng Buhay Foundation o BBFI	o Christian Multi-purpose Cooperative o Brgy. Mangingisda Senior Citizen Association o Charity Women's Association o SAMANUCO o LUZMA
PUROK	- - - -	o Purrok Council (7) - Putting Buhangin - Rolling Hills - Pantalang Bato - Magsasaka - Bagong Silang - Paglaun - Magtulungan	- -	-

Source: Cabrestante et al.

4.2. Process Documentation Research methodology (PDR) [7, 8]

What is process documentation research?

Work on the formulation of process-oriented research methodologies has made important contributions to the development of 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 to 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 to 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 et al. 1989).

Process documentation research is one of the methodologies social scientists have developed to provide processes and contextual data required for agency capability building toward effective program implementation. The PDR has since become an important tool for social learning as it highlights the dynamics and levels of agency and community decision-making. The PDR development was part of 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 their 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

[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.

organizational support response. The PDR captures the unfolding of field processes and events and knowledge on the dynamics of the relationships among participants. The intensive and continuous presence of the PDR also allows for the collection of 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 the 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 et al. (1989), there are several institutional learning functions that the 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, the PDR helps bypass any filtering process that may prevent, corrupt, withhold, and change information as it goes through the normal channels, giving people at all levels 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 necessary, although it tells us nothing about the process that connects the outputs to the inputs and, therefore, provides no insights into why a particular outcome is achieved.

4. Limiting retrospective reconstruction. Simple retrospective analysis by project participants is seldom an adequate substitute for immediate on-site observation and documentation.

5. Highlighting the process documenter as a key informant. The key informant is an important, though often overlooked, contributor of process documentation research, as is the development of the process documenter 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 documenter or supervisor participates as a key informant.

The 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 pertain to both technical and non-technical (institutional, organizational, or extensional) 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, or a monitoring device that project implementers use for measuring the progress of field activities.

Process-oriented research methodologies constitute the social scientist's response to the need for a link between development agencies and local communities. The social scientist conducting the research enhances the communication and interactions among the groups by discussing concerns and issues raised by the communities. Social scientists at the same time assist the agency in understanding the research results and their implications for 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 takes a different view of 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 that 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 diverged 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, requires an 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, the PDR is unstructured, experiential and inductive (Amonia et al. 1997). PDR provides updated information for use in the decision-making process by project beneficiaries and implementers. There is a need to know the specific decisions and actions, and to encourage the participation of the beneficiaries in the decision-making process and specific activities. The timely information that the PDR provides contributes to better implementation of project activities and prevents or minimizes conflicts among beneficiaries, or between the implementers and the beneficiaries.

In actual practice, the PDR embodies both a learning process approach and a blueprint approach. The overall goals and objectives of a project, such as one for community-based coastal resource management, provide the "blueprint" part of the project. The way to do it is the "learning process" component of the project. In a community-based resource management project, the 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 the 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 documenter (PD) and the researcher. It is recommended that a full-time PD be detailed to the project site for effective documentation of events and activities. The PD should record in as much detail 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 on the status of the project and in the case of problems arising; it will give project implementers 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 them knowing that the information is being verified from another source.

Process documentation research output

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

A PDR case study: Institutional arrangements in the fisheries co-management on Malalison Island, Philippines [9]

In order to help fishers 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

[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".

off western Panay, Philippines. The research project is development-oriented and integrates the various disciplines of biology, economics, sociology, public administration and engineering in its study of fishing communities and resources, and in evolving interventions and strategies (Agbayani 1998).

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 communities. The framework of the project integrates the analysis of the socio-economic conditions of the fisher 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 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 on 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 from 1991. His familiarity with the place and people was both an advantage and a disadvantage. It was an advantage because 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 the municipal officials. It was a disadvantage at the same time because he was married to a local girl who was associated with one of the more influential families; this made 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 transpires in the formal meetings. Moreover, some fishers were found to be too shy or were not used to articulating their opinions in formal meetings. Informally, however, they can express their honest opinions and perceptions concerning the project.

A "blueprint" of the plans and activities (research and development interventions) was already in place in 1993 during 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 (TURFs) and artificial reef (AR) deployment were 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. By 1997, preliminary studies on sea ranching of suitable species in the surrounding waters of Malalison Island had been 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 the PDR methodology, researchers from SEAFDEC/AQD were able to chronologically document milestone events that happened from 1990 to 1996. Milestone events occurring prior to the PDR activities were also included in the report to "pave the way" for the subsequent events covered by the PDR that led to the formulation of institutional arrangements in the fisheries co-management project on Malalison Island.

Milestone events occurring prior to the PDR activities in 1995

Prior to the deployment of a full-time PD on Malalison Island, historical records showed several important events contributing to the success of the CRM project on 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 fishers' association (FAMI) in implementing sea-farming activities. MO 2-91 prohibits incursions of illegal transient fishers and entry of commercial fishers to the TURF area.

(2) Investigation on the Traditional Marine Boundaries and TURFs (1991-92). This was carried out 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 on Malalison Island.

(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 familiarize them with 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 Forums, initiated by the SEAFDEC CFRM team members with participation of officers and members of FAMI and residents of Malalison, assessed the status of the project and prepared annual plans for 1993-94. At these forums, the concept of possibly adopting a fish sanctuary for 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 another council that would 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 institutional arrangements activities (1995-96)

The presence of a full-time process documenter 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 on Malalison Island.

The key institutions that played important roles in the institutional arrangements in fisheries co-management on Malaison Island were 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) were 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 the PDR include:

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

(2) 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 on Malalison Island. 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 the principles, methods and benefits of CBCRM.

(3) Construction and deployment of concrete artificial reefs. 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 annual forums on Malalison Island provided an effective venue to present assessments and evaluations of the CFRM project and to discuss problems and issues affecting the success of the project.

(5) Creation of Barangay Malalison FARMC. As mentioned earlier, the Malalison FARMC was created on June 24, 1995 in compliance with Executive Order No. 240 of the President of the Philippines. There was, 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 the Barangay Malalison FARMC, a series of meetings was held among the FARMC, the barangay council and the residents of Malalison 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). The 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) a 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 life forms; and 5) average frequency of benthic life forms. The value of scientific data for policy making has been demonstrated in the formulation of the fish sanctuary ordinance.

(9) Approval of the Malalison Rresolution 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 was to define the boundary by setting up markers. The second requirement was for mobility requiring a reliable boat for monitoring and surveillance work. Lastly, there was a need for disseminating information to fishers, residents of Malalison, and neighboring coastal barangays, who had traditionally fished in the area.

(11) Community-initiated survey on TURF. As mentioned earlier, the Municipality of Culasi granted a TURF-covering area of 1 km2 located between the Culasi mainland and Malalison Island to the 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 about 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 agreed to the conceptof TURF; 2) the types of fishing gears that should be allowed in the TURF area; and 3) amount of fee that the fishers were willing to pay the FAMI to defray operational expenses of overseeing the TURF area. The survey covered 146 respondents from Malalison and 6 coastal barangays facing Malalison Island.

(12) Draft of the Policies on Excursionists and Visitors to Malalison. In late 1996, Barangay Malalison officials drafted an ordinance to regulate the activities of travelers and visitors to the island. Salient provisions on the draft ordinance include designating a docking area, charging an entrance fee from visitors to the island, issuing cleanliness guidelines for visitors, andregulating the length of visitors' stay onthe island.

Lessons learned on the PDR and institutional arrangements in fishery co-management

On process documentation research 1) The PDR as a methodology is a useful tool for development-oriented projects because it provides current and useful information that will guide the project implementers. 2) Process documenters must be neutral at all the times. Ideally, a process documenter must not be involved in actual project activities to minimize bias; moreover, he or she must be a full-time process documenter (PD). 3) Process documentation should be undertaken from the beginning

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 contribute to the success of 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 an 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 on Malalison Island. The 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 happen, and why they happen. It provides project implementers with current data for decision-making and flexibility to adapt to any changes in the project.

4.3 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 the large number of CBCRM projects implemented in the country since 1984 represented a vast pool of untapped information that 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 before project implementation (baseline data) after project completion. Also ideally, information collected during both time periods would employ identical instruments or operational definitions of the variables (or indicators) being evaluated. Unfortunately, many factors associated with the 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 lack of baseline information and limited funding for post-evaluation that may be unevenly 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 was to determine factors influencing the success and sustainability of CBCRM projects, the issue of cross-project comparability of evaluation methods are significant. It is necessary to have common operational definitions of CBCRM project success, as well as factors

[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".

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 facilitates 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 the notion of "well-being" applies to both. Ideally, an aquatic ecosystem sould be assessed using indicators such as species richness and composition, trophic composition, and organism condition and abundance. Karr et al. (1986) developed a summary index based on a weighted summing of attributes of each of the indicators. Others (e.g. Rapport 1984) have identified indicators of natural ecosystem stress, including evaluations of nutrient loss, primary productivity, diversity and size distribution, and system retrogression. Costanza (1992) suggests construction of an overall ecosystem health index composed of system vigour 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 an ecosystem is a complex, expensive process.

Assessment of human community "well-being" can likewise be a complex and expensive process. Variables often mentioned as indicators include income, health and nutrition status, housing, and education. If some of these variables are available from baseline studies, there are frequently reasons to question the reliability of the measures used. For example, health and nutrition status is notoriously difficult to assess in developing countries. There is mounting evidence to question the reliability of informant recall as a method to obtain such information, and employment of biological and 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 an estimated income. More accurate information can be obtained from landing statistics, but they are rarely collected and notoriously unreliable. Frequently, the estimate is made based on an "average" (variously understood by individual fishers) fishing trip, which little information. 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 the infant mortality rate. This is a fairly good measure of general nutrition and health care, as are indicators concerning satisfaction with some basic human needs, as well as indicators related to income and education. Newland (1981) writes "no cold statistic expresses more eloquently the differences between a society of sufficiency and a society of deprivation than 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 that could be used to calculate an index for the CBCRMP, 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 the set of variables appropriate for evaluating coastal ecosystem "well-being" indicate that the entire set will rarely be available in existing CBCRMP baselines, and if some are, there will probably be questions concerning reliability and/or cross-project comparability. Unfortunately, most CBCRMPs are not, and probably will never 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 that are important to the "well being" or "quality of life" of the human community. For example, satisfaction with one's occupation is based on the fulfilment 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 domestic violence and impaired social relations to psychosomatic illness and heart disease.

With respect to impact indicators, the success and sustainability of a project are based in large part on the participants' reactions to the project. In turn, their 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 the long-termand 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 variously impacted by CBCRM projects, and this influences their perceptions of impacts and their reactions to the project. The ability to evaluate these differently perceived impacts will permit analyses to determine socio-cultural and socio-economic factors influencing different perceptions. It will also facilitate analyses of distribution of perceived project benefits.

Ideally, the method used should 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, ladder-like scale that 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 as a ladder-like 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, where the water is so foul that nothing could live in it. The highest step could be described as 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 was expected that there would be variability in perceptions of impact indicators and that these perceptions would vary together with both project experience and other socio-cultural 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 affect perceptions of project impacts. The variables are detailed in the following section.

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 was 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) increase the capacity for regionalization of decision-making and program implementation. The near-shore 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 the coral reefs at the four project

[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".

sites; (3) replanting of mangroves in all suitable sites, management of existing mangrove timberlands by small-scale holders, and allocation of user's rights to the areas; (4) strengthening of participating government line agencies; (5) undertaking of special studies to support near shore 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 were calculated of the differences between current impact indicators (t2) and those of the pre-project time (t1), A paired comparison t-test was calculated to determine whether the mean differences between the two periods were statistically different (Table 13). The results of this analysis show a statistically significant increase in levels of perception for all indicators, except for the one on access. However, the results indicate some decreased access for the sanctuaries, mangrove contracts, and exclusive access for members to artificial reef areas. 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.

Table 13. Perceived changes in indicators between the pre-project and post-project periods. pre

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 length of the respondent's residence in the community. Job-related variables include years of fishing experience, whether or not the respondent used to have other occupation than fishing, and whether or not the respondent would change from fishing to another occupation with similar income if given an opportunity. 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 of community members and fishers in working together to solve common problems, and 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. Correlations between perceived changes in indicators and independent variables					
Independent variables	Access	Indicators 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 of residence in community	-0.14	-0.09	0.03	-0.05	-0.08
Years of 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 correlations with the 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 poor 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. Correlations 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 important information concerning relationships between the independent and dependent variables, it is important to determine whether some insights can be gained by analyzing patterns of co-variation within the set of indicator variables and relating this co-variation to the independent, predictor variables. Hence, the next step in the analysis is 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 was selected based on a scree-test. The three rotated components explain 66 per cent 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 1 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 2 are perceptions in changes in access to the resource, amount of traditionally harvested species, and overall well-being of the resource. Finally, indicators loading highest on Component 3 are perceived changes in income and household well-being. Impact indicators loading on Component 1 are described as indicators dealing with behavior of community members. Indicators loading highest on Component 2 are resource-related indicators. Finally, Component 3 is described 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 14 and 15. Independent variables related ($p < 0.10$) to any of the three components were selected using an interactive step-wise multiple regression analysis to determine the set of independent variables that explain most of the variance in each of the three components. The step-wise regression used in the analysis is considered interactive in the sense that partial correlations are examined at each step for indications of changes that could be the result of multi-collinearity; the offending variable is not used in the regression analysis. Results of the step-wise regression analysis are shown 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 per cent 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 per cent 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 tallied, resulting in an overall measure of perceived changes. This measure will be referred to as the total perceived impact measure. The correlations of the total perceived impact measure with the 19 independent variables were calculated, and only the variables manifesting significant correlation ($P < 0.05$) with dependent variable were selected for use in the step-wise 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 planning – account for 17 per cent 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 household	0.153	2.247	0.026
Community members can cooperate	0.214	3.142	0.002
R = 0.315; R2 = 0.099; Adj. R2 = 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; R2 = 0.089; Adj. R2 = 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; R2 = 0.039; Adj. R2 = 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; R2 = 0.187; Adj. R2 = 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 increases in all four indicators.

The results of means tests applied to the impact indicators show 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 10 indicator variables and 19 independent variables concerning factors influencing success of CBCRM projects revealed that the most important among the independent variables 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 were perception that the resource was in poor 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 was 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 decisions 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 adapt project activities to local needs, but participants also gain a better understanding of the problems involved 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 fishers' statements that they now know how to run meetings and get something accomplished. Fourth, project cooperators, as well as non-cooperators, perceived some 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 is aware of 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, occupations may be the most effective strategy in 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 an effect, or greater, as trying to attract (or force) fishers into some alternative form of employment.

4.4 Measuring project success in community-based coastal resource management projects[12]

Community-based coastal resource management projects abound in Southeast 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 per cent 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 the project components were not relevant for the people.

An earlier study by Pomeroy et al. (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' organizations, 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 lives. They had more skills and felt more integrated into the economic and political mainstream. Hence, evaluations by both project staff and beneficiaries are important, but it is also necessary 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 subsequently 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 during the 1960s and 1970s 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 1987). 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

[12] Condensed from Harkes, I.H.T. (2001) Project Success: Different Perspective, Different Measurements. In: B. Vira and R. Jeffery (Eds.) Analytical Issues in Participatory Natural Resource Management: Global Issues. Palgrave Publishers. pp. 128-144.

implementation of natural resources management (Pomeroy 1998). 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 the government and the community (Pomeroy 1998).

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 (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, the interventions are not fully implemented and/or sustained. Thus, the project is deemed 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 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), "phonemic" refers to what a sound signifies in the minds of the users. "Phonetic", 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 cannot 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 its 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 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 1988; UNDP 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 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 7).

Figure 7. Individual indicators for project success

Individual indicators for project success	
Involvement	in the project design in decision-making in management in defining boundaries in rule development
Capability	to express an opinion to make decisions to prioritize issues to participate in a meeting to write a proposal to speak in public to work in committees
Control	over the process over resources over one's own life
Access	to knowledge to meetings to resources
Skills	to repair and maintain technical equipment to manage a project to solve problems
Personal change	in awareness in sense of responsibility in self-confidence in initiative in self-respect in generating new ideas in willingness to deviate from customs and community values 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 at the community level are listed below (Figure 8).

Figure 8. Community indicators for project success

Community indicators for project success	
Communication	commitment of stakeholders recognition of stakeholders understanding between stakeholder groups expression of different viewpoints level of open disagreement
Representation	of various stakeholders of various social groups of women and children of socially marginalized groups
Collaboration	among individuals among neighborhood groups among various social (differentiated) groups
Trust	among staff members among staff and the government among staff and the project beneficiaries
Support	of higher government levels of the local leaders of a NGO of the project staff 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 to 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 9). This evaluation typically focuses on the process of project planning and development. It will show whether the project goals are appropriate, need to be modified, adapted, or omitted 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 the project objectives, which makes it more likely that the selected activities will be 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 mechanisms (Figure 9).

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 participants through a process in which the goals and objectives are discussed and prioritized. This is essential if the 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 the project's success.

Figure 9. Project indicators of success

Project indicators of success	
Success in terms of material output	size of yields catches per unit of effort hectares of protected areas hectares of mangroves/forests replanted non-occurrence of destructive practices by local people
Success in terms of human involvement	number of people attending the training activity number of participants in the project frequency of staff meetings size of the network
Success in terms of project benefits	division of benefits economic opportunities well-being in terms of physical and mental health well-being in terms of income flow of investments higher education level
Success in terms of management structure	management institution designed and active management plan and regulations designed and implemented enforcement structure in place conflict-solving mechanism in place leadership
Success in terms of participation	type of participation 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 for 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 baseline data are available. The measurement of people's perceptions 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, economists are often favored over anthropologists and sociologists owing to their preference for quantitative indicators. As a result, perceptions and attitudes of people, not being part of the conceptual framework of economists, are usually neglected or measured in a non-valid way.

Perceptions cannot 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 the behavior of the people 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 (more than 80 per cent were satisfied). 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 per cent of the respondents would change their job, and less than 10 per cent of the fishers actually wanted their children to become fishers (Novaczek and Harkes 1998). So, only the combination of the three components reflects 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 baseline independent technique employs non-parametric statistical techniques and builds on the human ability to make graded ordinal judgments. Fishers are asked to answer questions about the state of the resource, fish-catches, personal well-being, income, occurrence of conflicts, and collective action. The method uses 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 the variability of 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 10). 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 derived 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 Jiggins and de Zeeuw 1992; Pido et al. 1996b)

1. Visual scoring and ranking systems can measure changes in wealth and well-being, development of skills, representation of social groups etc.
2. Time lines can represent significant changes in the village, as well as on the individual level.
3. Seasonal patterns can show the relative magnitude of the workload; they can also illustrate project activities and extent of involvement in the project.
4. Venn- and linkage diagrams can 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 external assistance for the project. At this point, the CBCRM arrangements become truly self-sustaining (Pomeroy 1998). After a 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 the 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 will be 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 have the opinions of the participants played 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 sufficient 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 measurement is only possible when donors are prepared to change their approach, away from predefined, entirely material goals. The implications for donors are significant. It means a restructuring of the project plans to include

a redefinition of its 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 production to a people-oriented approach. The central concern of CBRM and co-management 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 the participants and teh implementers, The indicators used to evaluate the project need to be adapted. 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 external agencies and donors for quantifiable, objective measurements. Social anthropology is one source of methods to operationalize 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 apparent and numerical and allow for statistical analysis. The fact that the material project goals are defined collectively with the assistance of the 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 is objective and truly represents project success.

As said earlier, project success will prove itself in the long run. An 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 time and money, as well as reallocation of authority over the project to local people, i.e. the new managers in the field.

CHAPTER FIVE

Evaluation of Fisheries Co-management Performance

A number of hypotheses exist concerning the advantages of co-management, especially when co-management is compared with centralized management systems. Several of these hypotheses were empirically tested during both phases of the project including: (a) whether regulatory compliance levels under fisheries co-management are higher than under centralized management; (b) whether or not transaction costs associated with fisheries co-management in the long run are lower than centralized management costs; (c) how adaptive and resilient are community-based coastal resource management institutions and how capable are they in responding to and managing change; and (d) whether co-management leads to greater stakeholder roles and participation in management. In addition, in Phase 2, the issue of "scaling-up" from a single community to larger geographic or political scales was studied. This chapter presents results of the testing of the hypotheses listed above and of the issue of "scaling-up" co-management.

5.1. Enforcement and compliance

This section highlights the theoretical and empirical dimensions of enforcement and compliance in four Southeast Asian countries. It summarizes research undertaken by Kuperan et al. (1997) in Malaysia, Indonesia and the Philippines; Susilowati (1998) in Indonesia, Malaysia and the Philippines; Siason (2002) in the Western Visayas, Philippines; Masae et al. (2002) in Southern Thailand; and Susilowti in Central Java, Indonesia (2002).

5.1.1. Enforcement and compliance with fisheries regulations in Malaysia, Indonesia and the Philippines [1]

Fisheries are regulated to mitigate over-exploitation and conflicts among user groups. Often, the over-fishing resulting from open access to the fishery is addressed with regulations that restrict gear and vessel types, set minimum fish size limits, specify the time and area of closures and quotas, and require licenses to fish. User conflicts are often addressed with gear prohibitions or restrictions and zones to separate competing 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 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 controling aspects of human behavior. The basic deterrence model assumes that the threat of sanctions is the only policy mechanism available to improve compliance with the 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

[1] Kuperan et al. (1997) and Susilowati (1998)

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 profits 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. When the probability is low in practice, the typical odds of being caught violating a fishery regulation are below one percent. Penalties, on the other hand, are not high enough to match illegal gains.

Raising fines 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 the regulations. Data show that 34 percent, 81 percent and 30 percent of fishers in Malaysia, Indonesia and the Philippines, respectively, comply with the zoning regulation.

When asked why they continue 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 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 moral development and standards of personal morality, individual perception of how just and moral the rules are being enforced, and the 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' decisions on 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:

$$Y_i = ßx_i + \Sigma \qquad [1]$$

Where Y_i measures the ith individual's non-compliance 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 morality, institutional legitimacy, and social influence.

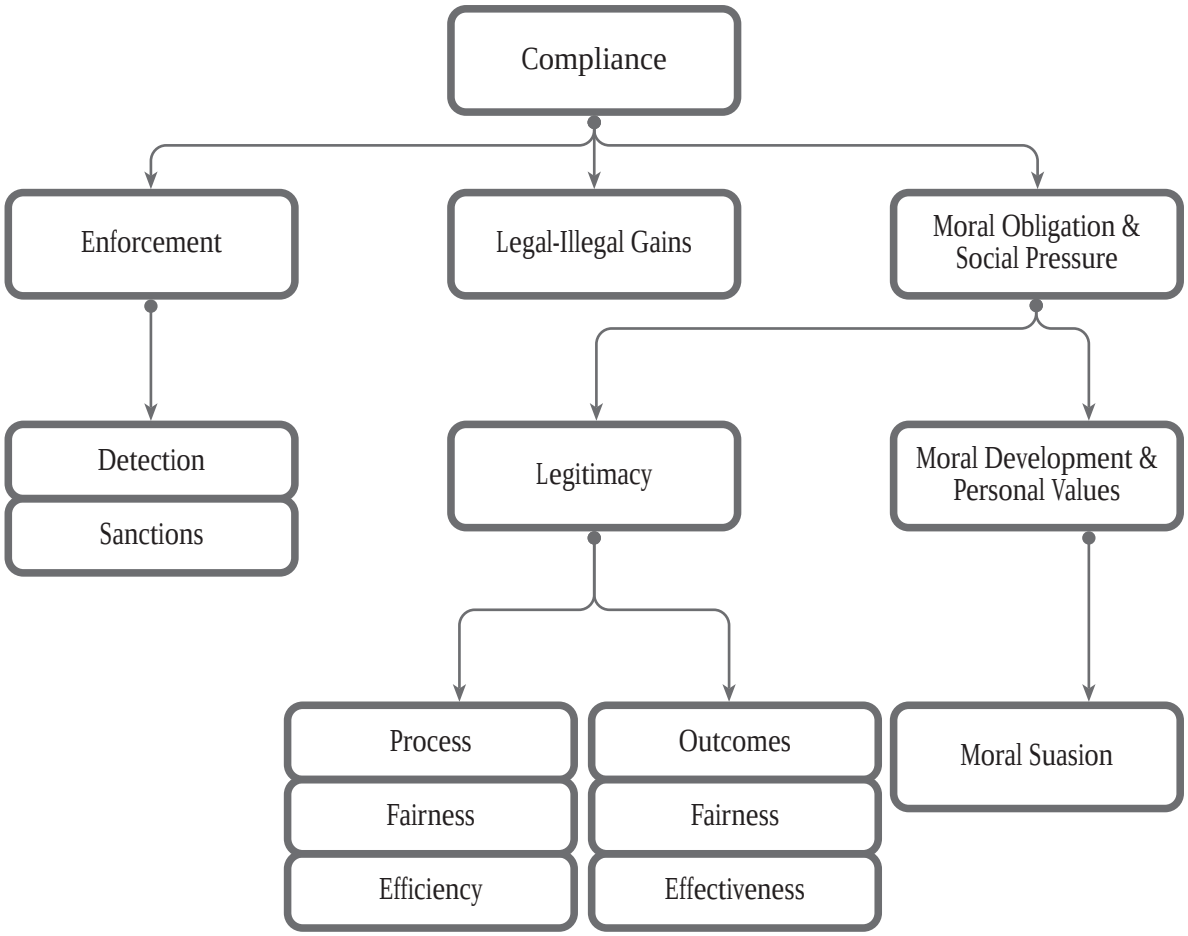
Equation [1] may be derived from a model in which a utility-maximizing individual decides whether and how frequently to violate a regulation. The individual's utility is a function of the net income from fishing (legal or illegal), his personal moral standing and his social standing. On the one hand, the individual's personal moral standing is assumed to depend on whether and how much he violates the regulation in conjunction with his morality 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 lower the probability of an individual violating a regulation,

1. The higher the probability of detection and sanction (or greater the enforcement inputs);
2. The greater the penalty if sanctioned
3. The less profitable violating when compared to complying;
4. The higher the morality of the individual;
5. The more legitimate the regulation as perceived by the individual; and
6. The more legitimate the regulation as perceived by the community at large.

Figure 11. 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 fisher 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 (Probit and Tobit models are linear regression models that enable analysis of dichotomous measures, such as yes or no response options, or discontinuous data).

The basic deterrence model

A fisher'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 fisher who fishes at least once inshore during the year and zero otherwise.

CONSTANT : the intercept in the equation.

CPUEI : the catch per unit of effort in the inshore area.

CPUEO : the catch per unit of 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, i.e. the subjective probabilities each fisherman 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 the area, the number of times he has seen enforcement personnel at sea, and the frequency of his actual contact with enforcement personnel in terms of boarding or checking. The estimated overall probability of detection and conviction is modeled as:

$$HOPROB_i = f(NPBOATSi, NENFORi, EXPEVAi, HPi) \quad [4]$$

Where,

$HOPROB_i$: the estimated overall subjective probability of detection and conviction for fisher i

$NPBOATS_i$: number of patrol boats fisher i believes to be in operation in his area

$NENFOR_i$: number of times fisher i has seen enforcement personnel at sea

$EXPEVA_i$: expenditure on evasion activity by fisher i

HP_i : horse power rating of engine in the ith fisher'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 et al. 1987) is used to rank fishers according to their level of moral development.

Legitimacy accorded to the regulatory authorities by fishers is measured by 12 variables reflecting the individual fisher's assessment of the outcomes and procedures associated with the 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 fishers), JUST (zoning regulation is a just regulation), EVERYONE (zoning regulation improves the long-term well-being of fishers), INSHORE (zoning regulation enhances the well-being of inshore fishers), and OFFSHORE (zoning regulation improves the well-being of offshore fishers). For each of these variables, the respondent ranked the level of agreement with each statement (Table 18) on a scale of one to five, where a higher 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 to 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 the regulation), VIEWS (views of fishers are taken into account in formulating fisheries regulations), NONCONST (zoning regulation is not enforced consistently), NODETECT (many trawler fishers 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 obey the institutions that produce positive benefits for them. The response for legitimacy questions is in the form of an ordinal scale with five ranks of agreement and disagreement.

Other variables used in the analysis include PERTVIOL and CPUEI. PERTVIOL indicates the percentage of fishers perceived to be violating the regulation. CPUEI reflects the potential income differences between 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 1991	1995	Indonesia	Philippines
CPUEO	-0.00440*** (-2.757)	0.0002099 (1.4066)	0.00004276 (0.53779)	-0.00040 (1.57460)
CPUEI	0.00896*** (6.698)	-0.00032118* (1.7079)		0.06013*** (7.4783)
HOPROB	4.650*** (6.710)	1.8822 (0.65179)	0.000000010 (0.12270)	0.0000012 (1.1262)
MCODE	0.781*** (-4.992)	-0.31462 (-0.73898)	-1.1092*** (-4.1945)	-0.32150** (-2.1785)
PERTVIOL	0.0122*** (2.286)	0.58233 (1.2809)	0.015708*** (2.9489)	0.00537* (1.7032)
CONSERVE 1	0.0475 (0.376)	-0.031223 (0.28559)	0.11196 (0.55126)	0.28555 (1.20930)
CONFLICT 1	-0.305*** (-2.328)	0.42076 (0.37882)	0.19321 (0.65182)	-0.37020 (-1.27030)
JUST 1	0.212** (1.758)	0.032939 (0.27089)	-0.22436 (-0.81140)	-0.06008 (-0.41782)
EVERYONE 1	-0.405*** (-2.630)	0.14076 (1.0330)	-0.23644 (-0.78247)	0.48175*** (2.6700)
INSHORE 1	-0.947 (-0.748)	-0.20401 (-1.5163)	0.40735 (1.5652)	0.08162 (0.40982)
OFFSHORE 1	-0.191 (-1.568)	0.1278 (0.90822)	0.16478 (0.73762)	-0.16248 (-1.00160)
RIGHT 2	0.139 (1.150)	0.15694 (1.2143)	-0.032829 (-0.10976)	0.06508 (-0.00447)
VIEW 2	-0.146 (-0.156)	-0.12554 (-1.0011)	0.17106 (0.78112)	-0.00447 (-0.03910)
NONCONST 2	0.106 (1.353)	-0.26006*** (-2.0238)	-0.18141 (-1.3921)	0.10017 (0.93416)
PENALIFT 2	0.0785 (0.822)	-0.07693 (-0.61089)	0.16076 (1.2103)	-0.26736* (-1.9534)
ENFORADQ 2	0.0691 (0.764)	0.82910*** (4.5534)	0.082951 (0.58502)	-0.00170 (-0.1157)
CONSTANT	1.242 (1.493)	-1.7114 (-1.4540)	-1.0516 (-0.79063)	1.3000 (-1.35990)

Variable	Malaysia 1991	1995	Indonesia	Philippines
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 ( ) * significant at 10% P ** significant at 5%P *** significant at 1%P

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 the traditional enforcement policy. Results show that 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 and regulations. In practice, however, the probability of detection is low and violations are rarely detected, especially for Indonesia and the Philippines, given their limited resources and vast geographical area. In 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 mind, it is recommended that a government should pay more attention to enhancing enforcement resources and increasing the penalty rates 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 insufficient 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 the 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 the regulation. This may mean that civil penalties and other sanctions should be comparable in value to the greater harm done or gains realized. Policy makers and enforcement authorities, therefore, need to reveal to violating fishers and the society at large the extent of damage the violations cause, so that the procedural and consequential aspects of the law 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 variables that respondents may not have fully understood. The difficulty in understanding the concept of legitimacy may have contributed to the weaker performance of the legitimacy variables. Another possible reason for the poor performance of the legitimacy variable is that other factors not captured in the model, but important enough to influence the normative factors of legitimacy, may have been overlooked (factors such as institutional problems and enforcement weakness).

Overall, the results show that basic deterrence, morality, and social standing variables in all models are statistically significant in determining the violation behavior of fishers in the selected study area. Not all legitimacy variables were significant. The study found sufficient support to demonstrate that personal moral development plays a more important role than the legitimacy variable in securing compliance. Under the Tobit model, process variables representing the legitimacy parameter are more important in explaining compliance compared to the outcome variables. Such a conclusion is consistent with Tyler's finding (1990) that process variables play a more important role compared to outcome variables.

Such a result has important implications for co-management. It is often iterated in the literature that co-management as an approach for governing fisheries resources is likely to receive greater legitimacy from a fishing community, as the communities are closely involved in the process and outcome aspects of governing the system. This strengthens the moral obligation of individuals in the fishery to comply with regulations imposed on the fishery and thus reduces enforcement costs and the need for elaborate enforcement institutions and structures.

This finding thus supports the general belief that co-management may lead to higher levels of compliance with fisheries regulations, 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.

5.1.2. The effect of co-management processes on enforcement and compliance with fisheries regulations in the Western Visayas, Philippines [1]

Compliance behavior among fishers is influenced not only by the economic gains of the fisher, but also by social and personality characteristics, including moral reasoning, social influence and legitimacy factors. In view of the increasing use of co-management as the strategy for addressing urgent issues of marine resource depletion and poverty in artisanal fisheries, it is hypothesized that co-management may involve processes that would promote better enforcement and compliance. Co-management is a partnership in which responsibility and authority for fisheries management are shared between the government and the local fishing community. Community-based coastal resource management is a central element of co-management and involves not only the decentralization of management of coastal resources to the stakeholders and resource users, but also the greater active participation of the fishers in the planning and implementation of fisheries management.

This study tested the extended model of deterrence when the variable of level of co-management is incorporated. The effect of the independent variables (involvement in decision-making, enforcement

[1] Siason (2002)

experience, management's capability to enforce, moral reasoning, probability of enforcement, social influence, fish catch, perceived legitimacy) on compliance is expected to be stronger in the sites with longer experience with co-management. The general model of compliance is summarized as:

COMPLIANCE = f(deterrence, economic, social and psychological factors, level of co-management)

The hypothesis, that there are differences in the responses among the three levels of co-management on the aforementioned variables, was also tested. The direction of difference is for higher variable values (more positive end of the measure) to characterize sites with longer experience with co-management.

Methodology

Three study sites in Iloilo Province in the Philippines were selected. Level 1 or High co-management is represented by Banate Bay area with its six years of experience. Level 2 consists of sampled Northern Iloilo municipalities with its three-year old management council. Level 3 consists of Southern Iloilo municipalities that had no existing co-management scheme. Proportionate to the number of fishers in the study areas and from a random draw of barangays, 326 respondents were selected. Interviews were conducted to obtain responses for the study variables. The fishing regulations for which compliance was measured were the prohibitions on: the use of fine mesh nets, use of explosives and poisonous substances, and fishing without a license. Two approaches to data analysis were applied. The Probit regression analysis tested the compliance model, while differences in the values of independent variables across the three levels were estimated using the analysis of variance (ANOVA).

Results

The results of the ANOVA show that violation and enforcement are highest in Banate Bay, which represents a high level of co-management. However, contrary to expectation, Banate Bay registered lower scores on the social measures of perceived management capability to enforce, fishers' involvement in decision-making, social influence and moral reasoning. The higher scores were registered by Level 2 respondents. The aforementioned belies the hypothesis that the positive effects of co-management would be highest where co-management of coastal resources is more established.

The Probit regression on the pooled sample from the three areas shows that Level 1 is a significant predictor only for the basic deterrence model. Contrary to what was hypothesized, fishers who live in Level 1 with its greater experience of co-management tend to violate more under conditions where the only existing information pertains to the economic utility derived from the fishing activity. However, when social variables are included through the extended model, the effect of being in a high co-managed area disappears. The Level 2 area is also a predictor of violation, though at a lower alpha significance (.10), with the result likewise moving against the direction of the study's hypothesis that higher levels of management would predict better compliance. It is not clear why those in co-managed areas tend to be more candid about their fishing practices, including those that are recognized as illegal. The reasons may be different in each level. Level 1 may be reporting their violations because they are confident about the ineffective enforcement and how they are able to escape arrest. However, those in non-co-managed areas are cautious about reporting their fishing practices.

Involvement in decision-making is a significant predictor, but not in the expected direction; thus, respondents who perceive greater involvement of fishers in decision-making are likely to violate. The

variable "perceived management capability to enforce" is not a significant predictor. Both involve processes that are promoted by co-management, and thus are expected to have been instrumental in influencing compliance.

There is better appreciation of the outcomes of the regulations than the efficiency and effectiveness by which the regulations are enforced (process legitimacy). The higher the perceived outcome legitimacy is, the less likely the violation.

Contrary to expectations, an arrest experience significantly predicts violation, meaning that those with greater arrest experience violate. As to the 'age' variable, the older the fisher is, the more likely he is to violate. Catch per unit of effort is a weak predictor of violation and loses significance when the social influence variable is factored in. Moral reasoning is not a significant predictor of violation.

On the other hand, the following hypotheses were supported. The lower the perceived percentage is of obeying the regulation (social influence variable), the more likely will a violation occur. On perceived legitimacy, the greater the agreement is on the outcome of the regulation, the less likely will a violation occur.

The more promising model indicated by the slightly higher R-squared or variance explained (49 per cent, compared to the basic deterrence model of 46 percent) is that which includes age, arrests, catch per unit of effort, perceived legitimacy of outcomes, and involvement in decision-making.

Separate Probit regression was run on Level 1 data, to test the hypothesis that the effect in the co-managed areas would be stronger. However, results showed few predictors of violation. One significant predictor is involvement in decision-making, though not in the expected direction. Further, in the basic deterrence model, the probability of being accosted was the only significant predictor, an effect which disappears when social variables in the extended model are incorporated. The better model is that which yields an R-square of 63 per cent (compared to 39 per cent for the basic deterrence model). This model yielded significant predictors in involvement in decision-making, perceived management capability to enforce, and moral reasoning, the latter two not obvious in the pooled sample. Except for moral reasoning, these variables confirmed the expectations.

In Level 2 Probit regression, only the deterrence model manifested variables as significant predictors. These include catch per unit of effort, number of years fishing, and age of fisher. The greater the catch, the more the fishers will violate. The older the fisher, the more likely s/he is to violate. The higher the number of years fishing, the less the violation is.

Discussion

Despite high enforcement in Level 1, the level of violation was still the highest among the study areas. Enforcement does not appear to deter violation. In fact, arrests reflect violation. The probability of being accosted for infraction appears to mediate the relationship between arrest and violation. In Level 1, the greater this probability, the less likely is violation. The probability variable does not show any significance in Level 2.

Although a supposedly more stable management council is in place in Level 1, its practice of involving fishers in decision-making bears further examination. Do fishers' opinions really count, especially in cases where there may be differences in positions between them and the local government? The long

experience of fishers in Level 1 may have given rise to clear instances when the motions of consultation are made, but where ultimately their opinions do not count in the decision. Such experience may have resulted in disillusionment, which explains their lower scores in involvement in decision-making. On the other hand, Level 2 respondents who experience the novelty of the council demonstrate more optimism in their responses.

The poorer relative scores of Level 1, compared with Level 2 on perceived management capability to enforce, may be attributed to higher awareness and, consequently, higher expectation in terms of governance. In Level 2, on the other hand, the early stages of awakening to elements of co-management would make the highly publicized campaigns on enforcement become impressive.

Those with arrest experience tend to violate. Although one would expect that previous arrests would deter violation, perhaps the consequences of arrest might not really deter because penalties are minimal, not imposed, or negotiable.

The expected association between the level of co-management and social influence (perception of how prevalent compliance is among fellow-fishers) is confirmed in the study. Fishers' compliance behavior is influenced by what they see others do, particularly evidenced in the pooled Probit analysis.

The overall pattern of the ANOVA results shows Level 1 to have significantly lower scores on all social variables, especially compared to Level 2. These social variables are assumed to be the effects of having co-management structurally in place. That the findings point to a lower level of effect, compared with an area where co-management has been instituted for a shorter time period, raises questions about the effectiveness of co-management. The few studies that have reviewed the implementation and outcomes of coastal resources management (CRM) use an interview method asking respondents to give their perceptions of changes brought about by CRM. In this current study, the research design allows for a comparison of effects across varying levels of co-management. It is able to capture possible transitions and phases.

The analysis of this cross-section of respondents representing varying time points in the implementation of co-management revealed unexpected results. It is speculated that the putative effects of co-management undergoes phases that move from a zero level of the effect variables to a phase of initial optimism and hope created by the expectation of positive outcomes (the promise of co-management, such as expressed in the legitimacy of outcomes). However, this is followed by a phase of disappointment after enough experience shows that the promise has created problems among fishers. The level of optimism is evident in the responses of Level 2, while the unexpected lower scores of Level 1 reflects such disappointment. Thus, it would seem that the effects of co-management do not follow a straight line in terms of the values of the effect variables. For example, perception of capability to enforce does not necessarily improve over time. Rather, the community response goes through stages, where the initial stage is marked by a level of hopefulness (as shown by Level 2), emerging from the baseline of conditions where there is no institutional effort to manage the coastal resource (Level 3). However, the second phase may represent a period of disillusionment.

The test of the deterrence models reinforces the results from the ANOVA. The result in the Level 1 area predicts violation, inasmuch as it has the highest violation among the study areas. The other major predictors of violation are social influence, perceived legitimacy of outcomes, arrest and involvement in decision-making. The unruly directions of the aforementioned variables, vis-a-vis compliance within

each level, raises questions on the consensus of community response to co-management. Stakeholders may speak with divergent voices, especially after a more prolonged experience with attempts to co-manage the coastal resource.

Recommendations

The results of this study point to the need to recommend that projects should constantly monitor the involvement of the community. In addition, the dynamic perceptions and experience with co-management of fishers should be recognized and allowed to influence policy. Implementers have to realize that co-management is an ongoing and reiterative process that is never completed. At the beginning of the implementation of co-management, much effort and dedication may be expended on community consultation and dialogue, which after apparent success may then be prematurely relegated to the background. At that point it is possible that the empowerment of fishers has not yet reached the critical stage where they can express and channel their discontent in functional and effective ways. Research can also document and analyze more closely the approaches used in involving fishers and communities in dialogue. The research, in fact, can assess whether the processes empower fishers to become assertive about their social-economic needs vis-à-vis the requirement of sustaining coastal resources.

5.1.3. Development, enforcement and compliance with fisheries regulations: A comparative study between communities under co-management and conventional management in Southern Thailand [2]

This study investigated the difference, if any, between the level of regulation enforcement and fishers' compliance with the regulations in two communities in Southern Thailand, one with co-management and the other under conventional state-led management. The two communities, Ban Mai (with co-management) and Ban Hua Khao (with conventional management) are located at the lower part of Songkla Lake, close to the city of Songkla. Ban Mai is categorized as the co-management community owine-g to its experience in working with a local NGO to actively manage fishery resources in collaboration with the local government. An important output has been the establishment of a fishing reserve managed by community members. Ban Hua Khao, on the other hand, has fisheries that are managed by the Department of Fisheries without participation of the local fishers.

A survey of 40 households in Ban Mai and 160 households in Ban Hua Khao provided data for the analysis. Ban Mai is a much smaller community and thus the sample of households was smaller than in Ban Hua Khao.

Results

The fisheries co-management arrangements in Ban Mai village emerged under conditions with no apparent policy and institutional frameworks. Therefore, it characterizes a special form of co-management that is based on local initiative, without formal recognition of the government agencies concerned. The development of local regulations and adjustment of existing government regulations related to fisheries management has not taken place. The involvement of the government agencies, especially the Department of Fisheries, is mainly to fulfill their duties to promote local participation in enforcing

[2] Masae, Nissapa and Boromthanarat (2002)

existing fisheries laws and regulations rather than to actually develop and implement a form of co-management.

The emergence of co-management in Ban Mai village does not affect clearly a reduction in the number of fishing violators, as the proportion of violators was not significantly different between the two villages studied. However, it affected a change in the type of violation. At the time of the study, only a small proportion of fishers used set bag-nets and none of them used a push-net. These two types of fishing gear had been commonly employed before the community involvement campaign against destructive fishing practices. At the time of the study, set bag-nets were still widely used by fishers in Ban Hua Khao, but the employment of push-net was minimal. Most violators in Ban Mai used a sitting cage for their fishing. This type of gear is restricted for use only in permitted areas that are generally 1 000 meters from the shore line. The main difference between Ban Mai and Ban Hua Khao was the removal of the set-bag nets. This level of achievement in removing the gear was a consequence of the people's attempt to stop destructive fishing practices according to their perception. The continuity in using sitting-cage gear was complicated since fishers in Ban Mai have limited job opportunities besides fishing, and the set bag-net was the second best type of fishing gear in terms of economic returns. Moreover, fishers in Ban Mai showed a higher degree of agreement on the danger of using set bag-nets than that of employing sitting cages.

The level of fishery regulation enforcement was not significantly different between the two villages. This implies that the co-management arrangements in Ban Mai did not improve the enforcement of fishery regulations. The change in fishing practices by reducing the use of set bag-nets and stopping push-net fishing was a consequence of active fishers' group in the community, together with a generally strong campaign of the DOF to stop push-net fishing country-wide. The low probability of seeing surveillance and arrest among fishers in both communities reflected indifference in the degree of regulation enforcement by the officials concerned. The improvement in fishing practices among fishers in Ban Mai was a result of social pressure rather than cooperation between fishers' organizations and officials to improve the regulation enforcement.

The level of fishers' compliance with regulations was found to be low in both communities, but the value was significantly higher in Ban Mai than in Ban Hua Khao. This implies that the co-management arrangement in Ban Mai brought about the improvement in fishers' compliance, although this improvement was minimal. For both communities, this conclusion is supported by data on probabilities on non-compliance, which were opposite to those on compliance.

The improvement in fishers' compliance with fishery regulations in Ban Mai correspond to their higher level of agreement on the regulation concerning the illegality of the set bag-nets as compared to fishers in Ban Hua Khao. At the same time, the level of agreement score on the regulation concerning the illegality of sitting cage gear was not different between fishers in the two communities. Although it cannot be simply concluded from these findings that the higher compliance level among fishers in Ban Mai is associated with their perception about legitimacy of fishery regulations since there is inadequate statistical support, the overall varying views about the agreement on statements concerning fishery regulations that Ban Mai fishers showed higher scores than Ban Hua Khao fishers reflect somewhat the correspondence between legitimacy and compliance.

There is no evidence of short-term improvement in catch and value of catch resulting from the co-management in Ban Mai. The co-existence of legal and illegal practices partly due to immaturity of the

co-management brought about difficulties in assessing economic benefits resulting from the co-management. The finding that fishing violators generally had higher returns per unit of effort was discouraging for the promotion of legal fishing.

Despite shortcomings, fishers in both communities generally had positive views towards co-management and its expected outcomes in various aspects. This implies that there is a good opportunity for introducing co-management arrangements at the local level.

Recommendations

The overall findings of the study indicate several benefits of co-management. However, these benefits are not clear in a quantitative sense since the co-management arrangement in Ban Mai is still relatively new. This immaturity could not generate crucial differences in improving fishers' livelihoods and fishery resources compared to the community without co-management.

To make fisheries co-management more effective, the government must have a clear policy framework to continually support communities that want to establish co-management. Such a framework should cover the institutional arrangements that encourage cooperation among the government agencies concerned, fisher groups, and NGOs. The support should be wide ranging and allow for the development of co-management systems established in each community to mature.

5.1.4. Evaluation of compliance behavior of fishers in communities with different levels of participation in co-management: A case study in Central Java Fisheries, Indonesia [3]

The main objective of the study was to examine non-compliance behavior of fishers towards fisheries regulations in communities with different levels of co-management in Central Java. Evaluating non-compliance behavior is an important stage in formulating an improved fishery regulatory program. The fisheries regulations studied cover restrictions on gear, area or zoning; means of fishing; and fishing permits. Pemalang and Demak regencies in Central Java were selected to represent the areas with high and low levels of co-management.

Methods

Violation decisions were hypothetically thought tt comprise factors including deterrence, biological, economic, and non-economic factors including psychological, social-environment, legitimacy and communities' characteristics. It is assumed that biological conditions such as weather, water salinity, and so on remain unchanged. The non-compliance model can be written as follows:

NONCOMP = f (Deterrence, Econ, Psycho, Pertviol, Legitimacy, Level)

[3] Susilowati (2002)

The definitions of the operational variables and their measurement are summarized in the following table.

Table 19. Operational variables and their measurement

Variable	Code	Definition	Measurement
Dependent/Endogenous			
Non-compliance	NONCOMP	Non-compliance decision of fishersto fish in prohibited zone, with restricted gear and/or means, or withour fishing permits	- Dummy (1 = if respondents violate any one of the observed estrictions; 0 = if otherwise) - Intensity = frequency of violation for the respective restrictions or rules)1/
Independent/Exogenous			
Age	AGE	Age of the respondent	In numerical value (years)
Numbers of family members	TFAM	Numbers of family members under the responsibility of respondent	In numerical value (persons)
Work experience	LONG	The length of the respondent's work experience as a fisher	In numerical value (years)
Horse power	HP	Capacity of boat engine representing fishing effort.	In numerical value (HP)
Deterrence	DETECT DREMIND DREPORT DOBSERV DCAUGHT	Detection and conviction representing enforcement availability	In Likert scale (MI)
Economic opportunity	SEAKG	Economic opportunity or values earned by fisher from violating the observed regulation	In numerical value (kg)
Moral development	PSYCHO	Psychological indicators of the morality of individual fishers	In Likert scale 2/(MI)
Social-environment	PERTVIOL	Social environment influencing the violation of individual fishers	In numerical value (%)
Legitimacy 3/	LEGITIM	Outcome and process variables representing legitimacy accorded by the individual fisher to the rules, regulations or legal authorities. (The variables used by Kuperan (1992) and Susilowati (1998) are adopted with modification and enhancement.)	In Conventional scale (1 to 10) 4/(MI)
Level of Co-management Process (CMPs)	LEVEL	Dummy variable representing the level of co-management practiced in the fishers' communities	Dummy (1 = if fisher belongs to the high CMPs community; 0 = otherwise)

1/ Rational choice of respondents that engage in non-compliance activity (it is estimated with Probit model). Violation intensity of non-compliance behavior is measured by the frequency of violation (it is estimated with Tobit model).

2/ It has been consulted with the competent panels such as religion and community's leaders.

3/ Detailed component of the legitimacy variables was determined after pre-survey.

4/ It is explored in an in-depth interview.

MI: it is measured from several items.

In Indonesia, the conventional scale (1 to 10) is more widely used by people as an evaluation scale measurement.

The multi-stage sampling method was used to select 168 respondents. The sample allocation was 85 respondents from Pemalang Regency and 83 respondents from Demak Regency. Economic models of non-compliance behavior using Probit and Tobit techniques were estimated. The Probit model was applied to estimate the violation decision of each individual fisher; the Tobit model was used to indicate the intensity of violation committed by all the fishers. The extended model using the Tobit estimation technique gave better performance in explaining the violation decision of fishers. Susilowati (1998) also found that the Tobit model was suitable to estimate the intensity of fishers' violations.

The model was applied to small- and large-scale fishers from high and low co-management processes (CMPs) in their community. The study examined the compliance behavior of fishers with different levels of CMPs participation. The CMPs in this study are classified into two levels, namely high and low. The study area of Pemalang Regency (West coast) was selected to represent fishers' communities with high CMPs, while Demak Regency (East coast) represents communities with low CMPs.

Results

The problem raised in this study is the high incidence of non-compliance with regulations by the fishers under a condition of limited enforcement in the fisheries and a different level of fishers' participation in co-management processes. The non-compliance of fishers to the regulations observed in the study area was high. About 62.5 percent of the respondents (105 out of 168 persons) have committed violation in their fishing activities.

The results show that most of the independent variables, such as demographical factors, fishing effort (HP), deterrence (DDETECT), moral development (PSYCHO), legitimacy (LEGITIM), and the participation level of CMPs (LEVEL), have expected signs, although they are not statistically significant. Nevertheless, the model reveals the phenomena of violation behavior of fishers in the study areas. The intensity of non-compliance behavior of the individual fisher has negative relationships with the level of participation of fishers' community in CMPs.

This study suggests that although enforcement is costly and the authorities are faced with declining budgets, fisheries management authorities should also explore alternative approaches for managing fisheries, such as community-based or co-management approaches. In addition, while violation behavior is something quite subjective to the individual fisher, it is valid to the universal case. Further, individuals have multiple motives and interests, thus it is not a simple task to predict the compliance behavior of people. Violation behavior tends to be influenced by the contextual situation and condition of the individual fisher. This study concludes that the strategy to secure compliance for a certain target of people should be developed with a unique design that suits the situations.

Policy implications

The policy implications and recommendations provided by the study are outlined based on the determinant factors of fishers' violation behavior such as demographical, fishing effort, deterrence, economic, moral development, social-influence and legitimacy factors.

Deterrence. One of the reasons why fishers violate the regulation as claimed by the respondents is due to the low deterrence of the penalty and sanctions imposed. Theoretically, a higher probability of detection and conviction arising out of enforcement activities discourages people from committing illegal activities. Further, higher penalties or fines imposed make people comply with rules and regulations. With limited resources for enforcement and a large geographical area to cover, higher compliance is hardly achieved in the short term. Nevertheless, a lot more effort should be put on it. One way is to increase the probability of detection and conviction, and penalties rate. This can be done by either improving the enforcement process and/or decreasing the violation's intensity. With a decreasing enforcement budget from the government, better formal enforcement in Indonesia may not be practical for the next couple of years. In order to improve fishers' compliance in the study area, there is a need to use other determinants of compliance such as morality and social environment, etc. Influencing the morality of fishers is not easy because it deals with human beings with multidimensional motives.

Morality. One of the strategies to secure compliance is through bridging resource overexploitation and degradation to moral development of the stakeholders. Based on the survey, many fishers do not understand the relevant regulations, and their contents. Moreover, most respondents found in the study area can be classified as pre-conventionalist and conventionalist. Thus, extension services and educating people are necessary in order to improve the moral level of the fishers. Socialization of regulations and/or other rules (perhaps followed by a proper extension service) is necessary to raise the understanding of fishers about the rules of the game that should be followed when conducting fishing activities. Furthermore, with higher moral development, fishers are expected to be more compliant. In addition, extension and education to link resource degradation to aspects of personal morality has the potential for increasing compliance levels. Of course, there are avenues for governments, political leaders and industrial leaders to make the links through formal and informal speeches and development program for fishers.

Social-environment. The influence of the social-environment (such as society, friends, and peers) plays an important role on the individual fishers' decision to engage in non-compliance activities. In the study, this variable is represented by what the fisher believes to be the percentage of fishers violating the regulations (PERTVIOL). Sociologists emphasize the impact of social relations and normative values as important bases for influencing one's behavior. It is very practical from a policy perspective that socio-religious leaders can wield some influence in encouraging a higher level of compliance by publicly praising compliers and exposing non-compliers. Thus, fisheries authorities should cooperate with the competent fishers' leaders to spread some development messages including the implementing of a compliance culture and other management programs in fisheries.

Legitimacy. Although legitimacy is seen as one of the determinants of compliance, the results from this study did not provide unanimous support for the theory. The weaker empirical support for the legitimacy variables could be due to the difficulty in measuring these variables. This study tried to modify the measurement for legitimacy variable, but the result found was unsatisfactory. There are two

reasons that may explain such a condition: (1) respondents might not have fully understood the definition of the variable; (2) there is an indication from the survey that many fishers are dissatisfied with the performance of the authorities in managing the fisheries resources and relevant matters. On the other hand, people consider the government to be the resource manager (because this party has enough facilities to do so, compared with other stakeholders). Therefore, people (fishers) were ambivalent to valuate the government's legitimacy. Based on these arguments, therefore, the authorities should improve their performance to materialize the management system with a good governance concept, and in this way, can perhaps improve the perception of the fishers towards the legitimacy of the government.

Demographical factors. Old age does not ensure more maturity and greater compliance. Theoretically, a mature person tends to be broad-minded. However, it is too naïve to think that younger fishers tend to be more non-compliant. The average age of the respondents in Pemalang is relatively lower than that of the fishers in Demak, but the violation rate committed by the fishers in Pemalang is lower than in Demak.

5.2 Transaction cost in fisheries co-management

Fisheries co-management as an alternative to centralized command and control of fisheries management is often suggested as the solution to the problems of fisheries resource use conflicts and over-exploitation. With fisheries co-management there is a transfer 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 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 Mustapha et al. (1998) and the second is a paper by Kuperan et al. (1998).

5.2.1 Transaction costs framework

Coase (1937) first discussed transaction costs economics in the economics 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. As Libecap (1991) points out, having lower transaction cost is a necessity 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.

Transaction 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 behavior, 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 one's 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 costs. 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 faced through various forms of implicit or explicit agreements. These contracts involve costly activities expended in the processes of achieving agreements before and during coordination of 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 costs 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 12. 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 interests in the 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 fishers' 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 that 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 for 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.

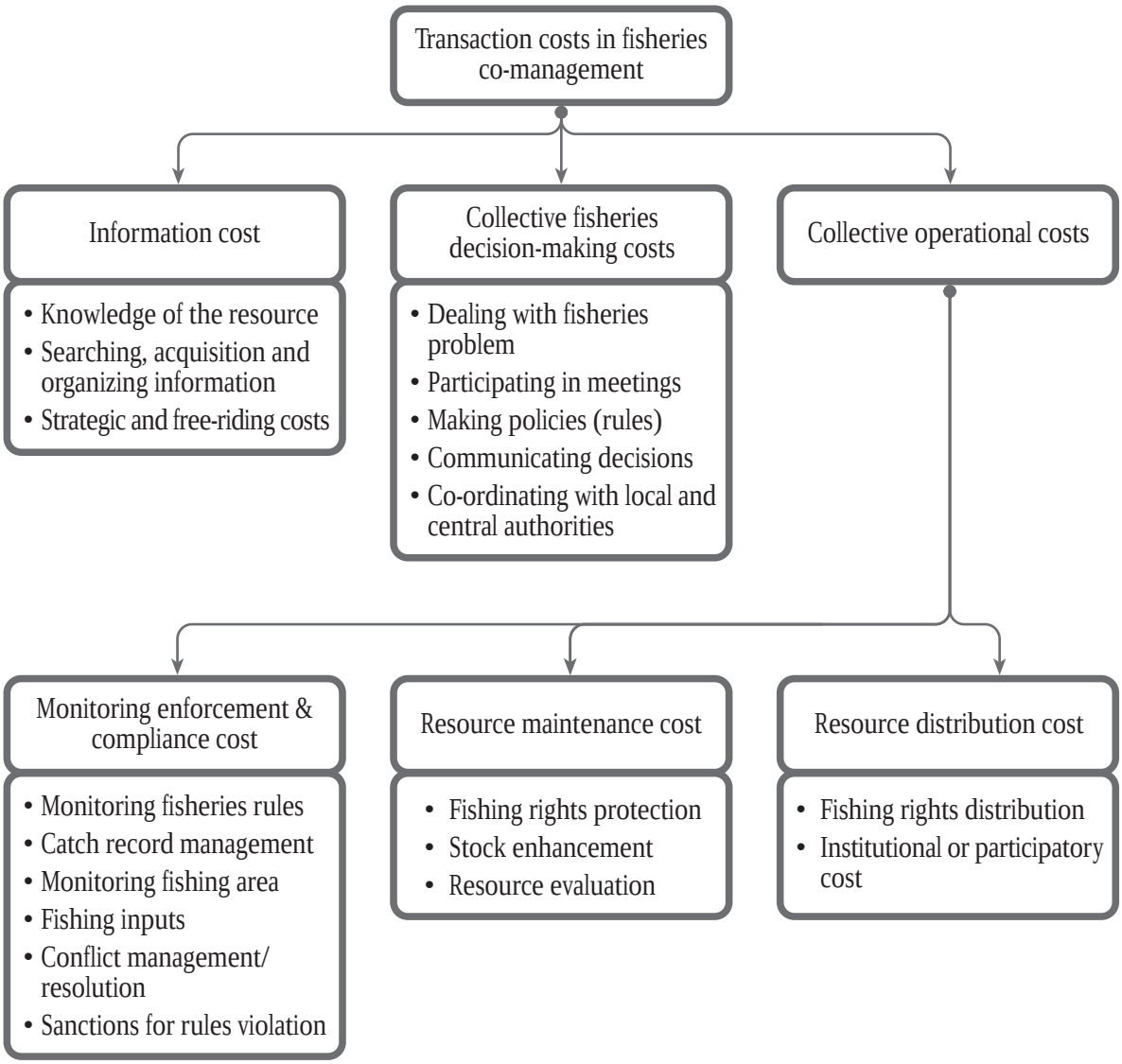
The third major component of transaction costs is the collective fisheries operations costs. This component can, in fact, form the strongest counter-argument for the centralized resource management system. It is argued that if the resource is to be managed by both the central agency and the community, 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 for this line of reasoning. Operation costs can be quite significant in carrying out a management regime. These costs come in three forms:

(a) Monitoring, enforcement and compliance costs;

(b) Resource maintenance costs; and

(c) Resource distribution costs.

Figure 12. Schematic flow diagram of the transaction costs in fisheries co-management



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 rights 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 costs of distributing the fishing rights to the appropriate stakeholders and the 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 realized from the increased legitimacy of the regulations and allocation procedures adopted by the community. However, 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 centralized 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 implications for the 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 costs 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 realize the benefits. These costs are often incurred by national agencies in most countries. A move towards co-management systems calls for the community to spend resources for such maintenance and replenishment interventions. Most communities are 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 the 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 the nature of institutions for the public good 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 over-exploited 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.

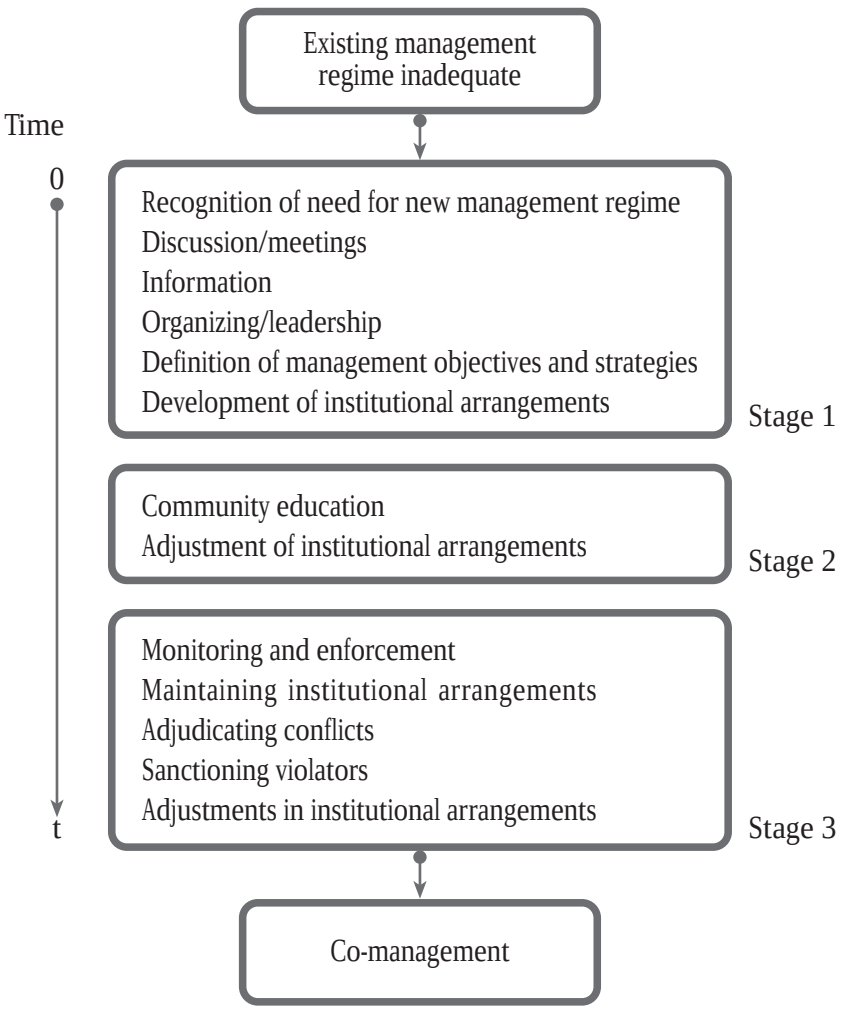
Measuring transaction costs

An approach to measuring transaction costs of fisheries co-management systems looks at a co-management system in terms of processes in both a static and dynamic senses. By process is meant looking at the details of the activities involved in the development of the co-management system over time (Figure 13). 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, adjudicating conflicts, sanctioning violators, and making adjustments in the 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 all 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 is the stage of devising, creating, obtaining information and decision-making. The second is the implementing stage, which involves dissemination of information and explanation of how the community system will work. The third stage includes maintaining, monitoring, enforcement, adjudicating and sanctioning activities, as well as meeting 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 change.

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 for activities involved in stage 3, which represents the current stage (time t). This is the stage in which many of the on-going fisheries co-management initiatives worldwide are. The second step involves the dynamic analysis of costs and benefits in stages 1 and 2, and involves backtracking to time 0. Time 0 refers to the initiation of the process 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.

Figure 13. Process of moving towards co-management



Source: Modified from White et.al. (1994).

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 is necessarily for managing the resource. Time could be spent on producing more than one outcome, and fishers would also consider meetings as consumption goods that, for example, enhances their sharing of fellowship, exchanging of gossips or ingesting of coffee, as suggested by Berkes (1992). This points to the fact that a more workable method for allocating time spent simultaneously on more than one production process should be developed. There are obviously many challenges in the development of appropriate measurement conventions and the appropriate wage rates that can be used for valuing time spent in organizing, implementing and maintaining a fisheries co-management system.

5.2.2 Measuring transaction cost of fisheries co-management on San Salvador Island, Philippines

One of the purported advantages of co-management compared to centralized management is that it will reduce transaction costs - the costs of gaining information about the resource and what users are doing with it, reaching agreements and coordinating with others in the group with respect to the use of resources, and enforcing agreements that have been reached. Hanna (1996) 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 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 centralized 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 on San Salvador Island

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, an indigenous tradition of fish stock management is virtually non-existent.

Fishers recall that, before World War II, San Salvador had abundant marine resources, 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, owing to 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 San Salvador Island 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 guns, 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 fish in shallow reefs. Local fisheries during 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 on 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 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 catching aquarium fish for a growing market in Europe and the United States. 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) under the Department of Agriculture (DA). 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 BFAR. In the process, Christie 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-governmental organization (NGO), provided personnel and logistical support to the project. Haribon was one of the first Philippine environmental 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 to apprehend violators. It also provided an opportunity for the municipal government and the village of San Salvador to cooperate on 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 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 continued to be sustained by the village and 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 had 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 1980s to the present. The time horizon for the marine conservation project of San Salvador was divided into three stages. Stage I was 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 was defined as the stage wherein the local island organization (LTK/SPSS), in partnership with the Haribon Foundation (Environmental NGO), went ahead with the full implementation of the project (Year 1990-93). Stage III was the stage wherein management of the sanctuary was 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 the San Salvador area for the period 1988-96 as shown in Table 20 indicate that the difference in the total costs of fisheries management between centralized government management and co-management is not significant. However, there is a significant difference in the costs at different stages of management. In Stages I and II, which are the stages of initiating a new management regime and community education, the costs are higher for the co-management approach compared to the centralized 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 (1996) view that the downstream or implementation costs are likely to be lower for a co-managed approach (Table 21). This is because the cost of monitoring and enforcement are likely to be lower as community members are more likely to comply with rules and regulations 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 those costs 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 20. Costs of alternative fisheries management on San Salvador Island (In Phil.Pesos; 40 peso = 1US$ in 1996)

	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 21. Transaction costs in centralized and co-managed systems

Resource management activities	Centralized 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

The 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 because 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 a co-management project indicates the importance of this activity and also helps to explain the lower cost for co-management in Stages II and III 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 III of the project as compared to government management. When seen in monetary terms, the monitoring activity again emerges as the activity responsible for more than half 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 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. However, there are serious problems with comparisons of this nature as both the co-managed arrangement and the

centralized government-based management are present at the same time. The results from this study indicate that since monitoring costs are the major transaction costs and are met by the community, there is an opportunity for these costs to decline over time as community acceptance of the rules and regulations for managing the common property is legitimized. Moreover, costs data (see full paper) show that the costs associated with managing common property are lower in the later years (e.g. fifth year onwards) under a co-managed regime than under a purely government managed regime.

5.2.3 Transaction costs in fisheries co-management at Oxbow Lakes (Baor) in Bangladesh. [4]

Under the pretext of the problems of centralized-management system, government policy-makers designed the Oxbow Lake Co-management Project (OLP II) in 1988 following the guidelines of the New Fisheries Management Policy (NFMP). This project was completed in July 1997 with funding by the International Fund for Agricultural Development (IFAD), and with a Technical Assistance grant from the Danish International Development Agency (Danida). The co-management arrangement followed in these oxbow lakes was a partnership arrangement between the government and the fishers where a non-governmental organization, BRAC, was involved to obtain external support.

In these lakes, the government and BRAC work together to ensure institutional, organizational and financial support to both listed and fishing license holders. Fishers in each lake are organized in a group called the Lake Management Group (LMG). These fishers elect their LMG committees. As per the LMG rules, income and costs are shared equally among the members, with an acknowledgment that the contribution to fishing labor is the basis for earning a share of the income.

In this study, the comparison presents a problem because the two institutions did not start their operations at the same time. In the case of co-management, the project started in the oxbow lakes during 1988-89, whereas the centralized-management institution was established in 1979-80. In the co-management process, the period from 1988-89 to 1993-94 is considered as the first stage, whereas for the centralized-management institution, it was from 1979-80 to 1985-86. To avoid the problem of inflationary effect, this study uses the consumer price index to convert the costs of the first stage of centralized management to 1993-94 prices. As there is a difference in location between co-management and centralized management lakes, as well as a time difference in the first stage, the comparison is based on a per-year and per-hectare basis in every stage. In centralized management, the period from 1994-95 to 1996-97 is considered as the second stage, and 1997-98 as the third stage similar to the co-management process. It is mentioned here that in the centralized management scenario there is no such division as stage two or three as that in the co-management project.

The transaction costs involved in the co-management and centralized-management institutions are on the basis of recurrent or continuous costs involved in the management process over the said duration. Costs incurred by the external agencies are ignored in the analysis. Only recurrent costs are included for this analysis. In the case of co-management lakes, the costs included for the analysis are mostly collective operational costs, such as provision of security, entertainment, fisher allowance, general fund, court cases and the unspecified costs that are mainly the costs for the group leader's salary, subscription of different organizations, lubricating payments to government officials (mainly for licensing purposes), stationery materials, record keeping and the like. Collective fisheries decision-making costs are for the

[4] Jahan, Viswanathan, Abdullah and Omar 1999

formulation of policies, decision-making and conflict resolution. Considered also as a cost for the analysis are meetings costs. The costs that the fishers incur themselves include attending different management activities. In the case of government-managed lakes, the government employed several staffs to manage the lake resources. The costs outlined in Table 8 include the provision of security, employee salaries, traveling allowances, festival bonuses, etc. Other costs in government-managed lakes cover unspecified costs such as subscription fees, entertainment and meeting costs, etc. In both institutions, the fisher spent a lot of time in management activities. The opportunity costs of the time spent are included in Tables 22 and 23. The sum of the costs mentioned above, which are shown in Tables 22 and 23, are the total transaction costs involved for running the co-management project and centralized-management institution over the years.

Table 22. Transaction costs (Tk/ha) in co-management lakes (525 ha) 1993-1998

Activity	1993-94	1994-95	1995-96	1996-97	1997-98
Security	434	505	383	532	603
Conveyance	138	1 562	132	107	235
Monthly meeting costs	16	75	29	39	52
Entertainment	11	0	33	47	133
Fishers' allowance	76	23	0	73	16
G. T. Fund	0	0	0	0	2
Court Cases	0	43	11	425	303
Pocket costs of fishers	23	52	55	39	35
Opportunity costs of fishers for participating in management activities	345	629	672	578	626
Others	1 601	938	852	732	932
Total transaction costs	2 645	3 826	2 167	2 572	2 938

Source: Published Statistics 1996-97 (Danida, BRAC, Bangladesh Government), in Jahan et al., 1999.

* Costs in different stages are adjusted to 1996-97 prices.

Table 23. Transaction costs (Tk/ha) in government-managed lakes (589 ha) 1993-1998

Activity	1993-94	1994-95	1995-96	1996-97	1997-98
Security	1 679	1 713	1 788	1 855	2 120
Employee salary	1 683	1 710	1 565	1 618	1 770
Traveling allowance	180	184	164	161	180
Entertainment / festival bonus	202	215	194	188	211
Pocket costs of fishers	7	7	7	7	9
Opportunity costs of fishers for participating in management activities	134	134	134	135	156

Table 23. Transaction costs (Tk/ha) in government-managed lakes (589 ha) 1993-1998					
Activity	1993-94	1994-95	1995-96	1996-97	1997-98
Others	158	240	169	277	228
Total transaction costs	4 043	4 204	4 022	4 242	4 675

Source: Published Statistics 1996-97 (Danida, BRAC, Bangladesh Government), in Jahan et al., 1999.
* Costs in different stages are adjusted to 1996-97 prices.

The results in Tables 22 and 23 indicate that there is a significant difference in the transaction costs between co-management and centralized management over the years. Transaction costs involved in the co-management project is much lower than the centralized management institution. The costs involved in Tables 22 and 23 are recurrent or continuous, which implies that the co-management approach reduces the overall costs of managing the fishery.

Recommendations

Although the analysis provides support for long-term institutional sustainability of co-management in terms of cost-effectiveness, the transaction-cost analysis presented earlier has, nevertheless, indicated some problems that require careful attention. These are as follows:

- It is evident from Table 23 that the costs of monitoring the fishing areas (lake guarding) are rising over the years, albeit expected to decline when the co-management system is established. One reason for this increasing cost is attributed to the fact that Bangladeshi fishers generally come from the lower stratum of society; therefore, it is sometimes not possible for them to refrain from poaching. This is the reason that locals are employed as guards, which results in huge costs. State action against the poachers and the mobilization of the fishers to create some form of "Social Fencing" around the lakes can, therefore, reduce these costs by a substantial amount.

- Land conflict with outsiders is another problem present in almost all the oxbow lakes. Delays in the demarcation of the lake areas have given the opportunity to these outsiders to illegally encroach into lake land. However, persons who illegally occupy the lands in the lake areas are often powerful individuals of society. Fishers incur a lot of expense for legal fees and court cases for initiating legal action against persons encroaching and sometimes against poachers as well. The government may provide administrative support to the fishers for these purposes.

- It is also expected that the co-management institution becomes transparent in all of its activities, but conversely, as shown in Table 23, unspecified costs in the co-management lakes are also rising alarmingly. It is the project's rule that financial audits should be checked by the Thana Fisheries Officer (TFO) concerned and the Area Manager (AM) of BRAC, with appropriate measures taken against those responsible for disparities, either informally or formally. A respondent noted also that at times, the collaboration of corrupt government officers motivated several LFT leaders to manipulate financial matters written as unspecified costs in the accounts. The central policy-maker should, therefore, seriously consider this issue.

The LFT account audit is essential on a regular basis to assist the LFT committee to maintain proper accounting in order to institute greater transparency pertaining to the costs incurred and income generated from the lake.

Policy implications

This study evaluates the transaction costs as a method for evaluating the co-management project and centralized-management institution in the case of the oxbow lakes fisheries in Bangladesh. The results show that the transaction costs involved in managing the fisheries resources in the co-management system is lower than the centralized-management institution over the years. It reduces the overall management costs of managing the fisheries resources. The Bangladesh government may, therefore, consider it an important instrument that saves huge costs for the government to effectively manage the inland fisheries resources.

5.3 Institutional resilience and fisheries co-management

This section reports on two studies. The first is an institutional analysis of Sasi Laut in Maluku, Indonesia by Novaczek and Harkes (1998). The second is a study of resilience and equity in co-management in the Western Visayas, Philippines (Fernandez and Carnaje 2002).

5.3.1 An institutional analysis of Sasi Laut in Maluku, Indonesia

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. These systems exhibit close linkages between social and ecological systems. Their success also appears to be related to how adaptive and resilient the institutions are and how capable they are of responding to and managing change. A critical question in designing and implementing co-management systems is: how can adaptability 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 that 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 the 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 on 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 systems

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 1995). 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 amongst 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 individuals and community, and 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, Ambon and Seram, 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 sasiinstitution was lost, that is, marine sasi, land sasi, and adat sasi; the latter being the most traditional form of sasi. Most losses occurred in the 1990s 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 considering village size. The size classes are class 1: < 1000 people; 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 1960s. Losses were moderate in the 1970s and 1980s, but have become more severe in the 1990s. 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 the 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, which 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 and Hetarie 1994).

The 1940s - 70s 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 Ambonese villages started to reach some critical threshold of population during those decades. Today, adat 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 it was effectively dormant in some of these. In the past, marine sasi was much more prevalent. Eighteen villages were identified that just lost marine sasi in living memory; this means that at one time at least 35 villages (57 per cent) had this institution. In four villages (Seith, Ouw, Seri, and 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 of 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 1990s, the only recorded loss was on Ambon Island.

Factors influencing the activity of sasi

The level of activity of sasi on terrestrial resources was measured using indicators for the 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 three 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 for 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 24. 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	Homogeneity	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 25. Reasons causing sasi to become (partly) non-functional	
Cause for the decline of 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 the 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 sasi institution. Conflicts between traditional adat leaders and village government leading to the 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 1990s. 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. 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 the 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 linkages among the different components (objectives, rules), the players and the external context of the sasi institution, and illustrate the interactions among these through time.

Comparison of villages

Nolloth and Haruku villages, on Saparua and Haruku islands, respectively, were both characterized as having a strong sasiinstitution. 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 sasihas 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) are 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 peoples benefit indirectly through local 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. There, 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 (on Haruku Island), conflicts between the kepala desa and the 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 (on Saparua Island), where there were 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 kewangcan be installed.

In both Seri and Toisapu-Hutumuri on Ambon Island, sasi has been 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, the 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 the 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 sasifor 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 sasirevenues for village development. However, fishers have declared that they would respect sasi only if they get direct benefits from a communal harvest. Villagers may be kept satisfied with village development projects, but there also may be problems because the village income and expenditures are not transparent. For example, at one point in the 1980s, when profits appeared to be 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 sasiregulations. 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 the 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 (at the operational level) were secondary, that is, the result of lack of kewangenforcement. 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 modification affects the function of sasi, but does not threaten its continued existence. Where the constitutional rules have been challenged, (e.g. the transfer of

authority from the kewang to the church, the loss of the kewang, the introduction of police as formal enforcers, and the promulgation of national fisheries legislation), the structure or legal basis of the sasiinstitution has changed. This has led to disappearance of part or all of a local sasiinstitution. 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 played a role that 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 laws on destructive gear types. In Haruku and Nolloth, formal regulations on mesh-size, the use of poison, blast fishing and bagansare 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 thought 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 quite successful in melding the formal and traditional government structures. In Nolloth, for example, the sasi area 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 has been less smooth and a cause for conflicts. Traditional authorities have become marginalized, as in Tuhaha. Where newcomers enter the local government through elections, villages become politically unstable. In all villages, there is some degree of overlapping between formal and traditional authorities, but the extent to which the traditional authorities are represented and can exert their influence varies.

The sasi study shows that the degree of overlapping is decisive for the continuation and stability of sasi. In Nolloth, where the traditional authorities function within the new system, the sasiinstitution is strong. The villages where sasi has ceased to function had problems with village leaders who did not collaborate with the 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 allow them to take a place in the village government before sasi can be revitalized. 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 lineages 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 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. in 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 so that they learn about sasi and the role of sasi in resource management.

Leadership

Village officials appeared poorly informed about local 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 can 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 and to be fully and legitimately involved in traditional ceremonies. The results of the research support those of Volker (1925) 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 decline or crumble. 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 represent the two opposing 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, apparently from the level of local political opposition.

External interests may influence the election of a kepala desa, as was reported in both Haruku and 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

The term "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 usually accepted. Fishers may accept areas of restricted access without complaint, but they do have reservations. For some non-sasirented areas, the lack of legitimacy is compensated for by a strong enforcement mechanism (in Tuhaha). Crucial in the acceptance of boundaries of restricted areas is the 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 the 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 fisher 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 kewangis 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 kewanghas 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 the marine sasi. In non-sasi villages, the church is not seen to play a role in supporting the 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 the land sasi and not in the marine sasi is that fishing is of too high importance to the people. The power of the church and God is considered strong, and the church minister thinks that if the church were involved in enforcement of the 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 on 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 controled 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 (an offender is caught two or three times a year). 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 the village demography and appear to pose no threat to traditional institutions. Tourism in Haruku, stimulated by sasiceremonies, 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 the appreciation that people have for sasi and traditional structures. It is here that the loss of adat ideology and tradition is largest. The 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 is widely applicable.

Pollution and resource degradation 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 usually fisheries regulations are poorly implemented. There are no government patrol boats in the area. When 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 for by high fish prices. Few village respondents have 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 per cent of fishers in villages where sasi is being revived and 70 per cent of fishers in non-sasi villages. In 14 villages, respondents expressed their desire to re-introduce 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, the 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 sasiby the people, not just as a management system but also 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 elites (government staff with the 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 is useful 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 the 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 re-installation of the traditional authorities and re-activation 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 breakdowns.

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 kewangs and the revival of the island-level Latupati institutions (traditional meetings of village leaders) with an emphasis on conflict resolution and management planning. The general plan is to promote the 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 establish 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 that should 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 1970s, a large number of villages lost sasi because of post World War II social, administrative and economic changes, internal village conflicts, and other reasons that were difficult to trace. The more recent breakdown of sasihas occurred in two distinct periods and villagers are able to articulate reasons for its decline in their village.

The 1970s, at the eve of the introduction of the new formal government structure, were a period of decline. A fundamental factor was confusion in the village or conflict 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 the 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 1980s were a period of relative stability. Villages where sasi was functioning remained stable. In some other villages, there was a tendency to revitalize sasi. The 1990s, however, were a period of further decline of sasi. The period between the 1970s and 1990s covers one generation. Modernization and commercialization as a result of improved communication, infrastructure and education, and the expansion of market relations, influenced 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 1990s, is most likely the reason why sasi is now suffering such a relatively rapid decline.

The contemporary decline of sasi largely stems from conflicts. Conflicts can, in some cases, be related to the social change that has 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), adatand sasi have remained a significant aspect of village life. Overlapping between the traditional and formal governments proves 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 decline of sasi recorded on Ambon Island, which 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 sasiis most resilient in homogeneous villages of fewer than 3 000 people. Villages close to the capital, where sasi no longer functions, have exceeded a critical size, become heterogeneous, and shifted from subsist ence fishing and farming to large-scale fishing and urban employment.

Of all the forms of sasi, the marine sasi, although less prevalent, appears to be relatively robust. Whereas sasi generally has suffered severe decline in recent years, the marine sasi has been relatively stable and even showed signs of revitalization during the 1990s. 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 niloticusand sea cucumber for foreign markets. The process is being further facilitated and reinforced by intervening NGOs, governmental 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 uninterested in the revitalization of sasi. A lack of transparency in the 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 elites. 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 the 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 the land sasi from adat to the church helped to shore up the effectiveness of the institution when the kewanglost the 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. When this happens, as shown in the inventory, adat sasi and the marine sasi may be lost. However, Haruku and Nolloth provide examples where the 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, sasihas 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 agreement 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 elites.

It is clear that sasi flourishes where the village leader is legitimate (kepala adat) and 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 to increase stability of local governments.

Because the constitutional rules are part of adat, and "adat is something that cannot be changed", as village officials in Nolloth stated, the process of revival concerns the re-establishment, adaptation of operational rules (harvest regulations and 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.

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, protection and legal recognition of local rights by higher levels of government. As a village organization active in enforcement, the kewang is more effective 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 both the kewang and the 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 the 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 and Folke (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 on the harvest, inter-generational 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. As a consequence, they are apt to change. What makes the institutionand all these components strong (and thus resilient) is the linkage among these components, i.e. legitimacy, trust, collaboration, and 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 benefit 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. 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, adatleaders, 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 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 kewangand tuan negeriare 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, sasiis 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 sasiregulations.
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 functions dependent on village size and homogeneity. When the population exceeds 3 000 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, tends to be established.
11. While revamping the institution to increase functionality in resource management, it is 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 are 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 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) 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 superstitious explanations for resource decline are still current. Although villagers 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 sasiritual, 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 adatfor 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 over three decades later we are witnessing not only stability but also resurgence in at least one form of adat institution: marine sasi. This brings up the questions: 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 adatcould alienate younger generations of fishers and inhibit the introduction of science-based management tools.

5.3.2 Resilience and equity of coastal areas and fisheries co-management in Western Visayas, Philippines: the Case of Concepcion, Iloilo and Sagay City, Negros Occidental before and after 1998 [5]

The focus of this study was to assess levels of resilience (i.e. the ability of institutions to adapt to changes and shocks while still providing stability and meaning to social behavior) and equity (i.e. the degree of fair distribution of the costs and benefits of management among stakeholders) in two local government units facing the Visayan Sea in the Western Visayas, Philippines in the hope of unlocking key factors that can improve the lives of subsistence fishers. The civic science approach was used in the study. This approach is a form of science that is deliberative, inclusive, participatory, transparent, open to learning from errors, built on consensus, and designed to promote equity and minimize losers. Its purpose is to reveal that various political and interest groups in society have to be involved in decision-making if more equitable decisions are made by increasingly more resilient institutions to address complexity and integrated concerns.

Major policy trends in the past

The analysis of secondary and field data has revealed that at the national, regional and local levels, coastal areas and fisheries resources have been subjected (especially during the colonial period and

[5] Fernandez and Caranaje (2002)

the Marcos regime) to a "tragedy of exclusion and enclosure" rather than a "tragedy of the commons". In this process, colonial interests and business and/or multilateral institutions, with the aid of the state, denied grassroots civil society actors and their institutions access to common property resources that may be regulated by communal rules and practices. In effect, the local commons and management regimes were taken over by allied or networked private or business interests using the legal and political powers of the state; or by the state for large-scale commercial exploitation by its own agencies and other private enterprises. The policy model of "command and control" guided economic and natural resource development initiatives well after the end of World War II. Policy-makers viewed development as a process in which modernization, industrialization and gross national product growth would lead to increasingly prosperous and democratic societies. The means to achieve these lofty goals was to address "gaps" in the development process through the means of public investment and centralized national planning that saw the pouring in of foreign assistance funds and expertise, as well as the construction of necessary infrastructure. Unfortunately, policy-makers and analysts did not pay much attention to the setting of checks and balances to central power through fair and open legal systems, transparent procedures and an active civil society. The result of the policy and practice of development and management has been dismal in improving socio-politico-economic and environmental conditions.

Shift in policy orientation and rise of local elite networks

What has become more pronounced, since the enactment of the Local Government Code of 1992 and the Fisheries Code of 1998 in the Philippines, is the ability of peoples' organizations to act independently or in concert with local government and/or civil society organizations to coordinate the use of official local, national and even international forums with determined and creative local direct action. This has happened in the wake of decreased local livelihood opportunities due to environmental deterioration or encroachment from public and private interests that extract natural resources. The cases of Sagay and Concepcion illustrate that the crisis of coastal and fisheries resource deterioration, perceived by local leaders and communities as more pronounced in the 1970s and 1980s, gave rise to assertive local policy networks to create resilient, and hopefully, equitable co-management regimes. Interviews and statistical analysis reveal that in leading hubs of coastal area and fisheries development in the Western Visayas, there is a general improvement in co-management indicators in the post-1998 period. The veering away from the centralized control of the national government has been spearheaded by policy networks and alliances led by the chief executives of Sagay and Concepcion.

The policy networks in Sagay and Concepcion are institutional players that trade information and share the burden of decision-making. The coalitions establish formal and informal partnerships with other stakeholders, generate and mobilize financial means, coordinate key power brokers in the area, formulate and disseminate a clear and visionary image of the island in its pristine state, and mobilize large segments of the local population while portraying an image of dynamism and success to the outside world. The network creates order by focusing on coastal areas and other related concerns, and simplifies the policy process by limiting the number of problems to be addressed and options considered.

On a larger scale, such phenomena were observed in the creation of inter-regional alliances such as the NIACDEV (based in Concepcion) in 1998 and the Northern Negros Aquatic Resources Management Council or NNARMC (based in Sagay) in 2000. An inspiration for the creation of NIACDEV and NNARMC is the establishment and success of an earlier policy network in the mid-eastern portion of Iloilo Province called the Banate Bay Resources Management Council Incorporated (BBRMCI) in 1996. BBRMCI was

founded by a network of individuals from state (municipal and provincial) and civil society groups (with considerable training in community organizing and coastal area dynamic). After a series of informal meetings of the emerging policy network, a funding outlay for capability building was provided by the cooperating municipalities, the Province and the Canadian government. Technical advice was later sought from academic and government agencies. The BBRMCI achieved a tremendous track record in capability building, community organizing and linking with other related agencies and in 1998 the BBRMCI received the "Galling Pook" national award as one of the most successful development-oriented rural organizations in the Philippines.

Following a relatively similar pattern as that of the BBRMCI, the establishment of NIACDEV in 1998 can be attributed to the friendship and initiative of three mayors, led by the mayor of Concepcion, who was a former owner of a commercial fishing fleet. The creation of NNARMC in 2000, on the other hand, was spearheaded by the Maranons of Sagay who also had commercial fishing interests. However, the creation of these larger policy networks illustrates the closed and consensual nature of the policy process. Important policy decisions, such as the creation of the networks, are made in informal settings outside the reach of formal democratic controls such as legislative scrutiny and bureaucratic controls.

The increasing importance of such elite configurations in shaping the socio-economic trajectory of Western Visayas is closely associated with certain contemporary processes. First, in the context of globalization, specific local conditions and calls for area-specific development or management strategies are playing a much more important role in the determination of the competitive position of locales and regions. This gives greater prominence to regional networks, relations and institutions. Second, the shifting and less interventionist position of the national state and hence the weakening of national regulatory prescriptions, moves the center of gravity for fostering and promoting a growth-oriented political economic framework to the sub-national scale. These have become the pivotal domains for launching proactive development activities. The often non-democratic and opaque organizations and decision-making procedures and mechanisms at these scales of governance turn them into implicit or explicit elite playing fields that permit shaping territorial trajectories in the image of dominant or hegemonic elite coalitions. These new, elite-based and led institutions and networks have become key forms of governance and have - at least to some extent – replaced the Philippine national government (often with its implicit or explicit consent) as rule making, policy formulating and implementing, and even executive organizations with powers that influence and shape a broadening range of socio-economic aspects.

Strengths and weaknesses of newly emergent policy networks

The insider information of policy and institutional networks, such as those found in Sagay and Concepcion and in the larger regional alliances they forged, are significant and have consequently been used effectively. The active and coherent policy and growth networks operate with other local politicians, the media, leaders of public and semi-public institutions (academies, Chambers of Commerce, environmental NGOs), and others, with a view towards generating a coherent vision and strategy. The underlying rationality, of course, is that the collective promotion of the town/city/municipality/region and forms of cooperation also benefit the individual agent.

However, institutional and individual benefits through the activities of larger policy networks can be easily disrupted during local or national elections. In the cases of the NIACDEV and NNRMC, their co

management efforts were stalled after some key members of the policy networks were unseated in the 2001 Philippine elections. Thus, even the capacity of these kinds of policy networks to sustain and effectively scale-up CRM efforts remain uncertain. The phenomenon was not observed in smaller networks set up in Sagay and Concepcion due to the absence of local leadership change during the elections. Nonetheless, there is still growing concern among some key residents of Concepcion that the current gains in co-management and sustainable development may not be sustained in the absence of a potential pool of local leaders who encourage community organizations and the establishment of village-based management councils.

Nevertheless, the case studies provide evidence that a key factor for attempts to sustain and scale-up coastal and fishery resource management and development in Western Visayas is the presence and activities of policy alliances and networks. This study provides a useful perspective to better understand the political and economic processes that affect the nature of local co-management efforts in municipal/city, as well as in larger bio-regions in the Western Visaysa. It is revealed that enabling legislation and decentralized policy alone is insufficient to explain co-management regimes before and after 1998. In fact, wider international and national socio-economic factors and local elite-based alliances have helped shape policy and decision-making in coastal areas and fisheries co-management in Sagay and Concepcion.

The current co-management frameworks in Sagay and Concepcion is a product of decentralization trends that also influence the trajectory of policy regimes in coastal areas. Interest in decentralization and participatory development efforts on the global and national levels have opened up theoretical, legal and financial avenues to create locally-based decision-making systems. It has also strengthened the political and economic position of globally alert and locally embedded elite coalitions engaged in the institutionalization of inter-regional coastal and fisheries programs and projects. In the Philippines, such configurations have been aided by decentralization laws such as the Local Government Code of 1991 and the Fisheries Code of 1998. These pieces of legislation have devolved natural resource management functions and finances from the national to the local level. In other words, the co-management systems in the Western Visayas are products of a wider and more market-oriented political and economic context and are institutionalized by elite alliances that are supportive of sustainable development and profit-oriented schemes. The legitimacy enjoyed by co-management systems, coupled with the improvement of fish stocks and catches, have resulted in an improved perception of policy performance in the post-1998 period.

Co-management as a discursive arena

The institutionalization of co-management efforts in the Western Visayas appears to be a discursive arena for various actors and their institutions on the ground. Behind the many actors and institutions, however, are alliances and counter-alliances that help shape and benefit from coastal areas and fisheries co-management policies. Notwithstanding the seemingly undemocratic nature of the elite-based policy and institutional alliances, the people still accept the systems. To do otherwise would be to put democratic procedures above the ultimate democratic goal – the improvement of livelihoods and the common good. As long as the livelihood of people is enhanced, no matter how little, civil society calls for more participation in the decision-making process, and increased equity in the distribution of gains from the CRM program or projects will remain muted. In regions and periods of economic privation and insecurity, participatory development and democratization processes do not fare well, giving ample opportunity for informal policy networks to build and benefit from coastal area and fisheries co-

management arrangements. However, policy networks in the Western Visayas need to encourage increased participation of local stakeholders and civil society organizations to sustain resilient or adaptive and area-specific efforts to address complex and integrated problems in coastal areas and the Visayan Sea.

5.4 Scaling-up

The scale for co-management will vary a great deal depending on the community and the priority issues. Scaling-up refers to the transferability of concepts, methods, and organizational and governance structures from one level to another in the dimensions of space and time, for example, scaling up from a single community to several communities to manage a bay-wide area through a co-management organization such as a bay-wide council that represents the different communities. Scaling-up may also be undertaken to address issues of ecosystem-based management and broader social and economic links in the area. Questions related to scaling-up include whether the same principles that guided the community-level co-management program hold at the larger scale and what are the costs and benefits involved in scaling-up and on community participation. Two studies on scaling-up co-management in the Philippines are presented below (Siar, Baticadoa and Garcia 2004 and Baylon 2002).

5.4.1 The scale question in co-management: the experience of Malalison Island and LIPASECU Bay Management Council, Inc. in the Philippines [6]

Coastal resource management has been carried out in the Philippines for over 20 years to abate the deteriorating habitat and declining fish catch. CRM started with the management of mangroves and coral reef fisheries surrounding small islands and barangays (villages) through the initiatives of the government, NGOs, and research and academic institutions. In recent years, CRM projects have expanded towards the establishment of integrated management councils.

The Local Government Code (Republic Act 7160), which decentralizes the authority for the management of most natural resources to the municipal governments, provided impetus for acceleration of these projects. Moreover, Executive Order No. 240 institutionalized CRM through the formation of the BFARMCs and MFARMCs. This was further reinforced by the Fisheries Code of 1998, which mandated the creation of integrated management councils for waters shared by contiguous municipalities. The Fisheries Code also gives the municipal governments jurisdiction over near-shore waters up to 15 km offshore with the option of allowing commercial fishing in the area between 10.1 and 15 km.

The LIPASECU Bay Management Council, Inc. was formed as a means to discuss and resolve conflicts affecting the use of coastal resources by four contiguous municipalities in Pandan Bay, Antique. Drawing its inspiration from the SEAFDEC/AQD community-based fishery resource management project in Malalison, Culasi, Antique and from BBRMCI in northern Iloilo, the Council adopted as one of its management intervention measures the establishment of marine protected areas in each of the four municipalities.

Site profile

Located on the northwestern part of Panay Island, central Philippines, LIPASECU consists of four contiguous coastal municipalities in the province of Antique. LIPASECU is an acronym for Libertad,

[6] Siar, Baticados, and Garcia (2004)

Pandan, Sebaste, and Culasi that share the Pandan Bay covering 1,950 sq km (Fig 1). Malalison is under the jurisdiction of Culasi municipality.

More than two-thirds of the population in LIPASECU resides in coastal areas, with a total of 12,173 coastal households. Of 107 barangays, 56 (53.3 per cent) are coastal. There were 3,288 registered fishers in 2001, representing 18.8 % of the total number of households (Table 1). Fishing is the dominant occupation in coastal areas, followed by fry gathering, shell gathering, and seaweed farming. There are more non-motorized (1564) than motorized (417) fishing boats in the area. The average catch per fisher per month is highest in Libertad.

Figure 14. Map showing areas covered by LIPASECU

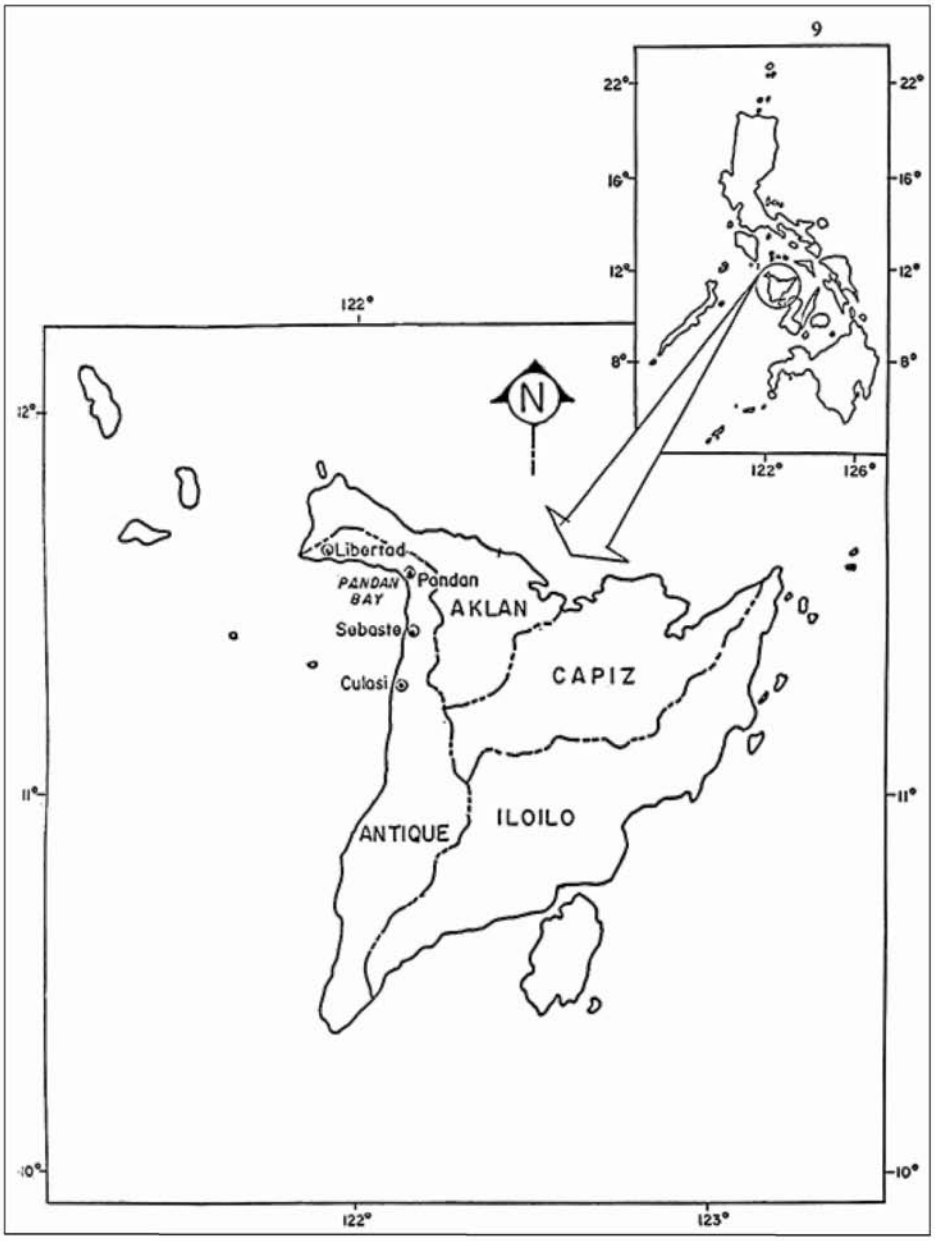


Table 26. Profile of LIPASECU

Municipality	No. of barangays	Household population	Coastal barangays	Coastal household population	Registered fishers (as of June 2001)	Average catch (kg/person/ month)	Number of marine protected areas
LIPASECU	107	88,539	56	61,344	3, 288		18
Libertad	19	12,952	14	10,968	820	300	8
Pandan	34	27,638	15	16,236	742	240	4
Sebaste	10	14,956	8	14,380	692	135	2
Culasi	44	32, 993	19	19,760	1,034	210	4

Source of data: LIPASECU Bay Management Council, Inc. and National Statistics Office.

History of LIPASECU

The four municipalities used to regulate their coastal waters independently despite sharing the same resource base - the Pandan Bay. It is an open access resource except for marine waters around Malalison Island, Culasi, where islanders were granted territorial use rights in fisheries, that enabled them to reverse the declining trend in fish stock (Baticados and Agbayani 1998) resulting from the Community Fishery Resource Management Project initiated by SEAFDEC/AQD in 1991. The project implementation in Malalison Island served as a catalyst for Culasi to become interested in CRM. Thus, it was not difficult for the ANIAD Foundation, Inc., a non-profit service-oriented organization funded by the Royal Government of the Netherlands, to convince the local executives of Culasi and the PROCESS Foundation, an NGO, to collaborate with its pilot program on community-based coastal resource management in 1995.

In 1996, the LGU of Pandan requested ANIAD to include the Pandan municipality, and the local executives of Libertad and Sebaste followed in 1997. ANIAD collaborated with the Antique Development Foundation (ADF), also an NGO, to handle community-organizing and institution-building activities in Pandan and Libertad; PROCESS was in charge of Culasi and Sebaste. On the other hand, the LGUs, through the Municipal Agriculture Office, were responsible for the formation of BFARMCs/MFARMCs in their respective municipality.

The Technical Working Group composed of LGU representatives from each municipality, PROCESS, ANIAD, and the fishers through their FARMCs found similar issues and problems in the four municipalities. A series of inter-municipal consultations led to the formation of the LIPASECU Bay Management Council in 1997. The Council was patterned after BBRMCI, an LGU-initiated CRM program in the Province of Iloilo. Each municipality committed to provide PhP 100 000 per year for the operation and maintenance of the Council, plus the salary of the employees running the office. LIPASECU became a venue for planning and implementing coastal resource management of Pandan Bay for the benefit of the marginalized fishers and other sectors of the community. From the 16 original members, the Council's composition increased to 32 in 2001.

LIPASECU CRM initiatives and outcomes

LIPASECU had seven programs that were implemented both at the municipal and council levels. Most of the activities were focused on Institution Building and Gender Development. The other activities were related to Resource Conservation and Rehabilitation, such as mangrove planting and reforestation, establishment of marine sanctuaries, and coastal clean-up, which were done at the municipal level. There were no activities for the Livelihood Enhancement Program. Noteworthy, however, were the LIPASECU linkages with government agencies (6) and NGOs (15), which provided technical assistance and sponsored many LIPASECU activities.

One of the major accomplishments of LIPASECU was the establishment of 17 marine protected areas (MPAs) in various sites. The MPA in Malalison serves as a model in terms of processes in the setting up of protected areas. These involved barangay consultations prior to the establishment and passing of a resolution for approval by the municipal council. Unfortunately, for many of these sites, the resource and ecological assessment was not conducted prior to the establishment (Table 2).

Table 27. Marine protected areas established in the LIPASECU area

Municipality/Barangay	Sanctuary name	Area (ha)	Year established
Culasi			
Malalison	Guiob reef [a]	28	1995
Batonan Sur	Batonan [b]	1	1996
Lipata	Lipata reef [b]	5	1996
Naba	Naba reef [b]	1	1999
Sebaste			
Poblacion	Sebaste shoal	52[c]	1998
Abiera	Abiera	2	1998
Pandan			
Mag-aba	Mag-aba	2	1997
Patria	Patria	3	1997
Tingib	Tingib	1	1997
Idiacacan	Idiacacan [d]	2	1998
Libertad			
Taboc	Sitio Balo	1	1999
Tinigbas	Puntahan-Sambulit	1	1998
Barusbus	Barusbus[d]	3	1999
San Roque	Puntod[d]	2	1999
Pajo	Puntod and Uri[d]	3	1999
Union	Cubay to Ocoy	3	1999
Pucio	Payapi site to Buruanga, Aklan boundary	1	2000
Bulanao	Puntod area	1	2001

Legend: [a] Assessed by SEAFDEC/AQD; [b] assessed by SEAFDEC/AQD in 1995 and by Hayuma in 2000[c] Originally declared for 395 ha, but amended in 2000 to 52 ha; [d]

LIPASECU was able to formulate an Integrated Coastal Resource Management Plan covering the period 2002-2010. The CRM Plan identified strategies and programs of the Council for nine years. These include maximizing the Council for the integrated resource management of Pandan Bay, intensifying a soft law enforcement approach while continuing the hard law enforcement approach, expanding areas for sustainable land use practices and environmentally friendly fishing and farming technology, among others. Ironically, the alliance could not come up with a unified municipal ordinance. Pandan's version of municipal fishery ordinance differs from that of Sebaste and Culasi. Pandan is the only municipality in the alliance with commercial fishing vessels (seven units), whose interests it has to consider. Small-scale fishers own one of these units. Libertad did not have one at the time of the survey.

The LIPASECU Council favors the regulation of the use of compressor-aided fishing, but not Malalison fishers and those in Sebaste, who believe that its use has an adverse effect on the fish catch of those using less efficient gear. Their contention found support in the Memo Circular 2002-129, issued by the former Secretary of the Department of Interior and Local Government, enjoining local governments to enact ordinances banning the use of a compressor as a breathing apparatus in all fishing activities. The most contentious issue facing the alliance, however, was the delineation of territorial waters in Pandan Bay and the operation of commercial fishing vessels. Pandan opened 10.1 to 15 km of its municipal waters to licensed commercial fishers for five years. This caused demoralization and disenchantment among BFARMC members and fish wardens who are the front liners in law enforcement and the establishment of MPAs.

Notwithstanding these issues, the Council members believe that LIPASECU as an organization is needed for managing coastal resources, enforcing laws, consolidating efforts of LGUs, resolving conflicts, and providing assistance for livelihoods and technical expertise, among others. About 79 per cent of them perceived that LIPASECU meets the above needs of their municipality. Anecdotal reports also indicate an increase in fish catch. Most Council members believe that LIPASECU will last long despite the ending of support from ANIAD.

Discussion

Established prior to the enactment of the 1998 Fisheries Code, LIPASECU pioneered the pooling of resources to manage fishery resources, thus, serving as a model for other LGUs in mitigating dwindling resources and alleviating poverty in coastal communities. The Council provides a venue for airing concerns and discussing conflicts affecting the four municipalities, particularly the opening of the municipal waters to commercial fishers from 10.1 up to 15 km in Pandan Bay. It is able to mobilize fishers and coastal communities to highlight issues in fisheries, enforce fishery laws, and generate support for fish wardens. Because of the inability of the national government to enforce fishery laws, the alliance pooled their resources to enforce them. LIPASECU organized a composite team within each municipality with patrol boats equipped with radio telecommunication connected to the LIPASECU headquarters, which reflects the Council's serious intervention to protect the interest of small-scale fishers. In addition, community participation to rehabilitate the resources was manifested in the establishment of 17 MPAs, which serve as a rallying point for fisheries conservation and a concrete step taken by the people to protect their coastal resources. Thus, LIPASECU has become an icon to symbolize unity of purpose among LGUs, people's organizations, NGOs, and small-scale fishers.

Similar to other organizations, LIPASECU is beset with problems, the major one being the funding source to sustain its existence when ANIAD assistance ended in 2003. This put to test the commitment

of the four municipalities to sustain the operations of LIPASECU. While the Council has attracted funding agencies, its activities are so confined to a donor's agenda that it even took the Council five years to formulate an Integrated Coastal Resource Management Plan. Furthermore, the over-emphasis on building the capabilities of its leaders and ignoring the needs of BFARMCs, POs and fishers from whose support lie its strength may weaken its operation. It had to launch a massive information and education campaign in communities to gain trust, confidence and support for its activities. The role of the Executive Director in ensuring continuity of the LIPASECU programs and projects is likewise crucial considering that LGU officials sitting on the Council have a fixed term. Thus, the managerial capacity of the Executive Director has to be strengthened, and rise beyond facilitating the activities of the Council. Moreover, the role of NGOs as implementers as well as Council members places LIPASECU in an awkward position to evaluate their performance. It also lacks the technical capability in bio-resource rehabilitation and, therefore, cannot monitor and evaluate the effectiveness of MPAs. In addition, it lacks an evaluation system to measure LIPASECU's performance.

Lessons learned

The experience of LIPASECU draws attention to the difficulty of unifying rules on a large scale owing to the different interests of members sitting on the Council. In Malalison, the fishers and village officials resolved conflicts faster because of the small size of the area and the small number of fishers. Nonetheless, gains are possible if problems are threshed out and the government and resource users of contiguous municipalities share a commitment to sound resource management and the will to take decisive actions. The pooling of scarce resources and involving the grassroots will come a long way in ensuring sustained management and protection of coastal resources.

5.4.2 Evaluation of the integrated municipal council as an institution for co-management in the coastal zone in Western Visayas, Philippines [7]

In the Philippines, the coastal areas are facing many challenges, such as resource over-exploitation, degradation of coastal habitat, user conflicts, and poverty of sustenance fishers. The Philippine government has passed laws, such as the Local Government Code of 1991 and the Philippine Fisheries Code of 1998, to address these challenges. The Local Government Code has devolved many functions and responsibilities of the national government to local government units (LGUs) such as provinces and municipalities. The Fisheries Code gave to the municipalities the jurisdiction of coastal or municipal waters from the shoreline up to 15 kilometers. LGUs in the Philippines, especially the municipalities, have to develop strategies and evolve institutions to better manage their municipal waters.

One institution that is evolving in Philippine coastal areas is the integrated municipal council (IMC), which has been established by several municipalities to manage large bodies of water in which these municipalities have jurisdiction. There is an advantage in having an IMC because several municipalities can pool their meager funds to protect their fishery resources, and eliminate boundary disputes because their municipal waters are combined together and treated as a single management unit.

There have been some success stories in the establishment of IMCs in the Philippines. One of these is the Banate Bay IMC, which obtained a national award for local governance. On the other hand, there have been cases in which an IMC was not successful in fulfilling its mandate. An example is the Batan

[7] Baylon (2002)

Bay IMC, which despite obtaining foreign funding is still perceived to be unsuccessful in accomplishing its objectives.

Banate Bay IMC

The Banate Bay IMC was initiated by Mayor Ramon Antiojo of the municipality of Anilao. His municipality, similar to most coastal areas in the Philippines, is confronted with problems of over-exploitation of fishery resources, destruction of coastal habitats, illegal fishing activities and poverty of sustenance fishers. Mayor Antiojo's awareness of the need for coastal resource management and the passage of the Local Government Code, which provided additional powers and authority to the local government, encouraged him to form an integrated municipal council with the nearby municipalities of Barotac Nuevo and Banate.

The establishment of the Banate Bay Resource Management Council, Inc. (BBRMCI) started with a series of consultations and dialogues started in November 1995, which culminated in the signing of a memorandum of agreement in February 1996. The Banate Bay IMC may be considered a successful institution and this has been validated when it won the national Pook Galing Award in 1998. This award, a project of the national government and the private sector, is given to programs of LGUs for innovation and excellence in local governance. Notable achievements of the IMC were increased awareness and empowerment of the fishers of Banate Bay, improved enforcement of fishery laws, and provision of alternative livelihoods.

The performance of Banate Bay IMC was evaluated, based on co-management criteria such as sustainability, efficiency and equity, and fishers were interviewed using these indicators. With regard to the ten sustainability indicators, the perceptions of participating and non-participating fishers were not significantly different for eight indicators in the bay five years ago (Table 1). Significant differences, however, were found in the perceptions related to the condition of the coral reefs and the economic well-being of the fishers, where the non-participating fishers gave significantly higher scores. Both groups believed that there was a significant decline in the fish stocks, sea grass, and in the economic well-being of the fishers from the past five years compared with the present. These groups also think that there was no significant change in the condition of the bay, mangroves, extent of fishing violations of municipal and commercial fishers, but they also believed that there was a significant improvement in their present knowledge of the bay's resources and state of information exchange among fishers in the bay.

For the efficiency indicators such as ease at which a collective decision is made, facility in resolving fisheries conflicts, and ease in enforcing the fishery ordinance, the two groups showed different perceptions. The participating fishers believed that there was significant improvement for these three efficiency indicators at present with the Banate Bay IMC compared with five years ago when there was no IMC. The non-participating fishers, however, said that there was no improvement for these indicators even if there is an IMC in Banate Bay.

With regard to equity indicators, both groups stated that with the IMC, there is now limited access of the fishers to the bay's resources, which could be traced to the zoning plan effectively implemented by the IMC. Both groups also agreed that there is now more active participation of the people in the management of the bay's resources compared with five years ago. The participating fishers believed

that with the IMC, there is now fairness in the distribution of government resources compared with the previous procedure where these resources were distributed by politicians. Moreover, they believe that there is now significant participation of the people in their community affairs compared with five years ago, which could be due to the fact that they were organized by the IMC. The non-participating fishers, however, believed that there was no change in the manner of distribution of government resources and people participation in the community affairs, even if the IMC was established. This perception could be traced to their non-participation in the projects and activities of the IMC, which made them feel that they could not avail themselves of the resources and benefits being provided by the IMC.

These performance indicators showed that fishers perceive a significant decline in some of the biological indicators and a few believe that there is no significant improvement even with the establishment of the Banate Bay IMC. This suggests that the interventions made by the IMC had no effect on the fishers, or these effects could not be felt during the five years after the establishment of the IMC. It was observed that the non-participating fishers had a very negative attitude toward the Banate Bay IMC, probably because it affected them adversely. The fishers from these non-participating barangays were mostly the ones apprehended by law enforcement units of the Banate Bay IMC for violations of the bay's fishery ordinance. Moreover, the zoning plan for the bay is effectively implemented because both groups of fishers say that they cannot easily fish in the bay now. There is also a positive outlook between both groups of fishers that the condition of the bay, fish stocks, and their economic condition will improve over the next 5-10 years and the presence of the IMC could be one of the contributory factors for this optimistic outlook.

Table 28. Perceptions of Banate Bay fishers on the conditions in the bay for two time periods: five years ago when there was no IMC and at present with the IMC

Indicator	Past condition 5 yrs ago, without IMC			Present condition with IMC			Change through time, past five years		
Sustainabilty	PF	NPF	Prob.	PF	NPF	Prob.	PF	NPF	Prob.
State of Banate Bay	5.97	5.77	ns	4.90	4.73	Ns	-1.07n	-1.03ns	ns
Status of fish stocks	6.53	7.07	ns	3.70	3.33	Ns	-2.88**	-3.73**	ns
Condition of coral reefs	5.58	6.88	*	4.54	4.32	Ns	-1.04ns	-2.56**	ns
Condition of mangroves	5.58	6.88	ns	4.90	4.83	ns	-0.97ns	-1.54ns	ns
Condition of sea grass	6.92	6.32	ns	3.96	3.78	ns	-2.96**	-2.82**	ns
Violations of municipal fishers	4.40	4.45	ns	5.27	5.47	ns	+ 0.87ns	+ 0.97ns	ns
Violations of commercial fishers	4.23	3.97	ns	5.23	5.37	ns	+ 1.00ns	+ 1.40ns	ns
Knowledge about bay's resources	4.40	5.37	ns	7.73	7.77	ns	+ 3.33**	+ 2.40**	ns
Information exchange by fishers	4.33	5.00	ns	7.27	6.83	ns	+ 2.93**	+ 1.83*	ns
Economic well-being of fishers	5.33	6.93	**	3.83	3.97	ns	-1.50*	-2.97**	ns
Efficiency									
Collective decision-making	4.47	6.00	*	7.00	5.66	*	+ 2.53**	-0.34ns	ns
Conflict resolution	3.87	4.87	ns	6.47	5.73	ns	+ 2.60**	+ 0.87ns	ns
Law enforcement	3.83	5.00	ns	7.00	5.50	*	+ 3.17**	+ 0.50ns	*
Equity									
Access to the bay's resources	8.30	9.13	*	2.47	2.37	ns	-5.83**	-6.77ns	ns
Distribution of gov't resources	2.62	2.86	ns	4.40	3.66	ns	+ 1.90**	+ 0.97ns	ns
Participation in community affairs	6.70	6.57	ns	8.30	7.33	ns	+ 1.60**	0.77ns	ns
Participation in bay management	4.53	5.17	ns	7.83	7.00	ns	+ 3.30**	1.83**	ns

N = 60 with 30 participating fishers (PF) and 30 non-participating fishers (NPF). The scale used is from 1 to 10 with 1 representing a poor condition and 10 representing an excellent one. Probabilities are as follows: ns = not significant, * = $p < 0.05$, ** = $p < 0.01$.

Batan Bay IMC

The Batan Bay IMC was part of a coastal resource management (CRM) project implemented by the province of Aklan and the municipalities of Altavas, Batan and New Washington. The project was started in January 1993 to address the issues of resource depletion and environmental degradation of Batan Bay. Technical assistance was provided by the University of the Philippines in the Visayas (UPV) with funding support from the Local Government Support Program of the Canadian International Development Agency (LGSP-CIDA). The main objective of this two-year project was to develop the capability of local government units to plan and implement an integrated and community-based coastal resource management program for Banate Bay and vicinity. Funding support from LGSP-CIDA ended in April 1995 and the CRM project was able to accomplish the following: (1) increased awareness of the stakeholders on the environmental issues affecting the bay; (2) conduct of consultation workshops and basic trainings on planning, environment, gender and participatory development perspectives and processes relevant to coastal resource management; (3) establishment of a zoning plan for the bay; (4) promulgation of a common fishery ordinance for the whole bay that will be implemented by the three municipalities; and (5) creation of an inter-municipal coastal resource management council or the Batan Bay IMC.

The activities of the Batan Bay IMC were not sustained when funding support from LGSP-CIDA ended in April 1995. To activate and strengthen the Batan Bay IMC, a second phase of the CRM project was started in December 1997. A memorandum of agreement was signed in which LGSP-CIDA granted the funds and UPV provided technical assistance to the three municipalities for the continuation of the CRM project. A series of consultation meetings followed to review the progress of the project and to formulate action plans for the bay. The zoning plan for Batan Bay was reviewed and the municipal coastal resource management body was activated in each of the participating municipalities. A fish-warden training course was conducted in August 1998 and the Batan Bay IMC structure was reviewed in September 1998. However, funding support from LGSP-CIDA ended in October 1998. The second phase of the CRM project focused mainly on capacity building and organizational work. The Batan Bay IMC was not really able to take off because a new set of mayors took office after the local elections in 1998. They were not fully supportive. This lack of appreciation of the importance of the IMC on the part of the new mayors, together with the termination of funding support from LGSP-CIDA, led to the non-implementation of the plans and programs of the Batan IMC.

Factors affecting success of the IMC

Sustainability is a major challenge facing a bay-wide management council. The Banate Bay IMC has survived even with changes in the political leadership of the LGUs and made notable achievements even with the limited financial resources of the collaborating municipalities. The success of the Banate Bay IMC could be attributed to factors such as active support of its mayors, the quality of leadership in the council, and multi-sectoral partnerships made by the council.

In Banate Bay, the three mayors provided funds and full-time personnel to the IMC, and saw to it that the plans were implemented in their municipalities. These mayors did not interfere with the actions of the IMC, especially in the apprehension of illegal fishers in the bay. The accomplishments of the Banate Bay IMC can also be credited to its Executive Director and dedicated staff. At the start of its operations, there were many problems and the salaries of the staff were often delayed, but the Executive

Director and her staff chose to stay despite these difficulties. When new mayors were elected and had a lukewarm attitude to the IMC, the Executive Director conducted a series of dialogues and orientation sessions with them until they fully appreciated the role of the IMC in the management of Banate Bay.

To augment its meager resources, the Banate Bay IMC collaborated with national government agencies, non-governmental organizations, people's organizations and the private sector in the conduct of its activities. A memorandum of agreement was forged with agencies, such as the University of the Philippines in the Visayas, Southeast Asian Fisheries Development Center, Iloilo State College of Fisheries, Provincial Government of Iloilo and regional offices of the Department of Agriculture, Department of Environment and Natural Resources, Technical Education and Skills Development Authority, Philippines Coast Guard, and Philippines National Police. Technical and financial assistance were received through these collaborative efforts, which contributed to the success of the projects undertaken by the Banate Bay IMC.

In Batan Bay, the IMC did not prosper because of lack of support from the mayors. The newly elected mayors did not appreciate the need for an IMC. Regular meetings were not held and contributions of the participating municipalities to support the operations of the IMC were not provided. There was no full-time Executive Director and staff that could advocate the continued existence of the IMC. Therefore, when the newly elected mayors did not appreciate its existence, the Batan Bay IMC just became inactive.

Challenges ahead for the IMC

The Banate Bay IMC has shown that an integrated municipal council can be a viable co-management institution in the coastal area of the Philippines. It was able to implement a zoning plan for the bay, effectively reduced illegal fishing activities, and provided livelihood opportunities for the fishers. The IMC was able to make the fishers aware of the need for environmental protection and conservation of fishery resources.

A major challenge in the survival of the IMC in the Philippines is the election of mayors every three years. This regular political exercise can cause the demise of an IMC if the mayors do not appreciate the need for it. The IMC should, therefore, evolve strategies to win the support of new mayors who are not fully aware of its importance.

The Philippine government has decentralized responsibilities in the management of the coastal waters to local government units. However, at the local level, governance is still highly centralized. This can be seen in the operation of the IMC where its success is still very much dependent on personalities like the mayor and the executive director. Thus, there is a need to make decentralization reach the grassroots, that is, the fishers and the communities.

5.5 Participation in and attitudes about co-management

Participation in and positive attitudes towards co-management are crucial for its success. Three different studies in Indonesia (Susilowati 2003), Bangladesh (Thompson, Sultana, Islam, Kadir, Hossain and Kabir 1999), and Cambodia (Nao Thuok, Hap Navy, Bouy Roitana and Kaing Khim 2003) were undertaken to better understand perceptions and attitudes towards co-management.

5.5.1 Fishers' participation in development activities in communities with different levels of co-management processes: A case study in Demak and Pemalang, Central Java, Indonesia [8]

The importance of people participation in rural development programs has been emphasized for a few decades. The term has diverse definitions and scope with different intensity among developing countries. Nevertheless, it is believed that through participation, development policies would better reflect the practical realities of rural development. In addition, participation is seen as a means of promoting democracy by enfranchising the poor people who are economically weak (Ingham 1993). Indonesia is basically an archipelago and agricultural country. Nearly three-fourths of the people live in rural areas and are involved in agriculture and fisheries. The majority who are involved in fisheries are indigent, small-scale fishers. However, they need to be empowered through several development programs and activities directed to improve their standard of living. Empowering is one way of helping poor people to rise from a situation of powerlessness, poverty, and isolation.

Since Indonesia's independence, a number of rural development programs have been launched. These were aimed at helping poor people to raise their living conditions by empowering them through their participation. The programs and activities varied among development sectors. Technical, investment, and management assistance were provided to them by governmental and donor agencies. In the fisheries sector, for example, one of the approaches used in a number of development activities was through co-management processes in which local fishers and support agencies collaborated on implementing development activities. By practicing this approach, it was intended that the development programs and activities would be sustainable and provide continuous benefits to the fishers.

Methods

The main objective of the study was to determine the level of fishers' participation in co-management processes (CMPs) in Demak and Pemalang, Central Java, Indonesia. The specific objectives of the study were: (a) to analyze fishers' attitudes toward participation in development activities or program in the study area; and (b) to provide policy recommendations for improving fishers' participation.

Participation defies any single attempt at definition or interpretation. According to Oakley (1991), community participation is an active process by which beneficiary or client groups influence the direction and execution of a development project with a view to enhancing their well-being in terms of income, personal growth, self-reliance or other values they cherish. With regard to development, participation includes people's involvement in decision-making processes, in implementing programs, their sharing in the benefits of development programs, and their involvement in efforts to evaluate such programs (Cohen and Uphoff 1980). According to Pretty (1995), a typology of participation consists of manipulative participation, passive participation, participation by consultation, participation for material incentives, functional participation, interactive participation, and self-mobilization.

The literature is stronger on quantitative indicators of participation than on qualitative indicators. Oakley (1991) mentioned that indicators for the evaluation of a process of participation comprise of: (1) beneficiaries' role in the planning phase, (2) beneficiaries' role in implementation phase, (3) beneficiaries' role in maintenance, and (4) project linkages to the beneficiaries. By employing the Cohen and Uphoff (1980) model, Bahaman (1992) verified that the degree of people's participation

[8] Susilowati (2004)

relates to several factors such as age, education, experience, income, number of family members, and length of stay.

The research was conducted during March and April 2002 in fishing communities in the regencies of Pemalang and Demak, Central Java, Indonesia, which are hypothesized to be different in the level of co-management processes (CMP's) (Susilowati 2003). This is subject to the external characteristics of the people and availability of the local institutions or infrastructures. The two districts have different fisheries profiles.

The operational variables of age, gender, level of education, number of family members, total income, and fishers' residence were employed to explain the fisher's participation in the study area. In assessing fishers' participation, this study has utilized an approach based on the four types of participation suggested by Cohen and Uphoff (1980) and indicators as postulated by Oakley (1991), Bahaman (1992) and Waridin (1999) with necessary modifications. Participation in development includes people's involvement in program planning and decision-making, program implementation, sharing benefits, and program evaluation. The Likert scale (1 to 5) was applied to measure the dimensions of fishers' participation and attitudes. In addition, the categorical scale (1 = low; 2 = high) was used to discriminate the factors influencing participation of fishers. The model of fishers' participation behavior in the study is formulated as follows:

PARTICIP = f (AGE, GENDER, EDUC, FAM, INC, DLOC)

where:

AGE – age of fisher (years)

GENDER – gender of fisher (1 = male; 0 = female)

EDUC – fisher's education (years of schooling)

FAM – number of family members (persons)

INC – average monthly income (rupiah)

DLOC – residence of the respondent (1 = Pemalang; 0 = Demak)

Results

Tables 29 and 30 present a profile of the respondents. Participation intensity (low or high) of respondents in Pemalang and Demak does not differ significantly although the two study areas were observed to be different in level of co-management processes (CMPs) by Susilowati (2003)1/. However, the relationship between gender and the level of participation is significant. Male fishers participate more than females in development activities. Moreover, the participation intensity of fishers in their community is influenced by the level of education. This implies that the more educated the respondent, the richer the experience and the more progressive in his/her way of thinking.

Table 29. Summary of characteristics of respondents				
Description (N = 108)	Mean	St. Dev.	Min	Max
Age of fishers	34.09	9.83	18	60
Gender of fishers	n.a	n.a.	0	1
Fishers' education	1.29	0.68	0	4
Fishers' experience	15.60	9.56	2	40
Number of family members	3.94	1.86	0	9
Total income (Rp. 000)	735.65	416.40	150	2100
Length of stay	28.87	13.95	1	60

Note: n.a. : not applicable

Table 30. Fishers' education by gender.			
Description	Female	Male	Total
No formal education	0	3	3 (2.8%)
Elementary school	12	68	80 (74.1%)
Junior high school	2	16	18 (16.7%)
Senior high school	0	5	5 (4.6%)
Others	1	1	2 (1.9%)
Total	15 (13.9%)	93 (86.1%)	108 (100%)
Pearson Chi Square = 3.670 Asymp. Sig. = 0.453	Decision: There is no significant association.		

In this study, participation of fishers in development activities is hypothesized to be determined by age, gender, education level, number of family members, income and location (Cohen and Uphoff 1980; Oakley 1991, Bahaman 1992 and Waridin 1999 with necessary modifications). Two estimation techniques were used to analyze the data: regression and discriminant analysis. The results from these two techniques provide a similar conclusion, i.e. participation of fishers in development is guided significantly by age and educational attainment. Results are shown in Table 31. Income and location do not have significant impacts on the participation of respondents in the regression model.

Table 31. Summary of regression estimation			
Variables	Coefficient	t-ratio	Probability
Constant	10.427	8.173	0.000
AGE	0.135	4.603	0.000
GENDER	-1.263	-1.900	0.060
EDUC	0.732	2.147	0.034
FAM	-0.412	-2.688	0.08

Table 31. Summary of regression estimation			
Variables	Coefficient	t-ratio	Probability
INC	5.452E-08	0.120	0.905
DLOC	-0.555	-1.215	0.227
R^2	0.251		
F-Ratio	5.639		
(Prob. – Sig.)	0.000		
DW	1.949 (dl = 1.550; du = 1.803); Decision: no autocorrelation		
N	108		

Dependent Variable: PARTICIPATION

Discriminant analysis performed showed that the independent variables of age, gender, education, family members, income and residence of respondents were able to discriminate the level of participation of fishers, as indicated in Table 32.

Table 32. Summary of discriminant analysis PARTICIP = f AGE, GENDER, EDUC, FAM, INC, DLOC)			
Variables	Standardized Canonical Discriminant Coefficients		
AGE	-0.082		
SEX	2.270		
EDUC	-0.085		
FAM	0.259		
INC	0.000		
DLOC	0.373		
CONSTANT	-0.896		
Box's M:	71.500		
F – Approx. (prob-sig)	3.198 (Sig:0.000)		
Class Commitment	Predicted Group Membership		
	Low	High	Total
Original			
Count:			
Low	29	28	57
High	11	40	51
%:			
Low	50.9	49.1	100
High	21.6	78.4	100

Note : Tests null hypothesis of equal population covariance matrices.
Significant at alpha 2%. 63.9% of the original, grouped cases correctly classified.

Conclusion

Participation of fishers in development activities and/or program in the study area with different co-management processes (CMPs) was found not to be statistically significant. In contrast, age and education factors were able to differentiate the fishers' participation intensity in the study area of Pemalang and Demak. By means of regression and discriminant analyses, it was found that age, gender, education, and family members are the driving factors in determining the participation of fishers in development activities in the study area. The findings of this study may be used for many purposes in enhancing participation of fishers and determining the target for extension, training, and credit schemes.

5.5.2 An assessment of co-management arrangements developed by the Community Fisheries Management Project in Bangladesh [9]

The Community-based Fisheries Management (CBFM) Project in Bangladesh has worked in ten rivers, three open floodplain wetlands (beels) and six morepermanently closed lakes (beels and baors). The Department of Fisheries ensure access to the beels for fishers groups organized by five NGOs. These fishers pay a government revenue for the fishing rights in the beels, and are represented on the local management committees. These organized fishers have stocked closed beels. Representation of different user-villages and stakeholders was an issue. Professional fishers, subsistence fishers, fish traders and processors, investors in fish aggregating devices, floodplain farmers, and local government are all stakeholders. They were represented in the committees or advised them in more open systems, which have set aside sanctuaries and observed closed seasons when fish breed.

Strong competition for these resources, and the benefits (income and resource rent) that flow from them, resulted in conflicts. The CBFM was expected to improve cooperation, but conflicts continued in rivers because in 1995 the government ended leasing, thus allowing open access. Consequently, fishers had no rights to resist encroachment by powerful people to make brush shelters. In the beels, elections for leadership of management committees divided the fishers, but resulted in the benefits of accountability and transparency. Higher fish catches were found in the open and closed beels where the fishers and wider community complied with local rules limiting fishing seasons, areas, and types of fishing. Because they hold property rights through payments of government revenue, fishers were able to enforce rules and could call on government backing when needed. Successful management of a floodplain beel with no formal fishing rights rested on involvement of local councils and a homogenous subsistence fishing community.

To assess possible project impacts, baseline and impact surveys of the same samples of households were undertaken. In each water body, separate random samples were taken of 60 fishing households organized by the partner NGO and of 60 other households from the same villages that catch fish (mainly for food). The surveys were designed to assess impacts in each water body and to distinguish between households fishing for food and income. The non-NGO households form a "control" sample for comparison with the direct participants of the NGO programs, but they too were expected to benefit as they belong to the same communities and fish for subsistence. The CBFM was intended to recognize the interests of all stakeholders in each fishery. The baseline survey was carried out in mid-late 1996. In late 1997, a second round of surveys of the same households was undertaken along with baseline surveys in four water bodies where BRAC had started activities. In late 1998, a third round of impact

[9] P.M. Thompson, P. Sultana, MD. Nurul Islam, MD. Manjur Kadir, MD. Mokammel Hossain and MD. Shamsul Kabir (1999)

monitoring was undertaken covering the same households.

Conclusions: Lessons learnt and future plans

When asked what balance between fishers and the government is appropriate for co-management, both NGO-organized fishers and others from the same villages favored a balance with a greater role for fishers than the government, but still with substantial government involvement. The only exception to this is in largely seasonal open beels, comprising private land where the communities feel government involvement is not required. Also some non-participants who are excluded from closed beels thought that management should be vested with the government, possibly in reaction to their loss of influence and access.

Based on surveys of fishing households, both those organized by NGOs and others, and on the initial experience of local management committees, some lessons can be drawn:

1. Establishing CBFM takes time where the fishers lack earlier fishery organizations or institutions. Major benefits should not be expected within three years.
2. Community management has developed faster where there is a well-defined community and water body and where there were few conflicts or factions within the community.
3. A clear intervention, which may be a visible conservation measure such as a sanctuary or an improved-production technology, is a focus for fishers to work together in the expectation of tangible benefits.
4. Progress was better where the partner organizations had local staff dedicated to the project and with sufficient autonomy to develop local initiatives.
5. NGOs focused on poor people who fish for their livelihood. Compared with the government, the NGOs have considerable advantages in working with fishers. But in open beels and rivers, an NGO cannot expect its participants to have exclusive rights. They need to be flexible and willing to assist communities to develop their own organizations and institutions for fishery management, and recognize that the community includes stakeholders other than their group members; otherwise, negotiation with those stakeholders is not possible.
6. NGO training and credit for participants to take up productive enterprises has helped, even if incomes are not substantially higher. They give poor fishers an option to reduce their ties to middlemen and moneylenders. They also help fishers to have extra sources of income. This has encouraged some to comply with local fishing restrictions (seasonal bans or sanctuaries).
7. Ad hoc government policies and lack of coordination, and a reluctance to support local communities establishing rights over open water fisheries constitute serious limitations. Some parts of the government machinery did not appear to recognize that the government had agreed to establish genuine local co-management arrangements with fishing communities, for which the communities needed support and rights.
8. The fishers often lack incentives for and past experience of working together. Some form of revenue payment is needed for a specific spatially-defined fishery if property rights are to exist in fisheries in Bangladesh. Without this, there is no precedent for any territorial-use right. International

experience strongly indicates that community management is unlikely to take off unless communities have rights over defined fisheries. Arrangements developed by the CBFM Project in closed and open beels appear generally successful. However, changes are needed in the rivers. Common property rights and CBFM could be enabled in rivers while maintaining the policy of minimizing taxes on fishers in rivers.

Already, a number of projects in Bangladesh are adopting a community-based approach, and the CBFM Project is one reason for this trend. However, "community-based management" should not be seen as a panacea. Approaches adopted so far have not worked in all locations. Also, it is all too easy to involve NGOs on a short-term basis to help fishing communities, without making a commitment to devolve fishing rights and responsibilities to local communities. The evidence is sufficient to warrant expanded piloting of different institutional arrangements for fisher-led management and co-management. The government should enable these arrangements on a flexible, but clear basis. Assessment of the results will then be used to advocate appropriate policy changes and strategies for fisheries in general.

5.5.3 Community participation and attitudes towards co-management in Cambodia: A case study in Stung Hao and Prey Nup Districts of Sihanoukville. [10]

The coastal area of Cambodia is being increasingly managed under a co-management system as the government has reformed the fisheries policy in the country. Since 2000, there have been several coastal fishing communities organizations established that give rights to local users to participate in resource management. There is a need to study the effects of communitiy participation and attitudes towards co-management in the coastal area of Cambodia. The objective of this study was to evaluate the views of the local stakeholders towards co-management. The study was undertaken in three areas using three types of fisheries management in the coastal zone near Sihanoukville. The first type of fisheries management is co-management or fisheries community with a support project, namely the Ream Fishing Community. The second type is co-management without a support project, namely Prey Nup 1 Community Fisheries. It was organized with the help of the provincial fisheries staff. Both of these cases are located in Prey Nup district. The third type is in the area of Stung Hao district where there is no co-management or community fisheries established yet.

The data collected for this study was based on a field survey that was carried out in the three study areas by using a standardized questionnaire for 150 households. A focus group discussion was also undertaken in order to obtain general information from the stakeholders.

Results

Marine fisheries are important to the livelihood of coastal people in Cambodia. The past management systems of fisheries focused on commercial fishing and favored this type of fishing in coastal areas, resulting in negative impacts on fisheries-dependent households. These impacts include:

- Strict control over poaching and movement of local fishers who live in and around coastal fishing grounds
- High fees to the government causing indebtedness
- Illegal fishing and over-fishing in the coastal areas
- Tension and conflicts between small-scale and small commercial fishers

[10] Nao Thouk, Hap Navy, Bouy Roitana and Kaing Khim (2003)

- No right or power given to the local people to take care of the natural resources

The policy reform of fisheries, which was brought about by Prime Minister Hun Sen in 2000 to give rights to the local people to manage their natural resources, was advocated by local fishers, representatives of the Community Fisheries Development Office of the Department of Fisheries, Provincial Fisheries Offices, local authorities, and the police/military. The dissemination of information about the reform was done by the Sihanoukville fisheries office for the coastal areas. The reform focused on the fishing community organizations, protection of fisheries resources by encouraging small-scale fishing rather than commercial fishing, protection of mangrove forests, and stopping illegal fishing. However, the dissemination process was short and targeted mainlyfishers.

The fisheries reform is not so well accepted by coastal people as freshwater people. During the interviews, community members had no idea about fisheries co-management or fisheries reform. The Ream fishing community cannot undertake fisheries co-management without support from external donors, especially the costs of control and protection from illegal fishing. The Prey Nup 1 fishing community organized by the Sihanoukville fisheries office has no funds to support similar activities. In Stung Hao, most respondents want their fisheries to be operated as a small-scale group, which is endorsed by representatives of the Provincial fisheries office and the Department of Fisheries. They feel that the community fisheries cannot operate currently without external support.

The results of the study show that there are many constraints facing community fisheries in Cambodia. These constraints include political, economic, socio-cultural, technical and institutional aspects. Each aspect is linked with another. The most important and immediate need is a political will to decentralize power and rights to lower administrators and local fishers to take responsibilities and participate in the process of fisheries resource management through the process of co-management.

The analysis indicates that fishing communities are willing to participate in co-management, but the local people are weak in terms of available resources, such as human capacity and financial resources; and capabilities including technical knowledge, skills and organizational and management skills. Moreover, the community fisheries are under threat from the slow process of adopting the sub-decree on community fisheries, opportunistic fishers' contempt on co-management, poor education of fishers, and others. On the other hand, fishing communities are willing to learn and implement co-management. Some government staff have advocated the reform and see co-management as an alternative to bring about a sustainable livelihood for local populations and sustainable resource management.

Concepts of co-management are very new to the local people. Co-management in these areas has just started. Currently, local fishers, local authorities and the police/military do not understand the process of co-management. There are many barriers to establish and implement co-management in the coastal areas without support.

Recommendations

In order to regulate the sustainable use of the natural resources, to protect the coastal habitats, to decentralize the fisheries reform, and to pilot ideas for livelihoods, the activities should include:

- Training in the co-management concept to the local people, provincial fisheries staff, local authority and institutions concerned.

- Providing fund and technology to organize and develop fishing community and extend public awareness to all natural resources users along the coast.
- Limiting the overuse of natural resources by promoting supplemental incomes such as improving aquaculture.
- Conducting catch monitoring programs on marine production (for Sung Hao district), and a catch and mangrove monitoring program (for Prey Nup district).

1/ Several criteria were imposed, among others are: participation intensity shared by the stakeholders, outcomes achieved in the community from the programs launched by the government or NGO/ universities or other agencies in the two sites; degree in attention given by the community for having cooperation and collaboration with other people or organization; management strategy performed by the community, such as in solving conflicts, formulating a plan, etc.; numbers of informal and formal organizations exist at the two sites.