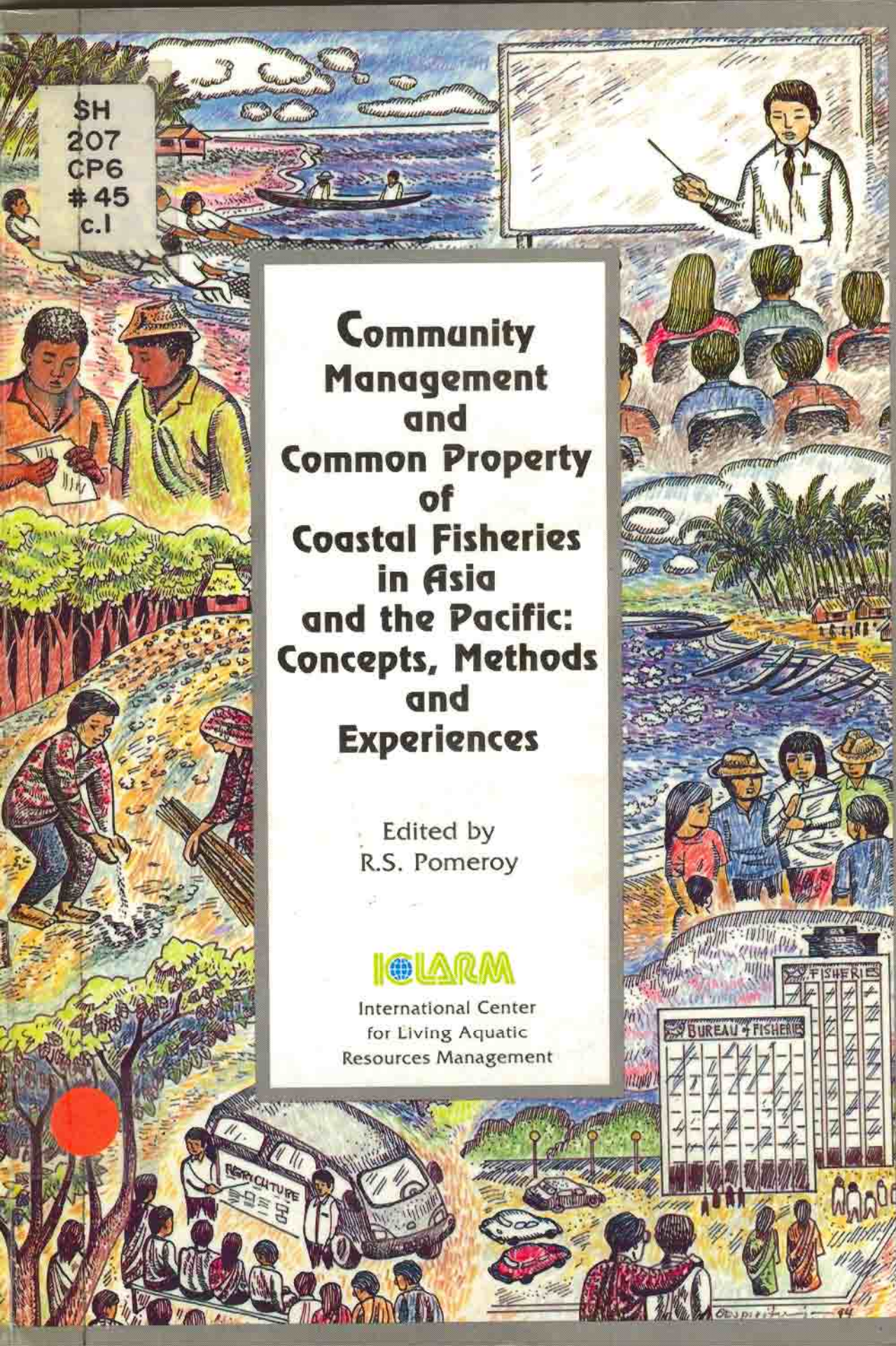


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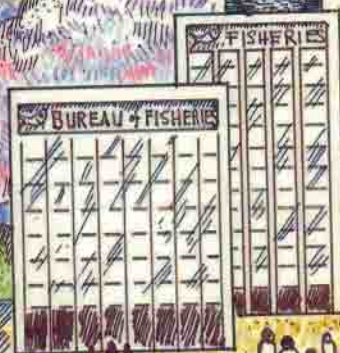


Community Management and Common Property of Coastal Fisheries in Asia and the Pacific: Concepts, Methods and Experiences

Edited by
R.S. Pomeroy



International Center
for Living Aquatic
Resources Management



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Proceedings of the Workshop on Community
Management and Common Property of Coastal
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Pacific: Concepts, Methods and Experiences
Silang, Cavite, Philippines
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Foreword

Researchers in the social sciences are at the forefront of the urgent search for better ways of managing fisheries resources. The papers in the present volume contain a significant record of the search: they examine the concepts of community management and common property in coastal fisheries; and look at how community management operates in a range of past and present fisheries systems in Asia and the Pacific.

All over the world, people are seeking viable solutions to the critical challenges of the management of stressed and degrading natural resources. More than in any other region, fisheries resources in Asia and the Pacific are important sources of food, income, jobs and cultural heritage. Over the recent decades, many governments have adopted management approaches suited to expanding, commercial fisheries development — relying on central control, monitoring and surveillance. Traditional management practices and codes of small-scale fishers often have been overlooked. The new approaches have often been ineffective in conserving resources and ensuring equity and economic efficiency in their use. Fishers tend to flout the government management arrangements or find ways around them; and governments lack resources for their full implementation.

Achieving more effective management will be complex but there is a consensus that the way forward requires greater community involvement. A quick fix or an easy answer, however, does not exist. For example, a greater level of community management will need considerable capacity building so that the community can cope with managing the present stresses on the resources caused by increasing population numbers, degraded present state of resources and coastal ecosystems.

Many of the complexities are discussed in this volume which is published as a contribution to the world's search for a way forward.

Meryl J. Williams
Director General
International Center for Living
Aquatic Resources Management

Acknowledgement

The workshop would not have been possible without the financial support of the International Development Research Centre (IDRC) and the Ford Foundation. The International Institute of Rural Reconstruction kindly provided the venue for the workshop.

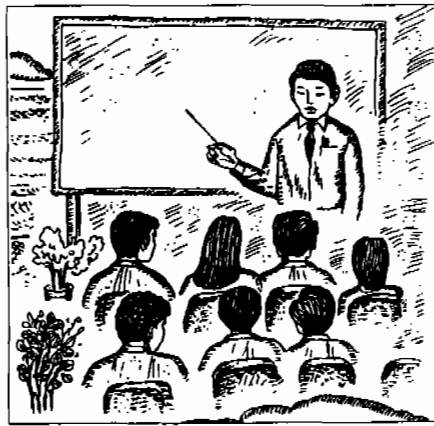
It would have not been possible to conduct the workshop without the coordinating skills of Angie Agulto, Rocky Josue and Rachel Atanacio of ICLARM.

Grants from IDRC to aid the publication of this book are also gratefully acknowledged.

The proceedings were copyedited and organized with the able assistance of Rachel Africa and Anjanette Trinidad.

Abstract

This volume reports the proceedings of an International scientific meeting to document the concepts, methods and experiences in community-based management and common property management for coastal fisheries in Asia and the Pacific. A number of general conclusions and recommendations about coastal fisheries community-based management can be made from the papers and discussion at the meeting. The conventional wisdom that fisheries resources which are held as communal property are subject to eventual overexploitation and degradation and that a centralized management authority is needed to manage resources is not equivocal. Traditional community-based management systems have an important role to play in the management of coastal fisheries. Recent investigation on community-based fisheries management has shown that when left to their own devices, communities of fishers, under certain conditions, may use fisheries resources sustainably.



Introduction^a

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Background

In many countries in Asia and the Pacific, national governments have increased their role in the management of coastal fisheries. The role of local level control, through traditional management and custom, has correspondingly diminished. By appropriating this control over coastal fisheries management, the national government has often underestimated the capacities of coastal communities, learned through often long and difficult experience, to manage local fisheries resource systems to meet their needs. In many instances, the national government has overestimated its ability to manage these same resources (see Ruddle, this vol.).

The dissolution of local level control of coastal fisheries management has been, in part, the result of institutional restructuring under colonial administrations; the rise of the nation-state; technological modernization; population growth; increasing efforts by private investors to gain

control over coastal and marine resources; and socioeconomic differentiation and unequal concentration of power within coastal communities. When community-level institutional arrangements for coastal fisheries management are undermined, the usual common-property resource management regimes (in which group size and behavioral rules are specified), have been, in many instances, replaced by open-access regimes, a free-for-all with uncontrolled entry for resource use and the economic incentive for the user to extract as much of the resource as possible before others do.

Fisheries management in the Asia-Pacific region has been heavily influenced by the Western concept of the need for a centralized administrative authority. This approach involves little effective consultation with the target beneficiaries and is often not suited to developing countries with limited financial means and expertise to manage fisheries resources in widely dispersed fishing grounds. Western approaches to fisheries management have been dominated by the assumption of free access to the

^aICLARM Contribution No. 1093.

resource and lack of power of a single participant in the fishery to prevent others from exploiting the same fishing grounds. A further dominant assumption is that any fishery must be characterized by intense competition which will inevitably lead to overexploitation and the eventual dissipation of resource rents (profits), the so-called "tragedy of the commons". Recent research on small-scale coastal fisheries in developing countries in Asia and the Pacific has shown, however, that some degree of regulated access, enforced at the local level through community institutions and social practices, appears to be the rule rather than the exception (Hviding and Jul-Larsen 1993).

Without denying that the traditional systems of fisheries management can often be inequitable and ineffective, state interventions that have chosen to ignore them have seldom fared better. National governments have, for the most part, failed to develop an adequate substitute for or complement to these traditional resource management systems. The promotion of nationalization or privatization as routine policy solutions has not solved the problem of resource degradation and overexploitation and, in many instances, has deprived large portions of the population of their livelihood (Bromley and Cernea 1989). In this light, devolution of major resource management and allocation decisions to the local level may thus be more effective than management efforts of distant, understaffed and underfunded government agencies.

Community-Based Resource Management and Co-management

The growing realization of the need for a stronger community role in resource management can be seen in a wide range of programs and policies worldwide. Both

increased local participation and institutional restructuring have given greater control of resource management to the community and resource users.

The advantages of community-based resource management (CBRM) systems have been well documented in various parts of the world (Korten 1986; Berkes 1989; McCay and Acheson 1990; Poffenberger 1990; Bromley 1992). The better known of these initiatives have been in irrigation and social forestry, but similar approaches are being applied in upland agriculture and wildlife. Community-based management efforts in fisheries are primarily still in a developmental stage. This is due in part to the complexity of coastal and marine resource systems; the social and cultural structure of fishing communities; and the independent nature of fishers. Examples of community-based management in fisheries do exist, however, in the United States (Acheson 1975), Japan (Ruddle 1985, 1989), the South Pacific (Ruddle and Johannes 1985) and the Philippines (White 1989).

Community-based management strives for a more active people's participation in the planning and implementation of fisheries management. CBRM starts from the premise that people have the innate capacity to improve their quality of life. Often what is needed is support to organize and educate people to mobilize available resources to meet their needs.

The potential advantages of CBRM include effectiveness and equity. CBRM can be more economical in terms of administration and enforcement than national, centralized systems. CBRM involves self-management where the community takes responsibility for monitoring and enforcement. CBRM provides a sense of ownership over the resource which makes the community far more responsible for long-term sustainability of resources. This is accomplished by establishing a resource management regime and rules of behavior

for resource use. By making maximum use of indigenous knowledge and expertise, CBRM allows each community to develop a management strategy which meets its own particular needs and conditions. CBRM permits a sufficient degree of flexibility and can easily be modified. Involvement of the community in the formulation and implementation of management measures will lead to a higher degree of acceptability and a stronger commitment to comply with the management strategy (Korten 1986; Cernea 1991).

Community-based management is not, however, a panacea for resource management. It may not be suitable for every fishing community. Many communities may not be willing to or capable of taking on the responsibility of CBRM. Not all elements of fisheries management authority can, or should, be allocated to the local community. For many communities, economic, social and/or political incentives to engage in community management may not be present. The risks involved in changing fisheries management strategies may be too high for some communities and fishers.

Despite the many advantages of CBRM, it is unlikely that local communities can successfully implement fisheries management on their own. A more dynamic partnership must evolve, using the capacities and interests of the local community, complemented by the ability of the national government to provide enabling legislation and other assistance. This partnership can be called co-management, where the national government and the community share authority. Community-based management is a central element of co-management. The amount of authority that the national government and the community have will differ and depend upon the country and site-specific conditions (Pinkerton 1989; Berkes et al. 1991). It should be noted that by itself, the planning and implementation of fisheries management

can be a complex undertaking, which may not yield immediate results. In addition, many of the solutions to sustainable fisheries management may lie in sectors outside fisheries. When combined with community/economic development and integrated coastal resource management activities, these concerns can often be addressed.

Rights, Regimes and Institutional Arrangements

An essential ingredient for success of any resource management system, whether community-based or centralized, is the system of incentives and sanctions - rights and rules - for influencing individual behavior of resource users and dependents. Thus, at the core of community-based management are the issues of property rights, resource management regimes and institutional arrangements. Specifically of interest in CBRM are common-property regimes. Common-property regimes are forms of management grounded in a set of accepted rights and rules by a group of resource users for the sustainable and interdependent use of collective goods. A collective good is defined as a resource managed and controlled by a group of users (Pomeroy 1994).

Common-property management issues have recently received much greater attention since they are felt to be critical to the practical work on development projects, primarily agriculture, forestry and fisheries (Bromley 1992). In many parts of the world, rights to common property are all that separate the poor from destitution. It has been pointed out that development planners must eventually deal, either explicitly or implicitly, with the issue of institutional arrangements for property rights and rules over natural resources (Bromley and Cernea 1989). Renewed interest in the role of community-level institutions and the importance of

indigenous knowledge and traditional values and institutions in the management of common property is a result, in part, of past failures of development projects and the search for sustainable alternatives to existing systems of resource use.

The transfer of management control from local communities to the national government has often resulted in the replacement of common-property regimes by open access.

Depending upon the conditions of the area and the resource, it may be more appropriate to restore common-property regimes than to promote privatization or nationalization. This is due in part to prevailing sociocultural values of resource users which often conflict with private property and past failures of nationalization (Bromley and Cernea 1989). Successful common-property management may be found through a combination of approaches. The application of community-based management and exclusive use rights, such as territorial use rights in fisheries (TURFs), presents one viable approach.

Fisheries management policies in developing countries are shaped through a convergence of institutional interests among resource users, resource stakeholders, community, local government, national government and international agencies. Those concerned with reorienting fisheries management to promote social and sustainable policies need to recognize this convergence of institutions and interests if they are to restructure them effectively.

The Workshop

It is within the context of the conceptual discussion above that an international workshop on community-based resource management and common property of coastal fisheries in Asia and the Pacific was convened. In recent years,

throughout the region, an increasing number of community-based coastal fisheries management projects have been undertaken. These projects are being implemented through a variety of strategies. This is good in the sense that a number of approaches to CBRM are being tried. It is bad in the sense that many of the project planners and staff are not fully aware of past experiences in community-based management or of the recent, vast literature on CBRM and common-property resources. Some projects are being carried out from "scratch", going through the same, often unsuccessful processes as previous projects. There was a felt need to bring together researchers and practitioners from around the region and the world who could consolidate the concepts, methods and experiences in community-based management and common-property resources in coastal fisheries. This pool of information could then be made more readily available to their counterparts in Asia and the Pacific for improving project planning and implementation.

In June 1993, the International Association for the Study of Common Property held its fourth annual conference in Manila, Philippines. Earlier that year, the International Center for Living Aquatic Resources Management (ICLARM) in the Philippines approached the International Development Research Centre (IDRC) and Ford Foundation to cofund a post-conference workshop focusing upon community-based management and common property of coastal fisheries. The IDRC agreed to finance the workshop and suggested that a concurrent one on upland resources would be valuable.

The three-day workshop was held on 21-23 June 1993, hosted by the International Institute for Rural Reconstruction in Silang, Cavite. ICLARM organized the program for the coastal fisheries workshop and handled the local arrangements for the uplands workshop, which was set up in

turn by IDRC. Over 70 people from around the world attended both workshops. The proceedings of the uplands workshop have been published by IDRC (Thompson 1993).

The general goal of the coastal fisheries workshop and its proceedings was to document the concepts, methods and experiences in community-based management and common-property resources in Asia and the Pacific. These ideas would serve as guidelines for wider dissemination and utilization in the region. Fourteen experts from Asia, the Pacific and worldwide were invited to present papers dealing with specific topics on the above theme. (See the Appendices for the workshop program, paper titles, authors and participants).

The workshop itself was organized so that both the coastal fisheries and the uplands groups met together on the first day to listen to and discuss three concept papers on community-based management and common property. The two groups then split up on the second and third days to follow their own agenda. They came back together briefly at the end of the third day to present a summary of the papers and group discussions.

The Papers

The contributions at the workshop are classified into three parts - concepts, methods and experiences. The three concept papers review recent analytical frameworks and empirical evidence about common-property resources and CBRM. The eight method papers discuss a variety of critical issues and procedures for implementing CBRM. The three experience papers, all from the Philippines, discuss lessons learned from ongoing and completed community-based coastal fisheries management projects.

Recent works by a number of researchers and practitioners have questioned the conventional wisdom of Hardin's "Tragedy

of the Commons" (1968), common property and the necessity for centralized government regulation of fisheries (Berkes 1989; Berkes and Feeny 1990; Feeny et al. 1990; Ostrom 1990; McKean 1992; Bardham 1993; Seabright 1993). These challenges to established knowledge have been brought about by the accumulation of more empirical evidence on common-property resources and community-based management systems (NRC 1986; Bromley 1992). This has resulted in a new conceptual focus of inquiry based on the role of institutions and property rights in resource management, the topic of the first three papers.

David Feeny reviews a number of frameworks, both conventional and more recent, for understanding resource management in the context of common property. Feeny emphasizes that recent literature in economics has recognized a fourth category or pillar of variables for describing economic systems - institutions. Together with resource endowments, preferences and technology, institutions, the "rules of the game", shape the possibilities for economic activity. Institutional arrangements, in general, and property rights, in particular, form the nature of resource use and management of the commons.

Reviewing the works of Hardin et al. on the nature of common-property resource management, Feeny points out that more recent theoretical and empirical studies on the subject illustrate that while the Tragedy of the Commons approach should not be ignored, the conclusions it draws are not unequivocal. Management mechanisms for common-property resources need to acknowledge the importance of incentives for cooperation and individual self-interest, as well as balance the claims of multiple uses and users. The more recent work argues that institutions matter, as does the ability to enforce collective agreements and innovate and accommodate evolving challenges. Feeny concludes that

“the frameworks imply a strong and central role for local knowledge” In developing a strategy for common-property resource management.

Building on the general discussion of the different frameworks for understanding management of common-property resources, Elinor Ostrom discusses results from the study of common-pool resources using a specific framework of analysis. The Institutional Analysis and Development (IAD) framework, developed by Ostrom and her colleagues at the Workshop in Political Theory and Policy Analysis at Indiana University, focuses on the identification of contextual attributes that shape various action situations, i.e., resource management strategies. The IAD links the characteristics of the physical world with those of the general cultural setting of the resource users; the specific rules-in-use that affect the incentives individuals face in a particular situation; the patterns of interaction among the resource users; and the likely outcomes.

Recent research has applied this framework to common-pool resource systems worldwide. A result of this research has been the identification of “design principles” which appear to characterize most of the robust common-pool resource institutions. While these design principles illustrate that community-governed commons can be sustainable, they are susceptible to internal and external threats to this sustainability. Ostrom discusses these threats, as well as coping mechanisms. The conclusion drawn from Ostrom’s paper is that while threats do exist to effective and sustainable self-governed common-pool resources, evidence reveals that these resources and their institutions in many countries can be long-lasting.

Discussing the issues of property rights and in particular, common-property resources, in the context of coastal fisheries, Fikret Berkes argues about the need to reassess the policy implications of prop-

erty rights and management of coastal fisheries worldwide. This should include an abandonment of the conventional ideals of open access and centralized government regulation. Berkes contends that many of the problems in coastal fisheries worldwide are not due mainly to the resource users but to Western-trained resource managers who still confuse common-property regimes with open access and are convinced of the necessity of a higher authority.

Similar to Feeny, Berkes states that recent work on common-property resources illustrates that left to their own devices, communities of fishers may use stocks sustainably under certain conditions. If community-based management of fisheries is to succeed, the conditions conducive to sustainable use of stocks by fishers must be produced. This means that the managers must create a management role for the community of fishers. Institutions must be built which enhance the capability of fishers for resource management, including the reorganization of property rights. Berkes avers that co-management, involving more participatory decision-making, organized fishers’ groups and incentives for cooperation, as mentioned by both Feeny and Ostrom, is consistent with sustainable coastal fisheries development.

The eight papers presented at the second part of the workshop discuss the range of issues and procedures in the development and implementation of effective community-based coastal fisheries management.

Building on Berkes’ article, Ken Ruddle asserts that it is becoming increasingly clear that CBRM systems may have an important role in the co-management of coastal fisheries. Reviewing various fisheries regulatory techniques in the context of small-scale tropical fisheries, Ruddle advocates the property rights alternative in which communities or groups of individual

rights holders make and enforce their own regulations for a defined resource area, such as the TURF concept. However, to succeed, the property rights approach must be nested in a system of traditional community-based management. Ruddle points out that traditional community-based marine resource management systems in the Asia-Pacific region are or were managed by systems of property rights, defined user groups, defined resource territories, and rights and rules which closely reflect social organizations and local power structure. While recognizing that traditional CBRM systems have difficulties, Ruddle states that they have a future in a form of co-management with some higher level of government. To be effective, however, an explicit government policy will be required regarding the scope and power of community management, flexible to the needs of local communities.

The inability of the state to slow down or reverse environmental degradation has forced a rethinking of the problem and its solutions. Grassroots movements for people empowerment, developed through years of struggle, are now finding support in environmental initiatives worldwide. Mary Racelis affirms that people who are organized, aware of their rights and ready to exercise them, and partners in the planning and implementation of resource management systems, can bring about sustainable development. People-centered resource management can enable an effective collaboration among fishers, nongovernmental organizations (NGOs), people's organizations, the government and others.

Richard Pollnac, building on the arguments made by Racelis for people's participation in fisheries co-management, specifies it further through fishers' cooperative-type organizations. While various types of fishers' organizations such as NGOs and stakeholder associations have been suggested for people's participation, Pollnac

suggests that fishers' cooperatives may be the most appropriate form since it is probably the most widespread and well-known formal organization of fishers worldwide. While the literature is replete with reviews of failed fishers' cooperatives, recent studies have systematically and quantitatively identified numerous factors influencing the relative success and failure of this type of organization. Pollnac asserts that these factors, when used systematically, can provide a more rigorous understanding on whether fishers' cooperatives can or should be used to facilitate people's participation in the management process.

John Kurien points out that the "community" about which we talk so much in community-based management has changed significantly with time as it has been incorporated into larger national and international systems. Social, economic, cultural, technological, resource and institutional conditions of the community have altered and in many cases a variety of conflicts have arisen. Before we can begin to develop or reinvigorate community-based management systems, Kurien emphasizes the need to redefine and rediscover the "community" in the context of today's social, economic and political realities. Rebuilding community must be undertaken through the establishment of "community property" over coastal waters, socioeconomic development, integrated multisectoral coastal management, and the forging of a new relationship with the global society and economy. Kurien concludes that the coastal community has changed and as such, our approaches to community-based management must balance the forces which have brought about this change.

Hal McArthur describes ways to enhance communication between and among fishers and fisher groups and researchers, planners and development practitioners. With increasing pressure on coastal resources

from multiple users, he suggests that dialogue can resolve conflicts and produce a consensus about sustainable resource management strategies. The various methods and techniques developed to create dialogue with community-based clients can be grouped and evaluated in terms of the underlying conceptual orientation, the objectives of the activity, the research framework used and the desired type of relationship with the community. Of the three major conceptual orientations for creating community dialogue - transfer of technology approach, agroecology and participatory action research - McArthur states that the latter two concepts are the most relevant to marine and coastal resources management. Due to the complexity of coastal fisheries management, various aspects of these two conceptual orientations may need to be combined into a research and intervention strategy to generate information and communication for management.

The management of small-scale coastal fisheries requires, among other activities, planning and the setting of objectives, and this in turn needs a good understanding of the fishers, their values and culture, the resource attributes, institutions and the overall environment in which the fishers operate. According to Kuperan and Mustapha, without prior knowledge of these attributes, any attempts to manage will often be met with serious resistance and noncompliance. The objectives of the managers and the fishers can often be different and conflicting. This requires, as discussed by McArthur, the creation of dialogue to develop a consensus to ensure effective management. Co-management can provide a forum for fishers to participate in decisionmaking, as well as have the authority to make and implement regulatory decisions on their own. Kuperan and Mustapha conclude, however, that among the Southeast Asian countries, only the Philippines has a high

prospect for adoption of co-management in the near future.

Much has been written about the inability of national governments to slow down or reverse the overexploitation and degradation of coastal fisheries. In many countries in Asia, the role of the national government is being replaced by NGOs which can facilitate development through people's participation and community organizing. What is the role of the national government and NGOs in resource management? Angel Alcalá and Fred Vande Vusse see a need for the government to recognize resource users as the real day-to-day managers of coastal resources. Discussing the Philippines, but acknowledging that the issues and challenges it faces are similar to those in other Asian countries, they advocate a more developmental than regulatory approach of the government to management. The government should encourage and assist communities and resource users in building their capacity to manage fisheries resources. Coastal communities should be urged to move away from *de facto* open access through the use of property rights to limit entry, such as TURFs.

In the Philippine setting, Carlito Añonuevo recommends a facilitative role for a service NGO, essential in helping build the necessary social infrastructure for implementing community-based management. In doing its work, the NGO can assist in community organizing, training and education, livelihood development, advocacy and financial resource mobilization. Añonuevo argues that community-based management, to be effective and sustainable, must assign property rights to the resource base to its direct stakeholders - the coastal communities and resource users. Moreover, community-based management must move beyond regulation and address the basic factors which cause poverty among the coastal inhabitants.

Practical experience in community-based coastal fisheries management in the Asia-Pacific region is much more limited than in other resource systems such as irrigation and forestry. Yet looking around the region it is possible to find an increasing number of coastal fisheries development projects which implement CBRM strategies. This is especially true for the Philippines, where since the mid-1980s, several projects have begun to work with fishers to develop community-based management systems for coastal resources. In the third part of the workshop, the three papers presented discuss experiences and lessons learned from three projects.

The island-community of Malalison in central Philippines was selected by the Aquaculture Department of the Southeast Asian Fisheries Development Center (SEAFDEC) as a project site to undertake a multidisciplinary, development-oriented research on community fisheries resource management. The ongoing project has multiple objectives including the development of seafarming and searanching as alternative livelihood activities; community organizing and institution building; and regeneration of marine habitats. Rene Agbayani and Susan Siar of SEAFDEC report that research and development activities have been undertaken simultaneously at the project site. Research conducted by SEAFDEC scientists are complemented by community-organizing activities of an NGO. Several problems have been encountered in project implementation, such as high expectations among project participants of immediate project benefits; lack of coordination and communication; and unstable community leadership. In dealing with these problems and in overall project implementation, Agbayani and Siar stress the need for open and continuous dialogue and coordination among researchers, development practitioners and the community; clearly defined project plans and objectives; and strong leader-

ship at both the community and project management levels.

The Central Visayas Regional Project (CVRP) had the objective of addressing both land-based and marine resource management issues in four provinces in central Philippines. In addition, the project was to reinforce the Philippine government's regionalization or decentralization program and develop both governmental and resource users' capability to manage resources.

Fisheries was only one component of the large, World Bank-funded regional project. Rafael Bojos recounts that CVRP recognized from the start that the resource users were the real managers and that the project should be carried out through a co-management approach. The CVRP staff and the government worked with fishers and the community to develop institutional arrangements in resolving open-access problems identified as the main cause of resource overexploitation. Resource management interventions and development activities were kept simple and appropriate to meet the identified needs of the community. Community-organizing activities were focused on the *barangay* or village, the lowest government administrative level in the Philippines. Formal Memoranda of Understanding were approved by the Philippine government to allow for secure resource access and management by users. Bojos concludes that project implementation must be participative. A sense of belonging and responsibility for project success must be imparted to the participants to encourage them to join and sustain the project activities.

Started in the early 1980s, the multisectoral Palawan Integrated Area Development Project initially aimed at improving agricultural production and natural resource management for the Province of Palawan in the central western Philippines. The project activities were

expanded in the late 1980s to address issues of environmentally sustainable development through the Strategic Environmental Plan (SEP) for Palawan. One of the strategies of SEP was the promotion of CBRM through pilot-testing in different resource systems, including fisheries. Ricardo Sandalo discusses the experiences of one of these pilot-test projects, the Honda Bay Resource Management Program (HBRMP).

In a similar fashion to the other projects described above, HBRMP included the beneficiaries/cooperators as co-implementors and not mere recipients of project activities. Fishers were organized and project activities reflected their priorities including alternative livelihood, resource enhancement and community development strategies. Sandalo concludes that two primary elements are critical for successful community-based management: (1) the community that utilizes a given resource is organized, either formally or informally; and (2) the organized community actively participates in project activities. The capability of the organized community to take on the responsibilities of resource management must be established by the project staff at such a level that sustains project strategies and activities over time.

Conclusion

A number of general conclusions about community-based coastal fisheries and common-property resources management can be made from the papers and discussions at the workshop. The conventional wisdom that fisheries resources held as communal property are subject to eventual overexploitation and degradation and that a centralized management authority is needed is not unequivocal. Traditional community-based management systems have an important role to play.

Recent investigations have shown that when left to their own devices, communities of fishers, under certain conditions, may use coastal resources sustainably.

Fishers, the real day-to-day resource managers, must be equal and active participants in resource management. An open dialogue must be maintained among all the stakeholders. Property rights to the resource must be assigned directly to its stakeholders - the coastal communities and resource users. The "community" must be reinvigorated through a multisectoral, integrated approach to both resource management and community development. The community must be provided assistance to organize and develop the capability to take responsibility for resource management.

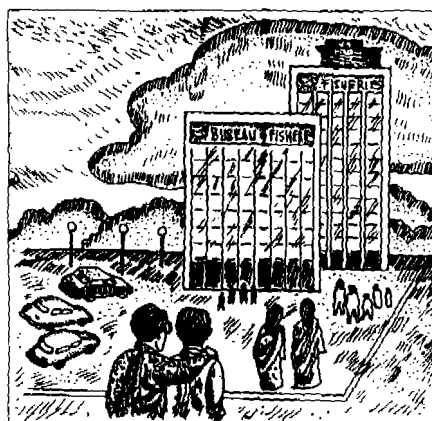
Fisheries resource management institutions have not kept pace with our technological ability to exploit the resource. The result is that the management system fails to address the growing problems of fisheries overexploitation; dissipation and redistribution of resource rents; and conflicts among different groups of resource users. The starting point in the search for more viable and sustainable institutions is to abandon the open-access ideals of the old freedom-of-the-seas principle and to recognize the failures of centralized management. A new management philosophy is warranted in which the fisher can once again become a part of the resource management team, balancing rights and responsibilities, and working in a cooperative (rather than antagonistic) mode with the government managers. Such joint management, or co-management, is a rational extension of evolutionary trends in fisheries management over the past decades.

Commitment to CBRM should not be taken lightly by either the community or the government. The implementation of community-based management strategies is complex and takes time. Based on a

new understanding of common-property resource management, however, CBRM provides a range of possibilities for sustainable development of coastal fisheries.

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The Role of Government in Coastal Resources Management

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Background

Philippine coastal resources are vast and have great productive potential. There are 18,000 km of coastline around 7,100 islands with a total land area of about 300,000 km². The Philippines' 200-mi exclusive economic zone (EEZ) encloses 2,300,000 km of marine waters and the total annual fisheries production from this area is estimated at 2.2 million t. About 75% of the total or 1.6 million t are reportedly taken from municipal waters (15 km from the shore) which comprise only 11% (about 270,000 km) of the nation's marine waters. This is because coastal shallows are much more productive than the open ocean and nearly one-third of municipal waters contain three of the most productive habitats - coral reefs, mangroves and seagrass meadows. A good quality Philippine coral reef, for example, can pro-

vide up to 30 t of fisheries harvest annually from every square kilometer or 60 times the average harvest from the same area of open sea (Alcala and Gomez 1985).

About one million families or six million individuals depend on fisheries for their livelihood and a far greater number supplement their diet with protein from the catch from part-time fishing or the gleaning of shallows at low tide. Fisheries products are the major source of dietary protein, especially in rural areas. Fisheries resources of all kinds contribute 5% to the gross national product each year.

The Government's Legal Mandate

Natural resources in the Philippines are state property. Article XI, Section 2 of the 1987 Constitution provides that "All ...

fisheries, forests or timber, wildlife, flora and fauna, and other natural resources are owned by the State." This section goes on to declare that "With the exception of agricultural lands, all other natural resources shall not be alienated"; "The ... development and utilization of natural resources shall be under the full control and supervision of the State" and "The State shall protect the nation's marine wealth ... and reserve its use and enjoyment exclusively to Filipino citizens." Article XIII, Section 7 adds a resource allocation provision which may be unique. "The State shall protect the rights of subsistence fishermen, especially of local communities, to the preferential use of the communal marine and fishing resources, both inland and offshore."

A series of laws provides various government agencies with jurisdiction over coastal resources and a mandate to protect and manage renewable resources on a sustainable basis. The national agencies primarily responsible are the Department of Agriculture, particularly the Bureau of Fisheries and Aquatic Resources, and the Department of Environment and Natural Resources (DENR), although more than 20 separate national government agencies have a legal mandate that in some way impinges on coastal resource management. The Local Government Code of 1991 transferred broad powers over coastal resources from the national government to municipal governments. These powers are to be exercised within their respective municipal waters.

Thus, the management regime for all Philippine natural resources is defined by law as one of state property (*res publica*). However, the constitutional provision that reserves the use of marine wealth for a limited group, Filipino citizens, introduces the key element of a common property management regime (*res communis*). Most countries of the world claim the natural resources within their boundaries and assign one or more government agencies to be

responsible for their protection and management but few are as restrictive on marine resource use as the Philippines.

Existing Situation

The Philippines has an extensive and highly productive marine resource base that provides livelihood and sustenance for a significant portion of the population. A state property management regime is clearly spelled out in the law, but all is not well. Overfishing is widespread and well documented (Dalzell and Ganaden 1987; Dalzell et al. 1987). The productive potential of coastal waters has been further compromised by pollution and damage to the most productive coastal habitats, coral reefs, mangrove forests and seagrass meadows. Only about 30% of our coral reefs remain in good (25%) or excellent (5%) condition (Gomez et al. 1981; Gomez 1990) and over half of the mangrove forest area has been cleared to make fishponds, many of which produce at levels well below their potential (Camacho and Malig 1988).

The concentration of fisheries wealth in coastal waters is often a source of conflict among those who seek to benefit from it. Fishpond developers want to clear the mangroves while small-scale fishers and wood product harvesters prefer to retain them. Industrial fishing vessels enter municipal waters to compete directly with artisanal fishers and contribute to overfishing there. Some fishers resort to illegal and destructive fishing practices such as the use of dynamite and cyanide in an attempt to increase their catch; however, they make the situation worse for themselves and everyone else by damaging the habitat that supports the fish species they seek to harvest. Reduced harvests for each fisher translate into lower incomes and increasing poverty in rural areas. Fishers who watch their catch diminish each year know they have a problem but feel helpless as

individuals to change their situation. They often look to the government for assistance.

Philippine law mandates a state-property management regime. However, given the vast areas involved; the limited capacity of the government to effect control; and a lack of functional communal management systems, open access prevails in most places most of the time. This condition has been categorized as *de facto* open access.

How did this situation come about? Can any government with limited means effectively manage coastal resources under a state-property regime? In attempting to formulate an answer to this question, three basic topics will be discussed: who actually manages coastal resources; the role of tenure; and the need for equitable resource allocation.

Who Actually Manages Natural Resources?

It is common for personnel of the government agency entrusted with the protection and conservation of natural resources to assume that the agency does in fact manage them. Laws are enacted and numerous rules and regulations are promulgated by these agencies. To many, this is resource management. The government, however, does not have the capability, personnel and equipment needed to ensure that its policies, rules and regulations are enforced. The government must, in reality, depend upon the people who daily use coastal resources to make proper management decisions.

Fishers decide each day if they will use dynamite, cyanide, fine-meshed nets or legal means of fishing. The government can work to influence these decisions but can only monitor relatively few fishers each day to enforce compliance with the law. Thus, effective resource management is really effective people management. This is true everywhere in the world.

Philippine government agencies have been relatively ineffective in controlling dynamite fishing for the very reasons cited above. Yet it is known that the vast majority of fishers oppose the use of explosives and understand that it causes long-term damage to the fisheries; but as individuals they feel helpless to try controlling this practice. However, where individuals such as these have been organized and assisted by their local government to take cooperative action against dynamite fishing, success has been uniformly high.

Recognizing that fishers are the real day-to-day managers of fisheries resources and organizing them at the village level to take positive steps in resource management are important roles for the government. Development nongovernmental organizations (NGOs) that can assign full-time workers at the village level are usually more effective than their government counterparts who can only make periodic visits.

Role of Tenure

Providing an individual or a group with secure tenure over a part of the resource (either physical possession or the right to beneficial use) serves both to restrict access and to encourage greater concern for improved resource management, although the provision of tenure *per se* does not guarantee better resource management. Providing tenure also carries with it the potential for abuse if control of the resource becomes concentrated in the hands of a few "lords of the sea", as suggested by Christy (1982). The history of mangrove utilization in the Philippines provides some interesting examples of the various roles tenure can play.

Prior to 1975, mangrove areas could be alienated for fishpond development and titled. Since then, the government has only leased areas up to 50 ha to individuals

and 500 ha to corporations. About half of the Philippines' 450,000 ha of mangrove forests have thus been cleared for development of an estimated 220,000 ha of fishponds. Some 131,000 ha (59%) of mangrove-derived fishponds are now privately held (Camacho and Malig 1988).

The release of mangrove areas for fishpond development continued through 1988 and sparked many protests by communities of small-scale fishers and mangrove users who wished to retain the forest. They seemed to understand and appreciate the valuable contributions made by mangroves to coastal fisheries long before the scientific community did. Ironically, it was impossible then to get a 25-year renewable lease agreement over a mangrove area unless one planned to destroy the forest to create a fishpond. The government refused to issue a similar lease to anyone who wished to conserve the forest under a sustainable use system.

In 1981, under Presidential Proclamations 2151 and 2152, some 79,000 ha of the best remaining mangrove forests were unilaterally declared as mangrove wilderness (4,500 ha) and forest reserve (74,500 ha) by the government. Communities that had in many cases used these forests sustainably for generations were ordered by the government to stop. This "do not touch" policy could not be enforced and the *de facto* open access prevailed. Traditional use continued within the proclaimed areas, as did illegal fishpond development.

These policies led to situations where communities of mangrove users were faced with the imminent loss of their mangrove forests to a wealthy fishpond developer from outside the community. As their pleas to preserve the forest had been ignored by the government, they cleared the forest to create their own fishponds in an attempt to retain control over their traditional mangrove areas using the only means that the government would recognize with secure tenure. Few of these ponds ever

produced as much as the mangrove areas that were destroyed.

While the major destructive force in mangroves has clearly been fishpond development and a significant proportion of the existing fishponds on government land has been developed illegally, few cases have been successfully prosecuted by the government. Conversely, there have been many successful prosecutions for small-scale mangrove firewood harvest, a practice that represents sustainable use in most instances.

In 1990, the government altered its policy and began to grant traditional small-scale mangrove users secure tenure over existing mangrove forest areas, provided they maintained the area as forest. The tenure instrument is the Mangrove Stewardship Agreement, a 25-year renewable lease. Where this approach has been implemented with community organization and training in simple forest management techniques, overharvesting for fuelwood has been eliminated, the forests are recovering and their contribution to coastal fisheries is increasing.

Tenure can be a useful tool to restrict access and provide a sense of ownership which can be a strong incentive for resource users to assume greater responsibility in management. Tenure, however, should not be awarded in isolation but rather in the context of an existing community management system or one under active development.

Equitable Allocation of Fisheries Resources

The Philippines has a large number of artisanal fishers who depend on coastal resources for their livelihood but their role in the economy often seems little appreciated by the national government. The perception exists that artisanal fishers do not contribute significantly to national

(big city and/or export) markets, which are better served by industrial fisheries and large-scale aquaculture. This viewpoint persists despite statistics showing that artisanal fishers routinely take 60-70% of capture fisheries harvest, including, for example, most of the sashimi-grade tuna for export, and that aquaculture production on average is well below international standards. This bias is expressed in many ways; several will be described briefly below.

1. The 1975 fisheries law (Presidential Decree 704) granted municipal governments jurisdiction over municipal waters (3 nm or 5.6 km) but few specific mechanisms to exercise that jurisdiction. The same law authorized the national government to issue industrial fishing licenses for use in waters 7 fathoms and deeper. A depth of 7 fathoms invariably falls within municipal waters. This overlapping authority diminished the role of the local government and served to heighten the conflict between artisanal and industrial fishers. The Local Government Code (LGC) of 1991 now allows municipal governments to ban commercial fishing within their waters but effective enforcement remains a problem.
2. The national government has apparently been reluctant to limit industrial fishing, possibly due to a concern that fish supplies in urban markets might be adversely affected. *Muro-ami*, a fishing method proven to destroy coral reefs, was banned only after a lengthy fight; the use of fish attracting devices (*payao*) that contribute to commercial overfishing (Floyd and Pauly 1984) remains uncontrolled; and drift nets that take porpoises, small whales and sea turtles in addition to tuna are being promoted locally although banned internationally. This

is happening despite evidence of widespread overfishing and data indicating that commercial fishing fleet horsepower should be reduced by 55% (Dalzell et al. 1987).

3. Coastal resources management problems are further exacerbated when the legal system fails to perform equitably due to pressures from vested interests usually those in high places with financial investments in industrial fishing, aquaculture or illegal fishing. Nothing is more discouraging to a community striving to protect its fisheries resources than to have clear-cut violations go unprosecuted or strong cases dismissed for lack of interest on the part of government personnel.

Artisanal fishers deserve their fair share of fisheries resources. A great number of lives are affected when government action (or inaction) denies this. Doubling the 2-kg average daily catch of an artisanal fisher with no corresponding increase in effort will more than double his net income. This can have a profound effect on family life and can be achieved within months after illegal fishing is stopped and commercial fishing kept at least 5 km offshore. Moreover, most of the artisanal harvest already finds its way into commercial marketing channels so big city fish supplies need not be adversely affected.

The constitutional mandate that gives preference to subsistence fishers has several possible implications. It can serve as an effective check on the concentration of resource access control in the hands of a few. However, it could also result in perpetual poverty for fishers who would presumably lose their preferential rights to access as soon as their incomes rose above the subsistence level. Without preferential access, their income could be expected to fall again.

New Approaches

In the mid-1990s, several projects began to work with Filipino fishers to develop community-based management systems for coastal resources. The intent of each was to initiate the move away from *de facto* open access by encouraging coastal communities to establish various territorial use rights in fisheries (TURFs) (Christy 1982). Fishers were accepted as the day-to-day managers of the resource, access was limited and fishers themselves made decisions on equitable access.

The Marine Conservation and Development Project (MCDP) of Silliman University worked with three small island communities in the central Philippines to develop a common property management regime for their coral reefs (Anon. 1986; Savina and White 1986). The community was organized to protect all of its reefs from destructive practices and to establish a marine sanctuary closed to all forms of exploitation on 10-15% of the reef area. This combination had produced a doubling of reef fish harvests over five years in an earlier pilot project at Sumilon Island (Alcala 1981, 1988). Although the formal project lasted only two years, the common-property management regime established at each island has persisted. In two cases, the protected reefs form the basis for an active tourist industry that also benefits island residents. The use of full-time community organizers who lived on the island and assisted residents to develop resource management capability was a key element in this success.

The Central Visayas Regional Project (CVRP) was a World Bank-assisted government project designed to assist coastal communities to develop integrated coastal resources management systems under a combination of common-property and private-property regimes. Again, full-time development workers living in the village were a key factor in establishing commu-

nity trust and management regimes. The entire fishing community was organized to protect their coastal area from illegal fishing and habitat-destructive practices. Subgroups managed mariculture activities and deepwater fish attracting devices (*payao*) using only handlines. Families controlled individual mangrove areas, artificial reef clusters and certain mariculture activities. Details of this project are reported in Bojos (this vol.).

A third example of community-based coastal resources management is the San Salvador Island Project of the Haribon Foundation in Masinloc, Zambales. Coastal residents were organized to control illegal fishing and other coral-destructive practices. Training was given in the capture of aquarium fish with hand nets as an alternative to the use of cyanide. The community established a marine sanctuary. This combination of activities resulted in a demonstrable increase in yields of artisanal fishers.

The MCDP, CVRP and the San Salvador Project were all successful in demonstrating that coastal communities could be organized to develop effective common-property and private-property management regimes that complimented the legally mandated state-property management regime. These three projects, however, were constrained by policies of the state-property management regime and the perception that the communities and projects were encroaching on the turf of the national agencies responsible for resource management. For example, of the 30 municipal marine sanctuaries established under the MCDP and CVRP projects, none ever received the national approval required under the fisheries law. Fisher groups and local government officials continue to enforce the local rules governing most of these sanctuaries, although under the fisheries law the local officials can be held legally liable for enforcing regulations not approved by the national government. Similarly, repeated requests for a national regulation to allow

the licensing of artificial reef clusters to restrict access and prevent overfishing have not received a favorable response.

Enactment of the LGC provides the potential to solve many of these problems as it transfers control of most fisheries resources up to 15 km from the coastline from the national government to local governments. This is in part a legislative response to the perceived failure of the nationally run state-property management regime to protect the interests of artisanal fishers. While the management regime under the LGC is still technically one of state property, the decisionmaking process has been brought nearly to the level of the resource user. This bodes well for the establishment of what are effectively common-property and private-property management regimes under the local government. Under a municipal ordinance, local governments may now, for example, establish municipal marine sanctuaries or license artificial reefs.

Role of the National Government

If resource users rather than the government are the real day-to-day managers of coastal resources, then it is incumbent upon the government agencies entrusted with resource protection and management to be more developmental than regulatory in their approach. They should encourage and assist communities to build their capability to effectively manage their resources. This is true of industrial as well as artisanal fishers. Difficult decisions on access limits must be made and are best done by organized and informed groups of resource users. The major challenge to the government then is to support local communities and other fishing groups to move away from *de facto* open access to whatever combination of sustainable management regimes is suited to the particu-

lar community and the resources available to them.

Some specific national government actions would include the following:

1. Accept that there are limits to natural production and a corresponding need to harvest within sustainable limits.
2. Gather and analyze adequate data to regularly assess the status of the resources and provide direction for management policies and activities.
3. Reduce the number of commercial fishing vessels licensed by the national government and make their licenses area- and gear-specific.
4. Make the legal system work. It is not enough to have laws and organized communities to apprehend offenders. The process must follow through to conviction and penalty when necessary.
5. Assist municipal fishers to organize and assume control over their fisheries resources. Development NGOs are well suited to help with this task. Assist every municipality to develop a municipal fisheries ordinance that provides for effective and equitable fisheries management.
6. Support implementation of the LGC because it complements community resource management.
7. Control water pollution to maintain coastal productivity. This can be effected through the application of an environmental impact assessment system.
8. Develop good working relationships with coastal communities and encourage them to assist the government in the protection of endangered species, such as sea turtles and *dugong*.
9. Carefully monitor resource management projects and practices and learn from the observed successes and failures.

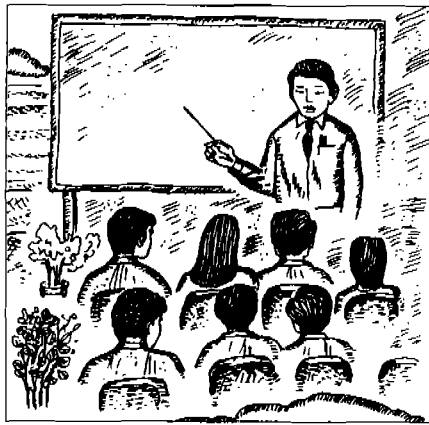
Two recent Philippine examples that seek to implement this approach are the enactment by Congress of the National Integrated Protected Area System (NIPAS) in 1992 and the establishment of DENR's Coastal Environment Program (CEP) in 1993. The NIPAS law accepts that people live in and around declared protected areas; recognizes their tenure; and seeks to involve them in protection and management. It calls for the establishment of a Protected Area Management Board for each area and ensures that local representation will be prominent. The NIPAS law also provides a sound legal basis for the establishment of community and private-property management regimes as a part of the park management plan to protect core areas.

The CEP consolidates all of DENR's coastal related activities. It stresses the management of coastal habitats by coastal communities under NIPAS or municipal-level projects. Major objectives are to bring most of the remaining mangrove forests under community management as well as to assist coastal residents to protect and manage major coral reef, seagrass and soft-bottom environments using the philosophy and approaches discussed above.

In summary, the government can play an effective role in coastal resources management at the national and local levels by supporting the development of effective management regimes by resource users. Three key factors must guide this process: (1) the recognition of limits on natural production; (2) the need to restrict access to sustain production; and (3) the provision of equitable access consistent with the socioeconomic situation in the country.

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Frameworks for Understanding Resource Management on the Commons

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Common-Property Resource

Berkes et al. (1989) defined common-property resources as "a class of resources for which exclusion is difficult and joint use involves subtractability" (see also Oakerson 1986; Ostrom 1986; Feeny et al. 1990. E. Ostrom instead used the term common-pool resource; see Ostrom 1990, Ostrom et al., in press). Most marine resources fit this definition. For migratory species, the problems of defining boundaries or excluding potential users (harvesters) of the resource are obvious. Exclusion is also problematic for more sedentary resources such as lobster. In addition, as is well known in the fisheries literature, the effort of one fisher may affect the current productivity of another as well as the future productivity of all fishers through its

effects on the stock of fish. Subtractability (or rivalry) is thus a salient characteristic of most marine resources.

Similarly, upland resources suit the definition. The physical nature of forests is such that exclusion is costly. In addition, at least some uses are competitive. Clearing swidden cultivation and logging may promote soil erosion and a deterioration in water quality downstream.

The definition of a common-property resource implies two major classes of management issues. First, mechanisms to regulate access to the resource to handle the exclusion problem, are needed. Second, the level of exploitation among authorized users must be regulated to deal with the subtractability or rivalry problem. Thus, any successful management regime will have to address these two fundamental problems.

The Four Pillars

Common-property resources are managed within the context of a larger economy. Until recently the literature in economics presumed that such a system could be adequately described by specifying three major categories of variables: resource endowments, preferences and technology. Now that it has come to be understood that the complex nature of institutional arrangements in general and property rights, in particular, need to be described, a fourth pillar, institutions, should be specified (Feeny 1988b; V. Ostrom et al. 1988; North 1990).

Resource endowments refer to the land, labor and capital (both human and physical) available for use in economic production. Resource endowments include the nature of the climate, topography and other important elements of the ecosystem.

Preferences refer to the goals of the exploiters of the resource. What are the resource users trying to achieve? How do they rank desired outcomes? What are their tradeoffs among competing and sometimes conflicting goals?

The third basic component of any economic situation is technology. It describes the array of production possibilities. Technology includes information on how to combine inputs to produce outputs. Technology reflects knowledge accumulated over time, including both the formal scientific and experiential types. Changes in technology, such as the introduction of chain saws or trawlers, clearly have the potential to affect resource management.

The first three pillars, resource endowments, preferences and technology, are important in shaping the possibilities for economic activity. However, to understand the operation of the economy, it is important to describe the overall institutional structure of the society and economy. Although the outcomes depend on the amount and nature of the resources available,

they are also contingent on the "rules of the game" — institutions.

There are three basic categories of institutions: constitutional order, institutional arrangements and normative behavioral codes (Feeny 1988b). The constitutional order refers to the fundamental rules about how society is organized — the rules for making rules. Institutional arrangements are created within the rules specified by the constitutional order. These arrangements include laws, regulations, associations, contracts and property rights, a key topic of this paper. Normative behavioral codes refer to the cultural values which legitimize the arrangements and constrain behavior. Normative behavioral codes also include the conventional wisdoms of society about how things work. The constitutional order and normative behavioral codes evolve slowly; institutional arrangements may be more readily modified.

Together, the four pillars affect the possibilities for the evolution of technology and institutions. Nevertheless, the normative behavioral codes and existing institutional arrangements may be the facilitators or inhibitors of the creation of new institutional arrangements to improve resource management on the commons (Feeny 1988b; Buck 1989; Ostrom 1990).

Property Rights and Property-Rights Regimes

A key set of institutional arrangements is a system of property rights. Property rights are a key element in the description of any situation involving common-property resources. Property rights assign benefit (and cost!) streams derived from the utilization of a resource.

In general, "property as a social institution implies a system of relations between individuals....it involves rights, duties, powers, privileges, forbearance, etc., of certain kinds" (Hallowell 1943). Property

rights are then a bundle of characteristics: exclusivity, transferability, inheritability, alienability and enforcement mechanisms (Hallowell 1943; Alchian and Demsetz 1973; Barzel 1989; Schlager and Ostrom 1992). Property rights define the uses which are legitimately viewed as being exclusive and who has these exclusive rights. Rights also have a temporal dimension comprising the present and future. The Institutional arrangements include mechanisms for defining and enforcing rights, consisting of not only formal procedures but also social custom and the legitimacy and recognition of rights (Hallowell 1943; Taylor 1988). Enforcement depends on a constellation of supporting arrangements and mechanisms including courts, police, financial institutions, the legal profession, land surveys, resource management authorities, record-keeping system and titling agencies in addition to the social legitimacy of property rights.

There are four basic categories of property rights for common-property resources: none (or open access), communal, private and state (or crown) (Berkes et al. 1989; Feeny et al. 1990).¹ Under open access, rights are left unassigned. The lack of any exclusivity implies the absence of an incentive to conserve, and therefore often results in degradation of scarce resources. Until recently, most marine resources outside of 3-, 12-, or 200-mile coastal zones were effectively held in open access. Forest resources have often been treated similarly.

Under communal property, exclusive rights are assigned to a group of individuals

(Bromley and Chapagain 1984; NRC 1986). The group excludes others from harvesting the resource and manages its use among members of the group. This type of property-rights regime was common among traditional artisanal fishing communities and is found in a number of contemporary coastal fisheries throughout the world, including Atlantic Canada, Japan and Micronesia. Many village woodlots have also been held as communal property.

Under state property, resource management is under the authority of the public sector who regulates both access and utilization. The regulation of fishing in national waters and tree cutting in state forests are examples.

In private property, an individual (or household) is assigned the rights. In the context of fisheries, aquaculture is often conducted under private-property rights. Similarly, in the context of the uplands, crop lands are often held as private property.

All or some of these categories of property rights may exist in a single society for different tracts of land or resources. Furthermore, there are circumstances where the same resource can be categorized under more than one regime. For instance, exclusive rights to crop production may be assigned to individuals while grazing rights are communally held by members of a village. Likewise, fishing rights may be held communally while navigation rights over the same body of water are characterized by open access. Thus, property rights for upland and marine resources are often layered in space and in many cases staggered in time. Although in practice, resources are often held in overlapping categories of property rights, it is nonetheless important to distinguish the resource from the property-rights regime in which it is held and also to describe the nature of the property-rights regime accurately.

Moreover, it is essential to distinguish *de jure* property rights from *de facto*. Many

¹The term "common property" sometimes refers to that classified as communal in the system used here, but also applies to open-access situations. More generally, common-property refers to situations wherein exclusion is difficult and use involves rivalry. To avoid confusion, group ownership is therefore labelled as communal, rather than common-property rights. For more on these distinctions, see Berkes et al. (1989) and Feeny et al. (1990). E. Ostrom (1990) preferred common-pool resource instead of common-property resource, and common property, rather than communal property.

common-property resources are classified as state property, their *de jure* designation. In practice, however, access is often left unregulated and *de facto* the resource is held in open access. In other cases, resources held as state property are in fact available for expropriation by privileged friends of those in power while the coercive power of the state is used to exclude ordinary citizens.

Framework for the Analysis of Common-Property Resource Management

Oakerson (1986, 1992) specified a simple framework around which one can organize information about any management regime for common-property resources. The original framework was comprised of four elements: the technical and physical nature of the resource; the decisionmaking arrangements; patterns of interaction; and outcomes. More recently, a fifth element (in part based on the work of James T. Thomson), the nature of the social and economic context, has been added to complement the information in the first category, the technical and physical nature of the resource. The framework closely parallels the four pillars described earlier. Each category will be described in turn.

Physical attributes of the resource and nature of technology

This category describes the resource endowment and technology. It gives information on the capacity of the resource system; its boundaries; the nature of the technologies available for its exploitation; the natural rate of reproduction or renewal of the resource; and the physical ease or difficulty of regulating access to the resource.

Nature of social and economic context

This category includes information on preferences and institutions that pertain to the resource, as well as social norms and cultural endowments. Is the nature of the society such that it is easy or difficult to organize resource users? What is the nature of markets for the produce derived from exploiting the resource? Do fishers sell their output for local consumption or to an export market? Clearly, the size of the market may affect the incentives for harvesting the resource.

Decisionmaking arrangements

This category describes the institutional arrangements that govern access to and the utilization of the resource. The decisionmaking arrangements include mechanisms for dispute settlement and enforcement. The arrangements may involve multiple levels of authority consisting of local, provincial and national.

Patterns of Interaction

Given the information on the physical nature of the resource; the nature of the social and economic context (including the size and nature of the market for the products derived from exploiting the resource); and the decisionmaking arrangements that influence individual behavior — what strategies do individuals adopt? Do they cooperate to manage the resource on a sustainable basis? Or do they free ride on the restraint of others and violate communal agreements governing resource use?

Outcomes: efficiency, equity and sustainability

A number of useful (and for the most part not mutually exclusive) criteria can

be used to evaluate outcomes. Among them are economic efficiency, equity and sustainability. (Of course each of these has a variety of definitions).

The framework proposed by Oakerson (1986, 1992) can be used to describe a resource management situation at a point in time. It can also be a diagnostic tool to identify the elements in a situation that might be associated with unfavorable outcomes. In this context, it can be "back solved" from outcomes to underlying characteristics (examples of this type of analysis are provided in Ostrom 1990). Finally, the framework can be used iteratively over time to help understand the evolution of resource management systems (Thomson et al. 1992).

Propositions from "the Tragedy of the Commons"

Our understanding and analyses of common-property resources, in the natural and social sciences and in the formulation of public policy, have been profoundly influenced by a set of germinal papers including those by Gordon (1954), Scott (1955) and Hardin (1968).

In the conventional wisdom derived from Hardin, Gordon and Scott, it is argued that all resources held in common will inevitably suffer overexploitation and degradation. This prediction was based in part from a confusion of open access and communal property. The conclusion was also inferred from an appreciation of the implications of subtractability. Users of the resource would collectively be better off if they all exercised restraint; any given individual, however, could do better for himself by cheating on the collective agreement.

In Hardin's tragedy of the commons (TOC) version of the conventional wisdom, there are two basic solutions to the problem: the transfer of the resources either to pri-

vate property or to government control (Hardin 1978; Bajema 1991).

Emerging Themes

A number of recent works, however, question the predictions of Hardin's TOC approach concerning the fate of common-property resources, e.g., NRC (1986); Berkes and Feeny (1990); Feeny et al. (1990); and Bromley (1992). The empirical record is far from unequivocal. Although overexploitation and degradation have occurred, their incidence is not exclusive to situations of communal property or open access as implied by the TOC argument; degradation has also happened under private- and state-property regimes. Similarly, successful resource management is found under communal, private- and state-property rights regimes. Apparently the TOC argument is oversimplified. Evidences from a voluminous case study literature, recent experimental studies and theoretical developments all serve to qualify and enrich the simple propositions embodied in the TOC approach.

This body of evidence will be discussed briefly in an effort to examine important and sometimes overlapping categories of assumptions that underlie the TOC and Gordon-Scott (G-S) approaches about individual motivations; characteristics of individuals; nature of existing institutional arrangements; interactions among users of the resource; the ability of users to create new institutional arrangements; and the behavior of regulatory authorities.

It is important to describe the explicit and implicit assumptions made in both the germinal work of Gordon and Scott, and Hardin. In the TOC/G-S model, resource users are assumed to act as if they were profit-maximizing firms. In their model, resource users (or firms) are essentially identical — firms are homogenous and lack distinguishing characteristics. The classic

TOC/G-S model also assumes open access to the resource for all. Property rights are not allotted and property rights to harvest of the resource stock are assigned only by "law of capture". Furthermore, individuals (firms) are assumed to have no direct contact or interaction with each other and to be powerless to alter the institutional arrangements to affect the outcome. In this setting, as the incisive analysis of Gordon, Scott and Hardin demonstrates, each resource user will take into account only his own marginal costs and revenues and ignore the fact that increases in his harvest affect the efforts of other resource users (as well as perhaps the health of future stocks of the resource).

Individual motivations

One way to characterize the TOC/G-S argument is that individuals are assumed to be myopic, oriented only to short-term gains. This conclusion results from the assumption of profit maximization, open access and law of capture which implies that it is individually rational to ignore the effects on others or the future. In such an environment, people act as if their motivation was short-term gain even if that is not an accurate description. Thus, the argument in the TOC/G-S approach that resource users behave myopically springs from assumptions concerning the institutional environment as well as the underlying motivations of the users themselves. It is, however, clear that even when individuals are operating in environments such as the one presumed by TOC/G-S, they are aware of the effects of their current actions on others and the intertemporal nature of resource management.

Furthermore, their motivations are not accurately described as profit maximization. The standard economic theory of the firm is overly restrictive (Charles 1988). As was discovered decades ago in the labor eco-

nomics literature and even more forcefully in the development economics literature, utility rather than profit maximization often provides more powerful insights and analysis in situations in which there is no clear separation between the household and the firm (Singh et al. 1986; De Alessi 1990). Thus, resource users have preferences for leisure that affects labor supply. The concept of the household-firm in which production and consumption decisions are interdependent is applicable.

Resource users also have nonpecuniary goals and preferences including an appreciation of the aesthetics of the environment (Karpoff 1985; Charles 1988). Such preferences have important implications; e.g., a willingness to sacrifice some monetary gains for nonpecuniary rewards (De Alessi 1990; Becker 1993). Thus, higher incomes are traded off for the enjoyment of the livelihood and the lifestyle.

Finally, altruistic motives are also relevant. Cultural norms, ideology and value systems appear to affect the degree of free riding (e.g., Andreoni 1988; Buck 1989; Feeny 1992). Evidence for altruism (in the context of the social sciences defined as failing to act in one's own narrow self-interest) must be interpreted carefully and in a balanced fashion. Complete free riding appears to be uncommon; but so is its complete absence. Social norms matter but may be insufficient to eliminate or control free riding when an enforcement mechanism is lacking. Nonetheless, self-interest does not appear to account for all behavior.

Characteristics of Individuals

In the TOC/G-S approach, individuals are assumed to be identical; firms are homogeneous and therefore interchangeable. This assumption greatly simplifies the analysis and was an important part of the original demonstration by Gordon and Scott of the

incentives for economic overexploitation in situations involving open access and therefore free entry. As a description of the nature of individuals and firms involved in the exploitation of the resource, however, the assumption of homogeneity is often inaccurate and sometimes misleading. There are often considerable differences among individuals and firms in terms of the size and scope of their operations; their abilities, education and experience; the degree of their lifetime commitment to the industry; their preferences over nonpecuniary aspects of their employment; their cultural values; and the technologies they employ. This heterogeneity has important implications for political economic analysis and the effects of regulation (Johnson and Libecap 1982; Karpoff 1987; Hackett 1992).

Nature of existing institutional arrangements

The germinal analyses of Gordon, Scott and Hardin assumed an open-access, free-entry and free-exit regime. The assumption of the lack of property rights, formal or informal, was crucial for obtaining strong unambiguous predictions concerning outcome — the eventual degradation of the resource. Much of the subsequent literature derived from the G-S model and TOC approach assumed either open access or state property. The standard literature has typically focused on only two property regimes and thus has limited relevance in a variety of other commonly found institutional environments (e.g., Barzel 1989; Schlager and Ostrom 1992).

Yet before the modern era of powerful governments, many fisheries were subject both to formal and informal property-rights systems and regulations. Typically, traditional hunting and gathering groups defined and enforced exclusive harvesting zones. In addition, customs served to regulate intragroup use and when coupled with

ethical norms that stressed sharing and cooperation, limited exploitation to sustainable levels. A similar story can be told for many upland resources.

In modern times, however, virtually all resources are *de jure* subject to state regulation. Thus, the descriptive accuracy of the assumption of open access is sharply limited. Furthermore, the analytical implications of the assumption are potentially misleading.

In addition, *de facto* there are often systems of informal communal property rights. The informal and formal communal property rights systems as well as private and state property serve to limit entry into the exploitation of the resource. Free entry is not an accurate description. Neither is free exit. In many cases, resource users have invested heavily in industry-specific human and physical capital which are not readily transferred to other industries.

The TOC/G-S approach argues that the free rider problem is so severe that users will be unable to organize effectively to coordinate strategies or provide enforcement mechanisms. It is assumed that agents ignore the actions of others in formulating their own strategies. There are, however, many counterexamples. Fishers are able to communicate with each other and devise cooperative strategies. Similarly, a number of informal and formal enforcement mechanisms have been observed. In the Maine lobster fisheries, violations of informal private property rights to harvesting sites are met with gear destruction (Acheson 1989). More severe social sanctions and violence follow when milder sanctions are insufficient to enforce property rights and harvesting regulations.

Interactions among resource users

The metaphor used by many to summarize the TOC/G-S argument is the single-period

prisoner's dilemma (PD) game.² In the PD game, defection is the dominant strategy and thus overexploitation of common resources is the prediction, even though both agents would be better off by cooperating. Hardin directly appealed to this argument in developing his prediction. The relevance of the single-period PD is, however, limited. First, resource management problems are usually multiperiod ones. Thus, the game is played more than once, allowing scope for viable cooperative strategies to avoid the "tragedy" (e.g., Godwin and Shepard 1979; Kreps et al. 1982; Berkes and Kence 1987). In theoretical and simulation studies, tit-for-tat has proven to be a robust strategy which resists challenge from others. (In a tit-for-tat strategy, a player cooperates unless another defects. In the event of defection, the player defects on the next round of play to punish the original defector, and then resumes cooperative play.) Furthermore, Hirshleifer and Rasmusen (1989) demonstrated that in a finite-period game, just a little morality, enforced for instance by social ostracism, is enough to make cooperation a dominant strategy. Thus, the multiple-period context of many common-property resource management situations provides scope for learning and the evolution of rules and new institutional arrangements that convert the stark

²In the basic PD game, each of the two players can cooperate or defect. In the original formulation, the prosecuting attorney has sufficient evidence to convict two prisoners of a petty crime but lacks sufficient evidence without a confession to obtain a conviction for a more serious crime that he is sure they committed. The attorney interrogates the suspects separately, offering a 1-year sentence each if both do not confess; 3 months for the person who confesses and 10 years for the other who does not; and 8 years each if both confess. In the context of fisheries, if both players cooperate, for instance to restrict their catch, they would both receive a payoff of 5, 2 if they both defect (refuse to restrict their catch); and if one defects while the other cooperates, 8 for the defector, 1 for the cooperator (Luce and Ralffa 1957).

defection-dominates-prediction of the single-period PD game into one in which cooperation is a viable approach.

Ability to create new institutional arrangements

In the TOC/G-S approach, resource users are powerless to create new arrangements to prevent the demise of the resource. The costs of creating and operating new institutions are indeed important (Johnson and Libecap 1982; Rose 1991). The creation and operation of these new institutions is indeed a form of collective action and subject to free-rider problems. Nonetheless, agents are sometimes able to alter the set of institutional arrangements to create new forms that better address their resource management problems. Inshore fishers are capable of innovating new arrangements (Berkes 1985; Pinkerton 1989). An important factor that affects institutional innovation by resource users is the nature of the political system. Japanese fisheries law legitimizes communal ownership of inshore fisheries by village-based cooperatives. Turkish fishers are able to exploit the laws on cooperatives to obtain exclusive and enforceable rights to lagoon fisheries. In contrast, long-standing communal property rights without formal recognition have often been insufficient to prevent incursions as in the case of the displacement of artisanal fishers by trawlers in Northeast Brazil (Cordell and McKean 1992) and the demise of informal ethnic management of the California fisheries (McEvoy 1988).

Behavior of regulatory authorities

There is no explicit model of regulatory behavior in the G-S model. The normative criterion used in the G-S approach to evaluate the effects of policy is one of maximizing net social benefits. There is, however, an implicit model of behavior

for regulatory authorities in Hardin's TOC approach. The implicit assumption is that regulators will act in the social interest — that state property will be managed in the public interest.

A large number of case studies, however, provide evidence to the contrary. Efficiency or social justice does not appear to have been the objective of many regulatory initiatives. In fact, the use of state power to convert *de facto* communal property into *de jure* state property, but *de facto* open access, has contributed to the decline of fisheries and upland resources in many jurisdictions. Similarly, the damages imposed by the unregulated use of air, land and water resources in the interests of industrial and urban users have often jeopardized rural communal management regimes.

A useful analysis of the behavior of regulatory authorities thus requires a detailed description of the legal, political and institutional setting as well as an understanding of cultural attitudes, value systems and conventional wisdom. In addition, the time horizon of officials in regulatory agencies does not, in general, correspond with that of resource users with a life-long commitment to the industry or to the interests of society as a whole. Negative consequences of actions taken by an official today that will become apparent only after he expects to have already left office are unlikely to be given much weight in decisionmaking. Those consequences are, however, often very important both to resource users and the general public.

An important assumption which underlies many regulatory approaches is that resource users themselves, the participants in the industry, are largely ignorant of the ecology of the natural systems which they exploit. It is often assumed that professional managers with training in the natural sciences are needed to formulate policy. Yet by providing little or no incentive for participants in the industry to reveal their

ecological knowledge, a great deal of potentially valuable information, obtained through years of experience and observation, is lost. A number of studies highlight the depth and usefulness of these knowledge bases (e.g., Ruddle and Johannes 1985; Berkes 1989). Although this knowledge is seldom articulated in the language of the scientist or manager, it can importantly complement and sometimes even substitute for scientific studies.

Similarly, the case for professional management and regulatory approaches often places too much faith in the accuracy of the formal scientific knowledge of the resource. In fact, the degree of uncertainty about ecological relationships and population dynamics has sometimes been profound. For instance, precise information on the determinants of fish populations and therefore the effects of human predation is often lacking (Munro and Scott 1985). Regulatory mechanisms which rely on careful fine tuning of the resource stock may therefore be unrealistic.

Predictions and policy implications of the TOC/G-S approach

The TOC/G-S approach predicts the overexploitation of common-property resources. The policy prescription generally inferred from the standard approach is the transfer of the resource to private- or state-property regimes. The conventional wisdom relies on market/government success.

In contrast, the case-study evidence is more agnostic. It recognizes the potential viability of communal, private and state property, as well as the potential for overlapping systems of property rights and co-management. The evidence indicates that private property does not guarantee success and that in addition to government success there is government failure (De Alessi 1990; Feeny et al. 1990; Copes 1992). For instance, a state-property rights regime

in Thai forest lands has not promoted the socially optimal exploitation of the resource (Feeny 1988a). Likewise, private property in the absence of unitization in oil fields has contributed to dramatically inefficient outcomes (Libecap and Wiggins 1985).

Just as evidence from recent case studies casts doubts on the simplistic arguments of the TOC/G-S approach, evidence from controlled laboratory experiments in social psychology, political science and related disciplines questions the approach. Laboratory experimental methods play an increasingly important role in the social sciences. Although case studies can be illuminating and are likely to remain the mainstay of studies on common-property resource management, they do have limitations. The management of common-property resources involves complex interactions among human agents. Modelling such behavior is difficult. In addition, because of the size, complexity and interactive nature of common-property systems, natural experiments are difficult to interpret and hence provide only crude tests. In the naturally occurring settings of case studies, frequently many things change at once, making it difficult to derive unambiguous interpretations concerning underlying causation.

In contrast, laboratory experiments permit more definitive tests of analytical propositions and inductive generalizations (Feeny 1992). Furthermore, experiments may also be used as a simple screening device for the assessment of proposed new institutional arrangements. The argument is that if a new proposal does not work in an ideal controlled environment, it is unlikely to function in practice. (Asymmetrically, the fact that a new institutional arrangement works in a laboratory setting necessarily implies that it will do well under natural field conditions).

Generalizations relevant to common-property resource management have emerged from recent experimental stud-

ies, which include: (1) rules and institutions matter; (2) sanctions and enforcement matter; (3) free riding is important but less than complete; (4) norms and ideology matter; (5) communication matters; and (6) information matters.

One very strong result emerges from the laboratory experimental literature. The rules of the game, institutions, do matter (Smith 1987; Roth 1988). Outcomes differ systematically among experiments in which different rules are deployed. For instance, Ostrom et al. (1992) demonstrated different outcomes in experiments with and without sanctions permitted and with and without communication. Outcomes in settings involving both communication and sanctions are more efficient than those with neither or only one of the two characteristics.

A number of experiments have been designed to test major propositions in game theory and public-goods theory. For example, Isaac et al. (1985) found that although initial voluntary contributions for the provision of a public good were substantial (but below the optimal level), in successive periods, free-riding behavior became more evident. After five periods, the level of voluntary contributions was low, but still greater than zero — free riding was less than complete. Similarly, Kim and Walker (1984) discovered that individuals with high personal pay-offs from the provision of the public good contributed more than those with low pay-offs. Moreover, Isaac et al. (1985) learned that allowing for communication among experimental subjects — thus more closely imitating the natural environment in which most common-property resources are managed — did increase moderately the level of contributions, although the optimal level was still not achieved.

Evidence on the importance of norms and ideology comes from an impressive array of experimental studies in social psychology, sociology, political science and

economics. These studies indicate that free riding is typically less than complete, even in situations involving repeated play and experienced subjects who have had the opportunity to assess the costs and benefits of free riding.³ Mestelman and Feeny (1988) provided results suggesting that ideology ameliorates free riding but does not overcome it.

Again in an experimental context, Cass and Edney (1978) demonstrated that the provision of up-to-date information on the condition of the resource and granting of private territorial usufruct both move the rate of exploitation closer to the optimal level. A number of studies corroborate the importance of communication.⁴

It is possible to synthesize the results of recent analytical, experimental and case study work into prescriptions for policy. A prominent example of such an effort is the derivation by E. Ostrom (1992) of eight design principles for crafting institutions (or rules) for self-governing resource-managing organizations, namely: (1) clearly defined boundaries; (2) congruence between appropriation and provision rules and local conditions; (3) collective-choice arrangements; (4) monitoring; (5) graduated sanctions; (6) conflict-resolution mechanisms; (7) minimal recognition of rights to organize; and (8) nested enterprises. Because the reasoning behind the propositions is discussed elsewhere, these ideas will not be dealt with in detail here.

Conclusion

The assumptions of the TOC/G-S conventional wisdom approach with respect to individual motivations; characteristics

of individuals; nature of existing institutional arrangements; interactions among resource users; the ability of users to create new institutional arrangements; and behavior of regulatory authorities often appear to lack both descriptive accuracy and predictive power. Important lessons from the TOC/G-S approach should not, however, be ignored. In the absence of the ability to exclude others and in the presence of rivalry, the outcome is unlikely to be optimal. Individual self-interest is a powerful force and must be taken into account in devising viable arrangements for the management of common-property resources. Mechanisms need to be incentive-compatible.

Another important theme that emerges from the literature is that the important resource management issue is often not the regulation of utilization of a particular resource but instead balancing the interests of multiple uses and users (Scott 1979; Munro and Scott 1985; Copes 1992). For instance, many fisheries have both commercial and recreational users. In addition, many fisheries share habitats with other uses and users, including hydroelectric power, forestry, irrigation, tourism, navigation and shipping, landfill and harbors. Upland resources are used for agriculture, forestry, habitat preservation, water resources management and others. The context in which resources are managed is substantially more complicated than the simple one pictured in the TOC/G-S approach.

Five key messages emerge from a review of recent theoretical and empirical studies. First, success and failure are not uniquely determined by the system of property rights. Both success and failure have been observed under communal, private- and state-property rights regimes. Second, institutions matter. Third, a key component of successful institutional arrangements is the provision of incentives for cooperation. Fourth, another key element of successful arrangements

³See for example, Cass and Edney (1978); Marwell and Ames (1979, 1980, 1981); Alfano and Marwell (1980); Isaac et al. (1984); Kim and Walker (1984); Andreoni (1988); and Feeny (1992).

⁴See for example, Dawes et al. (1977); Liebrand (1984); Isaac and Walker (1988).

is the ability to enforce collective agreements. Finally, a third characteristic associated with success is the authority and ability to innovate institutional arrangements to accommodate evolving challenges.

These messages have important policy implications. Among these is the importance of local biological, ecological and institutional knowledge. Although general principles and frameworks have broad applicability, the frameworks outlined above also imply a strong and central role for local knowledge concerning the physical nature of the resource; normative behavioral codes; decisionmaking arrangements; and social and economic setting. The support of the human capital capability and social and natural science infrastructure for the accumulation of such local specific knowledge then becomes a key component of any development assistance strategy for common-property resource management.

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Institutional Analysis, Design Principles and Threats to Sustainable Community Governance and Management of Commons

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Institutional Analysis and Development Framework

The Institutional Analysis and Development (IAD) framework is an evolving method for identifying and analyzing interactions between the physical environment and sociocultural and Institutional realms (Kiser and E. Ostrom 1982; E. Ostrom 1986; V. Ostrom 1991; Oakerson 1992; Thomson 1992; V. Ostrom et al. 1993). The framework links the characteristics of a physical world (such as forests) with those of the general cultural setting (the villages and harvesters that use forests); the specific rules that affect the incentives individuals face in particular situations (how forest products can be harvested, utilized and maintained); the outcomes of these

interactions (regeneration or deforestation); and the evaluative criteria applied to these patterns and outcomes (efficiency, equity, sustainability). Common-pool resources (CPRs) share two characteristics of a physical world: (1) it is costly to develop institutions to exclude potential beneficiaries from them; and (2) the resource units harvested by one individual are not available to others. Recent research projects have applied this framework to develop a database on CPRs (particularly irrigation systems and inshore fisheries) located in different regions of the world (Schlager 1990; Tang 1991, 1992; E. Ostrom et al. 1992; Schlager and E. Ostrom 1992). After more than a year's developmental work, we have now designed a new database to record information about forest resources and institutions in

many different countries (E. Ostrom et al. 1993).

Analysis of human actions and consequences frequently starts with a focal arena as shown in Fig. 1. Examples include situations where individuals decide when and how much to harvest of forest products from different locations, whether to establish a forest users' association, or to fence off a particular part of a forest to prevent animals from foraging within. What arena is analyzed depends on the questions of interest to the analyst. The analyst wanting to examine recurrent structures of situations must, however, find ways of separating one situation from another for the purpose of analysis. Further, individuals who participate in many situations must also know the difference among them. The actions that can be taken in harvesting timber are different from those in harvesting thatch or in selling either timber or thatch. An individual who is repeatedly mixed up about what situation he or she is in, is not normally considered competent to take independent actions.

What is distinctive about the IAD framework, when contrasted to frameworks that are closely tied to a single scientific discipline, is that all situations are viewed as being composed of the same set of elements. Thus, while harvesting or marketing timber or thatch differ in many important ways, these diverse situations can all be described by identifying and analyzing how particular elements constituting the situations under analysis lead to the patterns observed. These elements include identifying:

- the participants;
- the positions they hold;
- the actions they can take;
- the information they possess;
- the possible outcomes;
- how actions and outcomes are linked; and
- the benefits and costs assigned to actions and outcomes.

These elements are themselves relatively complex. Many different action situations can be constructed from them. At the same time that the IAD framework stresses a

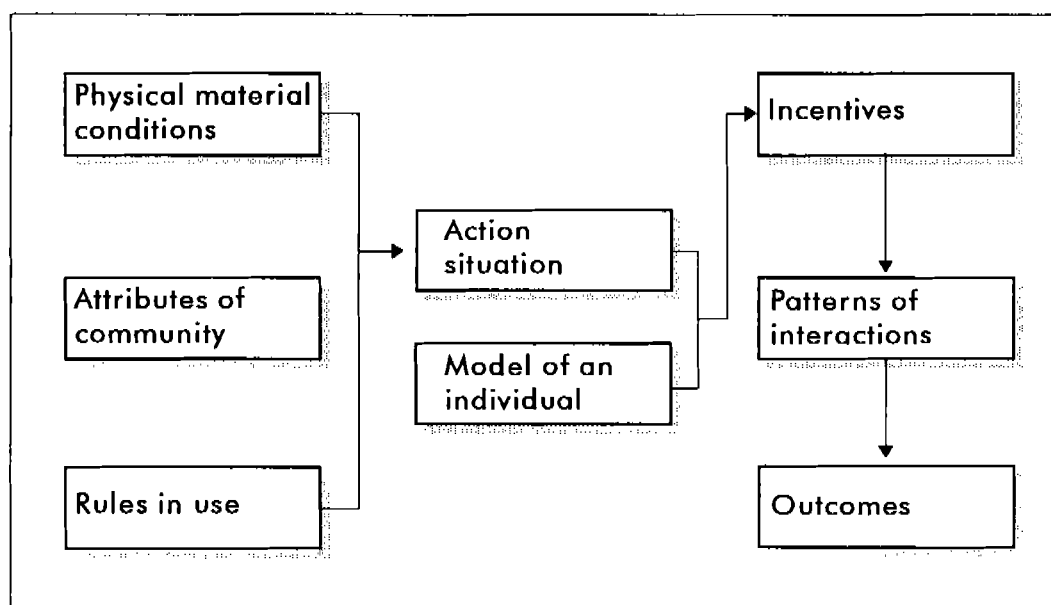


Fig. 1. A framework for institutional analysis.

universality of working parts, it enables analysts to examine unique combinations of these parts. The array of potential outcomes that can be analyzed and evaluative criteria, such as equity, efficiency, sustainability and adaptability, is also very broad. Moreover, these elements are themselves constituted by a deeper layer of attributes about a physical and material setting; the community within which a situation occurs; and the specific rules-in-use that affect the structure of the situation.

Action situations are perceived to be nested within at least three relevant tiers of action. *Operational level actions* are decisions which occur whenever individuals directly affect variables in the world by doing such things as harvesting products, worshipping at a forest shrine, planting seeds, building fences, patrolling the borders of a forest or feeding leaves to their animals. *Collective choice actions* constitute a group's decisions about operational activities, e.g., the actions taken at an annual meeting of a forest users' association to keep a forest closed for the harvest of a particular product except for a specified time. *Constitutional choice actions* are decisions about how collective choice actions will be made. An example is the resolution of a forest users' association to create an executive committee that will meet once a month to determine joint activities to be undertaken. Constitutional choices are frequently made without recognition that they are indeed creating a future structure to make rules about an operational action.

Design Principles of Sustainable Community-Governed Commons

The IAD framework has been an underlying foundation for all of our empirical studies of common-pool resources and common-property regimes. One line of

inquiry that we have pursued over time is the study of long-lasting resource systems that are user-governed. Many of these systems have been studied in depth by perceptive scholars such as Robert Netting, Daniel Bromley, Margaret McKean, Fikret Berkes, David Feeny and others. The resources involved vary from irrigation systems to mountain grazing lands and inshore fisheries. The most notable similarity among them is the sheer perseverance of these resource systems and institutions. The institutions can be considered robust in that the rules have been devised and modified over time according to a set of collective-choice and constitutional-choice rules (Shepsle 1989). In other words, these systems have been sustainable over very long periods of time. Most of the environments studied are complex, uncertain and interdependent where individuals continuously face substantial incentives to behave opportunistically. The puzzle addressed in *Governing the commons* is how the individuals using these systems have sustained them over extended periods of time.

The specific rules-in-use differ markedly from one case to the next. Given this great variation, the sustainability of these resources and their institutions cannot be explained by the presence or absence of particular rules. Part of the explanation for the sustainability of these systems is based on the fact that the particular rules do differ, taking into account specific attributes of the related physical systems; cultural world views; and the economic and political relationships that exist in the setting. Without different rules, appropriators could not take advantage of the positive features of a local CPR or avoid potential pitfalls that could occur in one milieu but not in others.

A set of seven design principles appears to characterize most of the robust CPR institutions. An eighth principle marks the larger, more complex cases. A "design

principle" is defined as a concept used either consciously or unconsciously by those constituting and reconstituting a continuing association of individuals about a general organizing principle. Let us discuss each of these design principles.

Clearly defined boundaries

Individuals or households with rights to withdraw resource units from the CPR and the boundaries of the CPR itself are clearly defined.¹

Defining the boundaries of the CPR and of those authorized to use it can be thought of as a "first step" in organizing for collective action. So long as the boundaries of the resource and/or the individuals who can use it remain uncertain, no one knows what they are managing or for whom. Without defining the boundaries of the CPR and closing it to "outsiders", local appropriators face the risk that any benefits they produce by their efforts will be reaped by noncontributing users. At the least, those who invest in the CPR may not receive as high a return as they expected. At the worst, the actions of others could destroy the resource itself. Thus, for appropriators to have a minimal interest in coordinating patterns of appropriation and provision, they should be able to exclude others from access and appropriation rights. If there are substantial numbers of potential appropriators and the demand for the resource units is high, the destructive potential of all users freely withdrawing from a CPR could push the discount rate toward 100%. The higher the discount rate, the closer the situation is to that of a one-shot dilemma where the dominant strategy of all participants is to overuse the CPR.

Congruence between appropriation and provision rules and local conditions

Appropriation rules restricting time, place, technology and/or quantity of resource units are related to local conditions and provision rules requiring labor, materials and/or money.

Unless the number of individuals authorized to use a CPR is so small that their harvesting patterns do not adversely affect one another, at least some rules related to how much, when and how different products can be harvested are usually designed by the resource users. Well-tailored appropriation and provision rules help account for the perseverance of the CPRs themselves. Uniform rules established for an entire nation or a large region of it rarely can take into account the specific resource attributes considered in designing rules-in-use in a particular location.

In long-surviving irrigation systems, for example, subtly different rules are used in each system for assessing water fees to pay for water guards and maintenance activities, but in all instances those who receive the highest proportion of the water also pay approximately the corresponding share of the fees. No single set of rules defined for all irrigation systems in a region would satisfy the particular problems in managing each of these broadly similar, but distinctly different, systems.

Collective choice arrangements

Most individuals affected by operational rules can participate in modifying them.

The CPR institutions that use this principle are able to tailor better rules to local circumstances since the individuals who directly interact with one another and with

¹This section draws in part on E. Ostrom (1990).

the physical world can modify the rules over time so as to better fit them to the specific characteristics of their setting. Appropriators who designed CPR institutions characterized by the first three principles—clearly defined boundaries; good-fitting rules; and appropriator participation in collective choice—should be able to devise a good set of rules if they keep the costs of changing rules relatively low.

The presence of good rules, however, does not account for appropriators following them. Nor is the fact that the appropriators themselves designed and initially concurred with the operational rules an adequate explanation for centuries of compliance by individuals who were not originally involved in the initial agreement. It does not even sufficiently explain the continued commitment of those who were part of the initial agreement. Consenting to follow rules *ex ante* is an easy “commitment” to make. Actually obeying rules *ex post*, when strong temptations are present, is the significant accomplishment.

The problem of gaining compliance to rules—no matter what their origin—is frequently assumed away by analysts positing all-knowing and all-powerful *external* authorities that enforce agreements. In many long-enduring CPRs, no external authority has sufficient presence to play any role in the day-to-day enforcement of the rules-in-use. Thus, external enforcement cannot be used to explain high levels of compliance. In all of the long-prevailing cases, active investments in monitoring and sanctioning activities are very apparent. These lead us to consider the fourth and fifth design principles:

Monitoring

Monitors who actively audit CPR conditions and appropriator behavior are accountable to the appropriators and/or are the appropriators themselves.

Graduated sanctions

Appropriators who violate operational rules are likely to receive graduated sanctions (depending on the seriousness and context of the offense) from other appropriators, from officials accountable to these appropriators, or from both.

In long-enduring institutions, monitoring and sanctioning are undertaken primarily by the participants themselves. The initial sanctions used in these systems are also surprisingly low. Even though it is frequently presumed that participants will not spend the time and effort to monitor and sanction each other's performance, substantial evidence has been presented that they do both in these settings.

To explain the investment in monitoring and sanctioning activities in these robust, self-governing CPR institutions, the term “quasi-voluntary compliance” (Levi 1988) is very useful. She uses the term to describe taxpayer behavior in regimes where almost everyone pays taxes. Paying taxes is *voluntary* in the sense that individuals *choose* to comply in many situations where they are not being directly coerced. On the other hand, it is “*quasi*-voluntary because the noncompliant are subject to coercion—if they are caught” (Levi 1988). Levi stressed the *contingent* nature of a commitment to follow rules that is possible in a repeated setting. Strategic actors are willing to heed with a set of rules, she argued, when they perceive that: (1) the collective objective is achieved and (2) others also comply. In Levi's theory, enforcement is normally provided by an external ruler although it does not preclude other enforcers.

To explain commitment in many of the cases of sustainable community-governed CPRs, external enforcement is largely irrelevant. External enforcers may not travel to a remote village other than in extremely unusual circumstances. The CPR appropriators create their own internal enforcement to: (1) deter those who are

tempted to break rules and thereby (2) assure quasi-voluntary compliers that others also obey. The Chisasibi Cree, for example, have devised a complex set of entry and authority rules related to the coastal and estuarine fish stocks of James Bay as well as the beaver stock located in their defined hunting territory. Berkes (1987) described why these resource systems and the rules used to regulate them have survived and prospered for so long:

Effective social mechanisms ensure adherence to rules which exist by virtue of mutual consent within the community. People who violate these rules suffer not only a loss of favour from the animals (important in the Cree ideology of hunting) but also social disgrace.

The costs of monitoring are kept relatively low in many long-surviving CPRs as a result of the rules-in-use. Rotation rules used in Irrigation systems and in some inshore fisheries place the two actors most concerned with cheating in direct contact with one another. The irrigator who nears the end of a rotation turn would like to extend the time of his turn (and thus, the amount of water obtained). The next Irrigator in the rotation system waits nearby for him to finish, and would even like to start early. The presence of the first Irrigator deters the second from an early start, and the presence of the second irrigator prevents the first from a late ending. Monitoring is a by-product of their own strong motivations to use their water rotation turn to the fullest extent. The fishing site rotation system used in Alanya, Turkey, (Berkes 1992) has the same characteristic; cheaters are observed at low cost by those who most want to deter another cheater at that particular time and location. Many of the ways that work-teams are organized in the Swiss and Japanese mountain commons also have the result that

monitoring is a natural by-product of using the commons.

The costs and benefits of monitoring a set of rules are not independent of the particular set of rules adopted. Nor are they uniform in all CPR settings. When appropriators design at least some of their own rules, they can learn from experience to craft enforceable rather than unenforceable ones. This means paying attention to the costs of monitoring and enforcing as well as the benefits that those who monitor and enforce the rules obtain.

A frequently unrecognized "private" benefit of monitoring in settings where information is costly is obtaining the data necessary to adopt a contingent strategy. If an appropriator who monitors finds someone who has violated a rule, the benefits of this discovery are shared by all using the CPR, as well as provides the discoverer a signal about compliance rates. If the monitor does *not* find a violator, it had previously been presumed that private costs are involved without any benefit to the individual or the group. If information is not freely available about compliance rates, then an individual gathers valuable data from monitoring.

By monitoring the behavior of others, the appropriator-monitor learns about the level of quasi-voluntary compliance in the CPR. If no one is discovered breaking rules, the appropriator-monitor learns that others comply and no one is being taken for a sucker. It is then safe for the appropriator-monitor to continue to follow a strategy of quasi-voluntary compliance. If the appropriator-monitor discovers rule infractions, it is possible to learn about the particular circumstances surrounding the violation; to participate in determining the appropriate level of sanctioning; and then to decide about continued compliance or not. If an appropriator-monitor finds an offender who normally obeys rules but happens to face a severe problem, the experience confirms what everyone already

knows. There will always be times and places where those who are basically committed to following a set of rules succumb to strong temptations to break them.

A real threat to the continuance of quasi-voluntary compliance can occur, however, if an appropriator-monitor discovers individuals who break the rules repeatedly. If this happens, one would expect the appropriator-monitor to escalate the sanctions imposed in an effort to halt future rule-breaking by such offenders and any others who might start to follow suit. In any case, the appropriator-monitor has up-to-date information about compliance and sanctioning behavior on which to make future decisions about personal compliance.

Let us also look at the situation through the eyes of someone who breaks the rules and is discovered by a local guard (who will eventually tell everyone) or another appropriator (who also is likely to tell everyone). Being apprehended by a local monitor when the temptation to break the rules becomes too great has three results: (1) it stops the infraction from continuing and may return contraband harvest to others; (2) it conveys information to the offender that someone else in a similar situation is likely to be caught, thus increasing confidence in the level of quasi-voluntary compliance; and (3) a punishment in the form of a fine plus loss of reputation for reliability is imposed.

The fourth and fifth design principles—monitoring and graduated sanctions—thus take their place as part of the configuration of principles that work together to enable appropriators to constitute and reconstitute robust CPR institutions. Let me summarize my argument to this point. When CPR appropriators design their own operational rules (Design Principle 3) to be enforced by individuals who are local appropriators or accountable to them (Design Principle 4) using graduated sanctions (Design Principle 5) that define who has

rights to withdraw from the CPR (Design Principle 1) and that effectively restrict appropriation activities given local conditions (Design Principle 2), the commitment and monitoring problem are solved in an interrelated manner. Individuals who think a set of rules will be effective in producing higher joint benefits and that monitoring (including their own) will protect them from being gullible, are willing to make a contingent self-commitment of the following type: *I commit myself to follow the set of rules we have devised in all instances, except during dire emergencies, if the rest of those affected make a similar commitment and act accordingly.* Once appropriators have made contingent self-commitments, they are then motivated to monitor other people's behavior, at least occasionally, to assure themselves that others are obeying the rules most of the time. Contingent self-commitments and mutual monitoring reinforce one another especially in CPRs where rules tend to reduce monitoring costs.

Conflict resolution mechanisms

Appropriators and their officials have rapid access to low-cost, local arenas to resolve conflicts among appropriators or between appropriators and officials.

In field settings, applying rules always involves discretion and can frequently lead to conflict. Even such a simple rule as "Each irrigator must send one individual for one day to help clean the irrigation canals before the rainy season begins" can be interpreted quite differently by various individuals. Who is or is not an "individual" according to this rule? Does sending a child below 10 or an adult above 70 to do heavy physical work meet this rule? Is working for 4 or 6 hours a "day" of work? Does cleaning the canal immediately next to one's own farm qualify for this community obligation? For

individuals seeking ways to slide past or subvert rules, there are always ways to "Interpret" the rule so that they can argue they meet it while thwarting the intent. Even individuals who intend to follow the spirit of a rule can make errors. What happens if someone forgets about labor day and does not show up, or if the only able-bodied worker is sick, or unavoidably in another location?

If individuals are going to follow rules for a prolonged period, a mechanism for discussing and resolving what is or is not a rule infraction is quite necessary to the continuance of rule conformance itself. If some individuals are allowed to free ride by sending less valuable workers on a required labor day, others will consider themselves suckers if they send their strongest workers who could otherwise produce private goods rather than communal benefits. Over time, only children and old people will be sent to do work that requires strong adults and the system will break down. If individuals who make an honest mistake or face personal problems that prevent them from following a rule cannot find mechanisms to make up for their lack of performance in an acceptable way, rules can be viewed as unfair and compliance rates decline.

While the presence of conflict-resolution mechanisms does not guarantee that appropriators are able to maintain enduring institutions, it is difficult to imagine how any complex system of rules could be retained over time without such mechanisms. In the cases described above, these mechanisms are sometimes quite informal and those selected as leaders are also the basic resolvers of conflict.

Minimal recognition of rights to organize

The rights of appropriators to devise their own institutions are not chal-

lenged by external governmental authorities.

Appropriators frequently devise their own rules without having created formal, governmental jurisdictions for this purpose. In many inshore fisheries, for example, local fishers form extensive rules defining who can use a fishing ground and what kind of equipment can be used. So long as external governmental officials at least minimally recognize the legitimacy of such rules, the fishers themselves may be able to enforce them. But if external governmental officials presume that only they can make authority rules, then it is difficult for local appropriators to sustain a rule-governed CPR over the long run. At any point when someone wishes to break the rules created by the fishers, they can go to the external government and get local rules overturned.

Nested enterprises

Appropriation, provision, monitoring, enforcement, conflict resolution and governance activities are organized in multiple layers of nested enterprises.

In larger systems, it is quite difficult to devise rules well-matched to all aspects of the provision and appropriation of that system at one level of organization. The rules appropriate for allocating water among three major branches of an irrigation system, for example, may not be suitable for farmers along a single distributory channel. Consequently, among long-enduring self-governed CPRs, smaller-scale organizations tend to be nested in ever larger organizations. It is not at all unusual to find a larger, farmer-governed irrigation system, for example, with five layers of organization, each with its own distinct set of rules.

Threats to Sustainable Community-Governed Commons

The study of community-governed and managed commons provides evidence of an immense diversity of physical settings and institutional rules relatively well-matched to the local environment. It is important to recognize, however, that not all community-governed CPRs cope effectively with the array of problems they face over time. Some efforts at self-governance fail before resource users even get organized. Others break down within a few years. Others survive for long periods of time but are destroyed as a result of a variety of conditions. One source of failure is institutions that are not characterized by many of the design principles. Earlier studies have shown that small-scale CPRs with only a small number of these design principles are more likely to fail than those that possess a larger number of them.

However, even institutions characterized by the design principles flounder. Thus, we need to speculate about other threats to community governance that arise from field observations, theoretical conjectures and empirical findings of scholars studying small-scale CPRs or related situations. The reader is cautioned that the next two sections are far more speculative in nature than the first two. It is important, however, to share speculations so that further research and analysis can be directed toward improving the knowledge claims of some conjectures and reducing our confidence in others. Here are eight threats to sustainable community governance of small-scale CPRs that I have come across in different contexts:

1. blueprint thinking;
2. overreliance on simple voting rules as the primary decision mechanism for making all collective choices;
3. rapid changes in technology, human, animal or plant populations; factor

availability; substitution of relative importance of monetary transactions; heterogeneity of participants;

4. transmission failures from one generation to the next of the operational principles on which community governance is based;
5. turning to external sources of help too frequently;
6. international aid that does not take account of indigenous knowledge and institutions;
7. corruption and other forms of opportunistic behavior; and
8. lack of: large-scale institutional arrangements related to reliable information collection, aggregation and dissemination; fair and low-cost conflict resolution mechanisms; educational and extension facilities; and facilities for helping when natural disasters or other major problems occur at a local level.

Blueprint thinking

Blueprint thinking occurs whenever policymakers, donors, citizens or scholars propose uniform solutions to a wide variety of problems that are clustered under a single name based on one or more successful exemplars. Korten (1980) called this the "blueprint approach" and made a devastating critique of its prevalence in development work at the end of the 1970s. As he described it:

Researchers are supposed to provide data from pilot projects and other studies which will allow the planners to choose the most effective project design for achieving a given development outcome and to reduce it to a blueprint for implementation. Administrators of the implementing organization are supposed to execute the project plan faithfully, much as a

contractor would follow construction blueprints, specifications, and schedules. An evaluation researcher is supposed to measure actual changes in the target population and report actual versus planned changes to the planner at the end of the project cycle so that the blueprints can be revised.

Korten's critique is just as relevant in the 1990s as it was more than a decade ago.

Even advocates of community governance fall into the trap of blueprint thinking. Whenever a policy is adopted that calls for the creation of large numbers of farmer organizations in a short period of time, there is a potential threat of blueprint thinking. Sengupta (1991), for example, described the efforts of the Sone Command Area Development Agency in India to defend itself against questions raised in 1978 by policymakers as to why one part of its objectives was not being met — "that pertaining to the formation of irrigation associations". The agency then turned to "the Cooperative Department to frame model bylaws for the irrigation-specific cooperatives called Chak Societies" (Sengupta 1991). The model bylaws contained 42 major and several minor clauses, but failed to address how irrigation cooperatives might be similar to or different from those established for other purposes. In the next year, 22 Chak Societies were initiated in the Sone Command area. But few of them performed in the way that policymakers thought they should, and the whole idea of registering irrigation associations using the model bylaws was dropped. The only way to get a large number of organizations set up in a hurry is to have an organizational charter and constitution written for all units. Then one can simply call meetings and have people sign up. Such efforts result in large numbers of paper organizations and little else.

Overreliance on simple voting rules

Closely related to blueprint thinking is the presumption that certain voting rules—either simple majority or unanimity—are the only rules that should be used in making collective decisions. The problem that users face is gaining general understanding of and agreement to a set of rules—not simply having a short discussion and a pro forma vote. The extensive theoretical and empirical studies growing out of social choice theory have demonstrated repeatedly that if the community members are strongly divided on an issue, it is extremely unusual to find any rule that enables them to achieve a final decision that is stable and reflects the preferences of those affected. Substituting a simple majority vote for a series of long discussions and extensive efforts to come close to a consensus before making decisions that commit a self-governing community, may bring leaders to simply arrange agenda so that they win in the short run. As soon as rules are seen as imposed by a majority vote rather than generally agreed upon, the costs of monitoring and enforcement increase. The group has lost quasi-voluntary compliance and must invest more heavily in enforcement to gain conformity.

Similarly, reliance on unanimity prior to major changes may also challenge the long-term viability of a self-governing society. Once formal unanimity is adopted, only one person needs to hold out to delay decisions or impose high costs on almost everyone else. The adaptability of a self-governed system may be too rapid if only simple majority votes are relied upon and too slow if only unanimity is used.

Rapid exogenous changes

All rapid changes in technology, human, animal or plant populations; factor availability; substitution of relative importance

of monetary transactions; or the heterogeneity of participants are a threat to the continuance of any self-organized system whether it is a firm in a competitive market or a community-governed CPR. Individuals who have adapted an effective way of coping with a particular technological, economic or social environment may be able to adjust to slow changes in one or several variables if substantial feedback is provided about the consequences of these changes for the long-term sustainability of the resource and/or the set of institutions used for governing that resource. They may even be able to adjust to changes in these variables that occur at a moderate rate. The faster key variables change and the more variables that change at the same time, the more demanding the problem of adaptation to new circumstances. These kinds of threats are difficult for all organizations. Those that rely to a greater extent on quasi voluntary compliance are, however, more threatened than those who are able to coerce contributions (Bromley and Champagain 1984; Goodland et al. 1989).

Transmission failures

Rapid change of population or culture may lead to a circumstance in which the general design principles of effective community-governed institutions are not transmitted from one generation to another. When individuals substitute rote reliance on formal rules for an understanding of why these rules are used, they can argue on how to interpret the formal rules that undercut the viability of community organization. Relating this back to voting rules, for example, the charter or constitution of a community organization may specify that simple majority rule will be used in making decisions about future projects and how the costs and benefits will be divided. If the founders of such

an organization recognize the importance of gaining general agreement, they will rarely push forward on a large project that is supported by only a minimal winning coalition. In such an instance, there are almost as many community members in opposition as those who support the project. But, if over time, the principle of gaining general agreement to future projects prior to implementation is not conveyed and accepted by those who later take on leadership responsibilities, then decisions receiving only minimal support may be pushed forward. Leaders of communities who rely on minimal winning coalitions for too many decisions, may resort to patronage, coercion or corruption to stay in power rather than depend on a foundation of general agreement.

Similarly, if those who are required to contribute particular resources or refrain from particular actions see these "rules" as obstacles to be overcome, rather than as the written representation of general underlying principles of organization, they may push for interpretations of rules that lead to their general weakening. If each household tries to find every legal way to minimize the amount of labor contributed to the maintenance of a farmer-governed irrigation system, for example, eventually the cumulative effect is an insufficient maintenance effort and the unraveling of the contingent contributions of all. If one family tries to make a favorable interpretation of how much labor they should contribute, given the land they own, others soon discover it and those who would be favored by such an interpretation, begin to use it as well. The total quantity of labor contributed declines. Unless there is a community discussion about the underlying principles that can be used in interpreting rules, practices may evolve that cannot be sustained over time. Then, the danger exists that the unraveling continues unabated until the community organization falls apart.

Turning to external sources of help too frequently

A threat to long-term sustainability can be the availability of funds from external authorities or donors that appear to be "easy money." These can undercut the capabilities of a local institution to sustain itself over time. This is particularly salient in regard to farmer-governed irrigation systems.² Monetary resources for constructing, operating and maintaining irrigation systems are frequently contributed by the taxpayers of the nation in which the irrigation system is located or the taxpayers of those nations providing economic assistance. When these funds are used, the financial connection between supply and use is nonexistent. Whether the resources so mobilized are directly invested in the construction and operation of irrigation systems or are diverted for individual use by politicians or contractors depends on the professionalism of those involved and on active efforts to monitor and sanction diversions of resources. When the farmers themselves are involved in the construction and operation of irrigation systems, they provide low-cost monitoring of how resources for these activities are used. This is lost when the users are not involved in construction or operation. Expensive auditing systems are then needed, but rarely supplied. Consequently, a considerable portion of the mobilized resources is diverted to purposes other than those for which they were intended.

Further, the design of projects is oriented more toward gaining the approval of those who release funds than toward providing systems that solve the problems facing present and future users. To convince politicians that large chunks of a national budget should be devoted to the

construction of irrigation projects, planners attempt to design projects that are "politically attractive." This means that politicians who support such expenditures can claim that the voters' funds are being invested in projects that will produce more food and the cost of living.

International aid that ignores indigenous knowledge and institutions

To convince external funding agencies that major irrigation projects should be funded through loans or grants, the evaluative selection criteria by these agencies have to play a prominent role in project design. Projects designed by engineers who lack experience as farmers or training as institutional analysts, are frequently oriented toward winning political support or international funding. This orientation does not lead to the construction of projects that serve most users (i.e., small-scale farmers) effectively or encourage the investment of users in their long-term sustenance. Inefficiencies occur at almost every stage. At the same time, this inept process leads to the construction of projects that generate substantial profits for large landholders and strong political support for a government.

Processes that encourage looking to external sources of funding make it difficult to build upon indigenous knowledge and institutions. A central part of the message asking for external funds is that what has been accomplished locally has failed and massive external technical knowledge and funds are needed to achieve "development". In some cases, prior institutional arrangements are not recognized at all. This has three adverse consequences: (1) property rights that resource users had slowly achieved under earlier regimes are swept away and the poor lose substantial assets; (2) those who have lost prior

²This and the next two sections draw on E. Ostrom (1992).

investments are less willing to venture; and (3) the status of indigenous knowledge and institutions is generally downgraded.

Corruption and other forms of opportunistic behavior

All types of opportunistic behavior are encouraged, rather than discouraged, by: (1) the availability of massive funds to subsidize the construction and operation of large-scale irrigation projects and (2) the willingness (or even eagerness) of national leaders to subsidize water as a major input into agricultural production. Corrupt exchanges between officials and private contractors are a notorious and prevalent form of opportunism; corrupt payments by farmers to irrigation officials are less well-known, but probably no less widespread. Free riding on the part of those receiving benefits and the lack of trust between farmers and officials, as well as among farmers, are also endemic. Moreover, the potential rents that can be derived from free irrigation water by large-scale landowners stimulate efforts to influence public decisionmaking as to where projects should be located and how they should be financed. Politicians, for their part, win political support by strategic decisions concerning who will receive or continue to receive artificially created economic rents.

Bates (1987) explained many of the characteristics of African agricultural policies by arguing that major "inefficiencies persist because they are politically useful; economic inefficiencies afford governments means of retaining political power". Part of Bates' argument relates to the artificial price control for agricultural products. The other part of his argument concerns the artificial lowering of input prices.

When they lower the price of inputs, private sources furnish lesser quan-

tities, users demand greater quantities, and the result is excess demand. One consequence is that the inputs acquire new value; the administratively created shortage creates an economic premium for those who acquire them. Another is that, at the mandated price, the market cannot allocate the inputs; they are in short supply. Rather than being allocated through a pricing system, they must be rationed. Those in charge of the regulated market thereby acquire the capacity to exercise discretion and to confer the resources upon those whose favor they desire. ...

Public programs which distribute farm credit, tractor-hire services, seeds, and fertilizers, and which bestow access to government managed irrigation schemes and public land, thus become instruments of political organization in the countryside of Africa.

Thus, there is an added dimension to rent seeking in many developing countries. The losses that the general consumer and taxpayer accrue from rent-seeking activities are one dimension. The second aspect of rent seeking in highly centralized economies is the acquisition of resources needed to accumulate and retain political power. All forms of opportunistic behavior, therefore, are exacerbated in an environment where an abundance of funds is available for the construction of new and frequently large-scale irrigation projects that provide subsidized water. This is exactly the political and financial milieu that irrigation suppliers have faced during the past 40 years in most developing countries. Developed countries have made vast amounts of money available to developing countries through bilateral and multilateral loans and aid agreements.

Lack of large-scale supportive institutions

While smaller-scale, community-governed resource institutions may be far more effective in achieving many aspects of sustainable development than centralized government, the absence of supportive, large-scale institutional arrangements may be just as much a threat to long-term sustenance as the presence of preemptive large-scale government agencies. Obtaining reliable information about the effects of different uses of resource systems and resource conditions is an activity essential to long-term sustainability. If all local communities have to develop all of their own scientific information about their physical settings, few would have the resources to accomplish this.

Let me use the example of the important role of the United States Geologic Survey in the development of more effective, local groundwater institutions in some parts of the country. It is important to stress that the Geologic Survey does not construct engineering works or do anything other than obtain and disseminate accurate information about hydrologic and geologic structures within the country. Some water users could contract the Geologic Survey to conduct an intensive study of a local groundwater basin and the cost would be shared by water producers and the Geologic Survey. It then becomes public information available to all interested parties. The Geologic Survey employs a highly professional staff who relies on the most recent scientific techniques. Local water producers obtain the very best available information from an agency that is not trying to push any particular future project in which it may be interested. Many countries, such as India, that do have large and sometimes dominating state organizations lack agencies that provide public access to high-quality information about resource conditions and consequences. Recent efforts to open

up groundwater exploration in India may lead to the massive destruction of groundwater basins rather than a firm basis for long-term growth.

Similarly, the lack of a low-cost, fair method for resolving those conflicts that spill out beyond the bounds of a local community is also a threat to long-run sustainability. All groups face internal or intergroup conflicts that can destroy the fundamental trust and reciprocity on which so much effective governance is based. If the only kind of conflict resolution mechanism available is either so costly that most self-governed CPRs cannot make use of it, or so biased, then these conflicts can themselves destroy even very robust institutional arrangements.

Methods for Coping with Threats to Sustainability

There are no sure-fire mechanisms for addressing all of the above threats. Three methods are not frequently mentioned as important in increasing the effectiveness of self-governed institutions: (1) the creation of associations of community-governed entities; (2) comparative institutional research that provides a more effective knowledge base about design and operating principles; and (3) developing more effective high school and college courses on local governance.

Creating associations of community-governed entities

Those who think local participation is important in the process of developing sustainable resources and their more effective governance are often committed to doing a good deal of "community organization." All too frequently, this type of organization is conceptualized as fostering a large number of community groups at

the same level. If community organization is fostered by nongovernmental organizations (NGOs) which then provide staff assistance and some external resources, the entities may flourish as long as the NGOs remain interested, but wither on the vine when the NGOs turn to other types of projects. A technique that draws on our knowledge of how self-governed institutions operate is helping to create associations of community organizations. As discussed above, most large-scale user-governed resource institutions are composed of several layers of nested organizations.

Community organizations brought together in federations can provide one another some of the back-up that NGOs offer to single-layer community organizations. While no single community-governed organization may be able to fund information collection that is unbiased and of real value to it, a federation of such organizations may be able to amass the funds to do so. Simply having a newsletter that shares information about what has worked and why in some settings helps people learn from each others' trial-and-error methods. Having an annual meeting that brings people together to discuss their common problems and ways of tackling them greatly expands that repertoire of techniques for coping with threats that any one group can muster on its own. Such organizations can also encourage farmer-to-farmer training efforts that have proved to be highly successful in enhancing farmer-governed irrigation systems in Nepal.³

³See Pradhan and Yoder (1989); WECS/IIMI (1990); Yoder (1991) for descriptions of a highly innovative and successful program of assisting farmers design their own institutional rules rather than imposing a set of model bylaws on them.

Rigorous comparative Institutional research

In addition to the type of information exchange that those involved in self-governing entities can undertake on their own, it is important to find ways of conducting rigorous, over-time comparative research that controls for the many confounding variables that simultaneously affect performance. For instance, folk medicine had frequently been based on unknown foundations that turned out to be relatively sound. But some folk medicine continued for centuries doing patients more harm than good. The commons governed by users and the institutions they use are complex and sometimes difficult to understand. It is important to blend knowledge and information obtained in many different ways as we try to build a more effective database about what works and why.

Developing better curricula on local governance

Western textbooks on the subject used to focus as much on local as national governance arrangements. During the past half-century, introductory textbooks on American government have moved from a 50-50 split between national and local administration to a 95 to 5 ratio. The textbooks used in the West have strongly influenced those in developing countries. Consequently, many public officials learn nothing in high school and college about how local communities can govern themselves effectively or about the threats to local self-governance. Instead, it is presumed that governance is done in national capitals and what goes on in villages is outmoded if not completely useless. Thus, it is recommended that more materials on self-governing communities be integrated into the curricula offered in high school, professional schools and colleges.

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Property Rights and Coastal Fisheries

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Summary

Fisheries resources, subject to individual use but not to individual possession, provide the classical example of common property. By definition, all common-property (or common pool) resources share two characteristics: (1) it is costly to exclude potential users from gaining access to the resource (the problem of exclusion); and (2) each person's use of the resource subtracts from the welfare of others (the problem of subtractability). These two characteristics provide the starting point for any discussion of property rights in coastal fisheries.

In the case of marine resources, the exclusion problem is closely related to the "freedom of the seas" principle, the idea that seas should be open access

or freely available to all. Exclusion may be approached through traditional management methods, such as territorial use-rights, and cooperative-based or community-based exclusive fishing areas. It can also be addressed through some of the current scientific management techniques which accomplish much the same purpose through license limitation and the allocation of individual transferable quotas (ITQs).

The problem of subtractability may be approached by making and enforcing rules to limit short-term individual interest and to protect long-term, collective interest. Rule-making and enforcement by government agencies everywhere have been both difficult and costly. Thus, there is renewed interest in many parts of the world to involve fishers in management. But no community of fishers carries out its business in isolation; purely communal

fisheries exist hardly anywhere in the world. Thus, practical solutions to the subtractability problem revolve around some appropriate mix of communal and state management regimes (or co-management) for coastal fisheries.

Reliance purely on the government has blinded fisheries resource managers to the broad range of possibilities offered by systems that involve various degrees of user self-management. But integrating communities of fishers into the management process requires, in the first place, the creation of incentive structures for users to fish sustainably. The exclusion problem almost always requires government management to help enforce rights. The subtractability problem needs the building of institutional capability for self-management. In sum, policy implications of a reassessment of property rights in coastal fisheries of the world include the abandonment of open-access ideals and the notion that government regulation is sufficient. It also calls for institution-building in fishing communities to establish co-management regimes towards the sustainable use of resources.

Introduction and Context

It is ultimately desirable to develop integrated resource management systems which include the human dimension. More and more managers emphasize that fisheries can only be managed with due regard to communities of fishers. A major dilemma has, nevertheless, persisted. On the one hand, many agree that fishers have to be integrated into management systems. But on the other hand, many managers hold the view that users cannot be trusted with the resource. An article in *The Economist* (10 December

1988) encapsulates the conventional wisdom:

...it is possible to manage fisheries successfully, provided three facts are kept in mind. (1) Left to their own devices, fishermen will over-exploit stocks. (2) Those stocks are extremely unpredictable. (3) To avoid disaster, managers must have effective hegemony over them.

Note that two of the three "facts" are germane to community management (no one is questioning the unpredictability of stocks). Those two "facts" compel us, as does the consequence of "freedom in the commons (which) brings ruin to all" (Hardin 1968), to do something to control those fishers.

For many managers, this means a better and tighter kind of government management. Even in cases in which the resources are privatized by the allocation of ITQs, the allowable catch still has to be calculated and total fishing effort controlled, a very major job for any one entity. A large amount of literature testifies to the difficulties of regulating fishing effort (e.g., Larkin 1988). Stock assessment costs and administrative costs of regulating and policing have been escalating. For example, Macdonald (1980) calculated for Prince Edward Island fisheries in Canada that:

... with administrative costs and subsidies of \$13 million, it cost more than \$41 million to produce \$28 million worth of fishery products ... However, if a more kindly view of the PEI fisheries performance is taken (i.e., assuming the opportunity costs of labour to be zero) then it costs as low as \$25 million to produce \$28 million. If this view is taken, then it cost \$13 million

In government funding to produce something less than \$16 million in income to fishermen and processing workers.

The concentration of management powers and responsibilities with government agencies is not only costly; it is administratively inefficient. Other branches of management science have discovered over the years that complicated regulations are counterproductive. Such findings have compelled the wiser managers to take into account the self-regulatory abilities of workers. In many fields of management, managers are turning to the view that the person who does the job knows it best.

The irony in the field of marine resources is that fisheries managers had been heading, until recently, in the direction of tighter government controls, whereas those in other fields of management (and who have already "been there") are moving towards devolution, deregulation, decentralization and cooperative management. The popularity of the Japanese model of business management may be seen in this light. The current interest in community-based fisheries may also be viewed from this perspective.

To summarize, the conventional wisdom in marine resources management has favored strong, well-informed, centralized controls (Hanna, in press). But there is ample evidence over the years that centralized controls have not worked (MacKay 1993). As part of the process of rethinking coastal resources management, it is informative to reflect on the history of management philosophy that separated the resource user from the manager; perceived the need for a "higher authority"; and made a managerial axiom out of the "freedom of the seas" principle.

Historical Background: Hobbes, Rousseau and Grotius

The current "crisis in the world's fisheries" (McGoodwin 1990) has historical roots with respect to managers' assumptions and management philosophies. The conventional wisdom in fisheries circles ("left to their own devices, fishermen will overexploit stocks; managers must have effective hegemony over them") reflects the thinking of an era that glorified technological elitism, and created a bureaucratic elite to manage the affairs of the state. The development of technocratic-bureaucratic controls was identified and analyzed by the German sociologist Max Weber in the early twentieth century. The separation of the user from the manager and the governed from the governor is usually explained in terms of the rise of the modern state whose affairs had become too complicated for ordinary citizens to handle. The debate over self-governance has in fact much deeper roots.

In the 1600s in Britain, Thomas Hobbes argued in *Leviathan* (1651) for the necessity of a higher authority. He was convinced that society needed the absolute dominance of a sovereign ruler as the source of law. People were incapable of collective action towards their common good, Hobbes argued, and the rule of law had to be exogenously imposed. By contrast, Jean-Jacques Rousseau in France (*On the social contract*, 1762) developed the antithesis of Hobbes' solution. The rule of law was endogenous to society rather than externally supplied by a Leviathan. A higher authority was not necessarily needed; it was possible, for Rousseau, to have egalitarian agrarian communities in which peasants regulated their affairs "under an oak tree."

Hard-nosed fisheries managers have been Hobbesians; they have always considered Rousseau's kind of thinking as "soft" and "romantic". The managers of enormously successful Japanese businesses would probably disagree. Now combine with Hobbesian attitudes a second cherished Western notion, the "freedom of the seas." Hugo Grotius wrote *The freedom of the seas* (1608) to justify the Dutch trade in the East Indies. The sea, he argued, was limitless and could not become the possession of anyone but was, by nature, suitable to the use of all. The limitless sea of Grotius is said to be the basis of the fundamental assumption of "freedom of the seas," a notion which persisted more or less until the 1982 Law of the Sea.

The point to emphasize is that "freedom of the seas" and an open-access approach to marine resources in general were deliberate and essential to colonial trade. Grotius did distinguish among *res nullius* (no one's property but could be acquired), *res communes* (collective property) and *res publica* (public property). But Grotius' legacy has been that the sea, while *res communes*, is also free, limitless and cannot be owned. This assumption makes marine resources, in effect, *res nullius*.

Among Western-trained fisheries managers, however, the confusion between *res communes* and *res nullius* persists despite notable efforts by scholars such as Ciriacy-Wantrup and Bishop (1975) and a series of recent major works (McCay and Acheson 1987; Berkes 1989; Ostrom 1990; Bromley 1992). To set the record straight, many continue to confuse common property with open access (Pomeroy 1993a). The basic differences between the two regimes are shown in Fig. 1. Note that in the absence of common-property institutions to receive and evaluate feedback from the resource and a common-property regime to regulate the behavior of users, one ends up with a runaway positive feedback loop that will lead to a "tragedy of the commons" (Hardin 1968).

In some non-Western cultures, marine resources are not regarded as open access, and coastal marine areas have property status comparable to that of communal land. Such resources are held as *res communes* by communities of users under well-defined resource-use rules, although not under outright ownership in the Western sense. Contemporary examples of such communal property marine resources may be found in Fiji and Solomon Islands (Baines 1989) and in coastal Japan

Table 1. A sampling of traditional fishery and integrated resource-management systems.

System	Country/region	Resource type or function	Reference
<i>Irial</i>	Japan	coastal fishing	Ruddle (1989)
<i>valll</i>	Adriatic, Italy	lagoon fishing	Lasserre and Ruddle (1983)
<i>prud' homle</i>	France	lagoon and coastal fishing	Tempier (1985)
<i>tambak</i>	Java, Indonesia	brackishwater fishponds	Lasserre and Ruddle (1983)
<i>acadja</i>	West Afrlca	lagoon fishing, grazing	Lasserre and Ruddle (1983)
<i>dlna</i>	Mall	fishing, farming, grazing	Moorehead (1989)
<i>ahupua'a</i>	Hawaii	watershed and adjoining marine	Costa-Pierce (1987)
<i>puava</i>	Solomon Islands	Interconnected sealand	Ruddle et al. (1992)
<i>vanua</i>	Fiji	Interconnected sealand	Ruddle et al. (1992)
<i>tablnaw</i>	Yap	Interconnected sealand	Smith (1991)

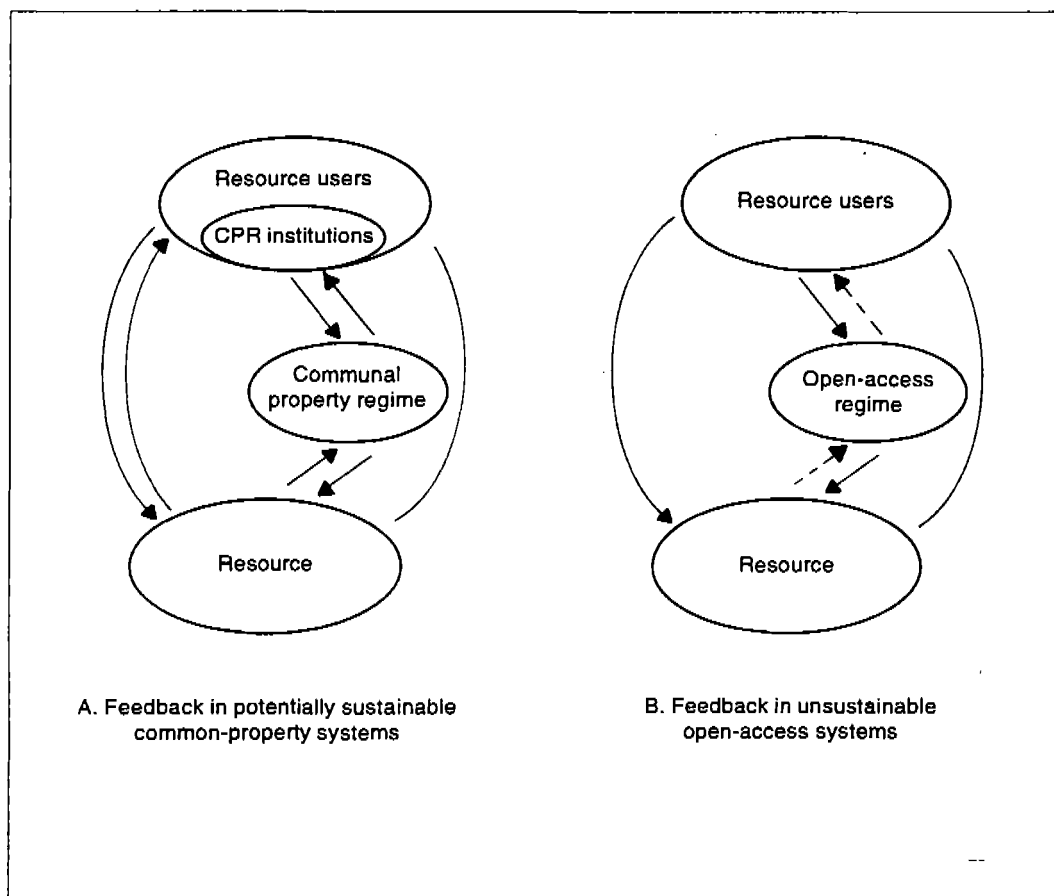


Fig. 1. A system view of the differences between common-property and open-access systems.

(Ruddle 1989). A sampling of traditional fisheries systems from diverse regions of the world is given in Table 1. These set the stage for the discussion of community management of fisheries.

There is a great wealth of information from the Asian-Pacific region about the traditional marine resource management systems. Country-by-country surveys show, however, the great variation in the persistence and health of these systems (Ruddle, *In press*). Functional systems exist only in areas where traditional marine tenure has been legally recognized and protected by the government (Ruddle,

in press). In other areas, such as Hawaii, well-documented ancient management systems have completely disappeared (Costa-Pierce 1987). In yet other areas (Philippines, Indonesia), traditional coastal marine management systems have been poorly documented or difficult to find. It should be noted, however, that the existence of traditional systems is helpful but not essential for the development of common-property institutions. Community-based management systems can arise, if conditions are appropriate, in areas which lack traditional systems (Berkes 1986, 1987).

Common-Property Framework

The approach outlined here starts with Grotius' concepts, modified to distinguish *res communes* from *res nullius* (Ciriacy-Wantrup and Bishop 1975). It addresses, in effect, the central debate between Hobbes and Rousseau. It has become an approach used by a growing number of workers, not only in fisheries but also in wildlife, forestry, grazing lands, mountain ecosystems, irrigation and groundwater resources.

Common-property resource management has become a truly interdisciplinary area, with contributions from economists, anthropologists, ecologists, sociologists, geographers, political scientists and planners (Feeny et al. 1990). As reviewed by Feeny (this vol.), common-property resources, as a class, have two characteristics which distinguish them from other kinds of resources: (1) the difficulty of exclusion, that is, control of access to the resource; and (2) subtractability, that is, the capability of each user of subtracting from the welfare of others. To these, one may add boundary problems as a characteristic especially pertinent to regional fisheries in which the geographic range of the resource does not match administrative or communal boundaries. As shown by Ostrom (this vol.), this issue poses a serious obstacle to management success, as the requirement for clearly defined boundaries is at the top of the list of design principles for long-term stability of common-property institutions.

Almost all living resources of the sea are common-property (or common-pool) resources by the above definition, except for some of those under aquaculture. But a given resource may be held under a variety of management regimes (Ostrom 1988; Bromley 1992). There is nothing inherent in the resource itself that predetermines the kind of regime

it may be held under. As explained in more detail by Feeny (this vol.), there are four basic kinds of such regimes:

1. open access (*res nullius*) which is actually no management regime at all; property rights are absent and access is free and open to all;
2. private property in which the claim rests with the individual or the corporation;
3. state property (*res publica*) in which claim and sole jurisdiction lie with the government; and
4. communal or common property (*res communes*) in which the resource is controlled by an identifiable community of users.

These four categories are ideal analytical types. Nevertheless, examples are available that fit each category reasonably well (Table 2). Many other resources, however, are held under regimes which combine the characteristics of two or more of these types. In fact, this is true to some extent for the cases in Table 2. For example, the use of ITQs in Canadian Lake Erie effectively privatized harvesting rights, while the stock technically remained state property. The particular system only worked because of effective self-policing of quotas among fishers and processors. The example therefore combines private, state and communal property regimes (Berkes and Pockock 1987).

Likewise, both of the examples of state property in Table 2 contain some elements of communal property. User-groups are involved in fisheries management under the (US Federal) Fishery Conservation and Management Act (FCMA) (Young 1981) but perhaps not very effectively. In the United States northeast coast groundfish fisheries, there are cases of effective community-based management (McCay 1980). Despite ingenious ways in which some groups of fishers restrict the access of other potential users to

Table 2. Property rights regimes as applied to marine resources.

Regime	Example	Reference
open-access	Oceania fisheries during colonization	Johannes (1978)
	Gulf of Thailand fisheries	Tiews (1975)
private property	exclusive or monopoly fishing rights	Scott (1955)
	individual transferable quotas	Berkes and Pockock (1987)
state property	US northeast coast fisheries under FCMA	Young (1981)
	Pacific salmon fisheries, Canada	Marchak et al. (1987)
communal property	Japanese coastal fisheries cooperatives	Ruddle (1989)
	reef and lagoon tenure in the Pacific	Ruddle and Johannes (1985)

the resource (McCay 1980), there is no official limitation of these fisheries so that actual management, in effect, combines state property, communal property and open-access regimes. The Canadian example, by contrast, is under limited entry; there is no open-access element here, but neither is there much communal property (Marchak et al. 1987).

Matching the Resource and the Regime

Resources differ in the difficulty with which property rights may be established. For example, enclosed aquaculture areas may be owned outright by their users, as with agricultural land. They may also be owned by the state and leased to individuals and cooperatives. Aquaculture may be considered to be at one end of a continuum which extends through lagoons and semi-enclosed areas, to inshore fisheries within bays and estuaries, to coastal fisheries carried out by small-scale fishers, to those undertaken by intermediate-scale fisheries, to offshore fisheries requiring extended trips, and finally to open-ocean fisheries un-

der international regimes. There are natural differences among these marine environments in terms of pulsing and cycling behavior (Fig. 2). Thus, the nature of the fisheries is also different in these environments (Hammer et al. 1993), and so are the appropriate management regimes.

The basic idea of matching the resource and the regime is not new and has been suggested before, for example, in a study of Turkish coastal fisheries. Local-level management provides a feasible arrangement for managing "small-scale fisheries in which the community of users is relatively homogeneous and the group size relatively small". In contrast, for "larger-scale, more mobile fishing fleets, community-level management is less likely to work" and the assignment of fishing rights, such as transferable quotas may be more appropriate (Berkes 1986). In another example, a comparative investigation was carried out on the management of Barbados and Jamaican fisheries. Communal property regime made sense for Jamaican fisheries, predominantly inshore and reef-based, with communal trapfishing territories in some areas. By contrast, Barbados fisheries

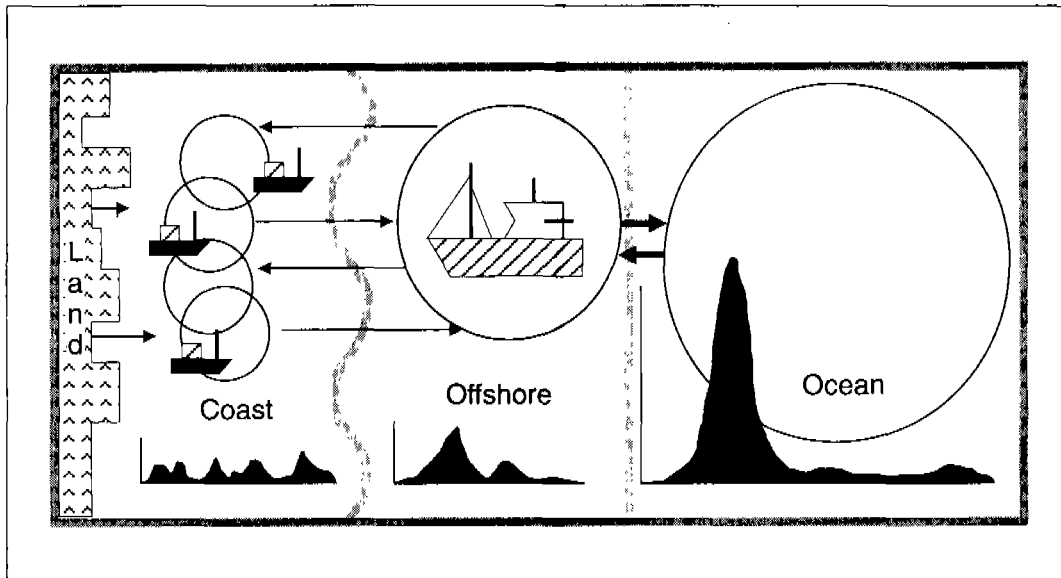


Fig. 2. The archipelago, coastal, offshore and open-ocean ecological systems are integrated. However, they are quite different in terms of pulsing and cycling behavior. The frequent pulses in the nearshore system and the ability to recycle matter, continuously received from the offshore areas, give rise to a more diverse and resilient system. Coastal fisheries, dependent on the resources in a restricted coastal area, have co-evolved with the dynamics of the ecosystem. The offshore fisheries have taken advantage of the much higher magnitudes in pulsing fish species. These differences emphasize the cross-scale nature of fisheries management and the need for coordination for future sustainable management.

Source: Hammer et al. (1993).

were relatively large-scale and offshore, and license and quota management (state property with privatization of harvest rights) made more sense (Berkes 1987).

Thus, it is possible to sort out different kinds of fisheries with respect to management regimes which are more likely to be appropriate. In so doing, one could at least rule out some of the combinations that make relatively little sense. Private property, with allocated quotas, may be reasonable for offshore fisheries in which fishing units are relatively few, large in size and amenable to policing. Inshore and coastal fisheries, by contrast, enforcement of privatized rights is likely to be troublesome, and privatization of harvest rights may probably create equity problems with the traditional users of these resources. The range of problems

encountered with ITQs indicates that privatization is not likely to be a universal solution (Copes 1986; Berkes and Pockock 1987).

State property regimes make more and more sense as the scale of fishing operations, and hence the ability of fishers to deplete the stock, increase. However, beyond the 200-mile limit, state governance is effective only in combination with International agreements; otherwise, an international "tragedy of the commons" is obtained. Near the shore, state property regimes are sensible in combination with community management, that is, in co-management arrangements (Pinkerton 1989).

Finally, communal property regimes are more sound at the small-scale end of the continuum, and less and less so

towards the other end. However, even in these coastal, small-scale fisheries, government regulation still has a place. Examples for the enabling role of government include the exclusion of outsiders from a resource which is under communal management, as in the case of Japanese coastal fisheries (Ruddle 1989), and the enforcement of conservation regulations so that all users can benefit from increased production (Delos Angeles and Pelayo 1993).

Conclusion

The Hobbesian approach favored by many Western resource managers, exemplified by the quotation regarding the necessity of manager's hegemony over fishers, is based on the dominant culture and values of resource management science. The recent accumulation of a great deal of evidence on the potential sustainability of community-based fisheries management systems indicates that we may do well to review some of our assumptions about the behavior of fishers. These findings challenge, for example, the "fact" that "left to their own devices, fishermen will (necessarily) over-exploit stocks". Instead, we need to look for the system-stabilizing feedbacks such as those in Fig. 1.

Our best evidence is that, left to their own devices, communities of fishers may use stocks sustainably under certain conditions. The investigation of these conditions is consistent with research agenda being developed at the International Center for Living Aquatic Resources Management (Pomeroy 1993b), the Beijer International Institute for Ecological Economics, the Caribbean Natural Resources Institute and elsewhere. The first general condition pertains to the exclusion of other potential users. Thus,

the first research question is: *Is there an identifiable community of fishers which can control access to the resource?*

A second general condition pertains to circumstances within a community of users that permit the evolution of effective communal property institutions (Ostrom 1990); that is, *can the community of users make and enforce its resource-use rules?* Hardin's (1968) "tragedy of the commons" would completely reject this possibility, in keeping with Hobbes. But we know now that the "tragedy" is a very limited and incomplete view of reality. Many groups of resource users can and do create appropriate institutions for resource use (Ostrom 1990; many cases in the previously cited volumes).

One central task is to examine and, where possible, to create the conditions conducive to the sustainable use of stocks by communities of fishers. *First*, we need case-specific information to characterize user-groups and the scale of the fisheries. Generalizations are risky; many fisheries around the world do not clearly fall into categories of small- or large-scale (Berkes and Kislalioglu 1989). *Second*, data on group size and homogeneity of fishers are essential (e.g., Berkes 1986). *Third*, knowledge on the existence of any common property institutions in a given fishery or among a group of users is helpful. Perhaps as a *fourth* task, we should examine the management objectives that underlie a given case study. Charles (1988) observed that "normative single-objective analyses tend to find favour primarily in 'industrial' fisheries", whereas "multiple-objective socio-economic analysis has been preferred in developing or 'inshore' fisheries." In any given case, we need to know managers' explicit or implicit objectives. In some situations, the behavior of managers may be as crucial to the

management outcome as the behavior of fishers!

The emphasis on managers becomes particularly relevant if we accept the proposition that a mix-and-match of resources and regimes is necessary. Managers need to be willing and flexible to seek the regime appropriate for the fisheries at hand. Fishers are not always alone to blame for the failure of a fishery. As Marchak et al. (1987) put it, "instead of talking about the 'tragedy of the commons', we should be concerned with the tragedy of mismanaged state property" in fisheries.

Community-based management of fisheries is never entirely free of its context of government resource management policies, whether explicit or implicit. Communal fisheries are viable even in countries such as the Philippines where there is little evidence of communal property regimes for marine resources. For example, McManus (1988) argued that traditional community rights over coastal resources in the Lingayen Gulf can be rejuvenated. This would involve "the organizing of fishermen into legally and traditionally recognized groups that would have the clout to be stewards of their resources."

Deregulation and decentralization of management, and devolution of authority in fisheries, as in other fields of management, can be accomplished only if both government managers and users are willing and have the capability. Creating a role for fishing communities in resource management is not easy, if there is no cultural background of self-regulation and no stewardship ethic. Even with such a background, community-based management will likely fail if there are major problems with exclusion, subtractability and boundaries. Institution-building to enhance the capability of fishing communities for resource management will probably be a major com-

ponent of any effort to reorganize property rights in fisheries.

As Hanna (1990) observed, marine resource management institutions have not kept pace with our technological ability to exploit these resources. First, the starting point in the search for more viable and sustainable institutions is the abandonment of open-access ideals of the old principle of "freedom of the seas." Second, the failure of centralized management compels us to abandon pure Hobbesian approaches, or rather to balance Hobbes with Rousseau in the new management philosophy. The fisher can once more become a part of the resource management team, balancing rights and responsibilities, and working in a cooperative (rather than antagonistic) mode with the manager. Such joint management, or co-management, is a rational extension of evolutionary trends in fisheries management over the past decades (Rettig et al. 1989). Co-management that: (1) involves more participatory decisionmaking; (2) creates conservation incentives by empowering fishers to reap the benefits of their own restraint; (3) enables cost-cutting in research and enforcement; and (4) sets policy objectives more in tune with fishers' social and economic needs, is consistent with sustainable development planning for coastal fisheries.

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Changing the Focus of Coastal Fisheries Management

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Introduction

Contemporary fisheries management, based on familiar bioeconomic models, has generally not been able to either foresee or overcome the now equally familiar and intractable problems in coastal fisheries worldwide. It is common knowledge that most problems and errors have occurred in the fisheries of temperate-zone developed countries. Yet, the same bioeconomic models that have been less than successful are still those generally recommended for fisheries development and management in Third World contexts. This is ironical, "... first because in many Third World societies there already exist sophisticated fisheries management systems well-adapted for local use; second, because similar systems also exist (although often extra-legally) in many parts of the First World; and third, because many such Third World systems might be readily adaptable for managing fisheries in the First World" (Ruddle et al. 1992).

Traditional systems of fishing rights and tenurial relationships of small-scale fishers to resources and resource areas have been documented throughout the world, particularly in the Asia-Pacific region. In many parts of that region, traditional management systems are often common-property regimes where access to a particular territory is limited to a defined user group; operational rules are specified; and control resides in traditional local authorities. Many systems were either deliberately or inadvertently weakened or destroyed by colonial administrations, and replaced by centralized fisheries institutions nominally responsible for all aspects of fisheries management, from policy formulation through enforcement (Ruddle 1994a, b).

Where that occurred, community-based systems of marine resource management were not usually replaced by more effective central or regional management institutions. Neither has nationalization nor privatization policies usually resulted in more effective resource management.

Rather, the cumulative effect of this restructuring of fisheries management has been the impoverishment of fishery resources and fishing communities. Compared to the scope of the problems facing government agencies attempting to manage inshore fisheries, their administrative and technical abilities are generally relatively weak. As a result, devolution of resource management and allocation decisions to local communities, within the framework of co-management, is increasingly seen as an alternative to ineffective management undertaken by distant, understaffed and underfunded government agencies.

This paper examines various shortcomings of conventional fisheries management. The characteristics of traditional community-based systems of management are then summarized, based on the Asia-Pacific region. Policy alternatives regarding the future adaptation of such systems to a modern management role are then examined.

The Context of Fisheries Management

In any fisheries, there exist four actual or potential foci of problems that require management (Table 1). Conventional fisheries management focuses on fish stocks and stock externalities and assumes an open-access resource regime. Thus, it has concentrated on modelling the biological and physical flow of fish resources and through fishing grounds, and in implementation, on attempting to manage the resultant stock

externalities. In other words, it focuses on trying to manage what is *unknown* (and perhaps inherently unknowable), and thus unmanageable. It is also predicated on the generally false assumption of "open access" and implemented by regulatory measures which are often complex; far from having been wholly successful; and unsuited to Third World conditions.

The erroneous assumption of open access

The "tragedy-of-the-commons model" (Hardin 1968) is the principal Western theory held to account for problems in certain fisheries, according to the dynamics elaborated by Gordon (1954) and subsequently refined by other economists. But this model is grounded in the erroneous notion that the misuse of fisheries resources stems from the institution of common property, which was, and unfortunately often still is, mistakenly assumed to be synonymous with "open access". Thus, fisheries must be managed to mitigate the selfish and myopic behavior of fishers, consequent upon fisheries being a classic example of a "common property" (meaning "open access") resource. This has been widely viewed as the predominant pattern of individuals. The proposition asserts that inherent in the exploitation of common property resources are the tendency to physical wastage of the resource; an incentive to overexploitation by users, leading inexorably to the now familiar tragedy of the commons; and an inclination toward economic wastage via overcapitalization of

Table 1. Actual or potential foci of fisheries management problems.

Focus	Definition
1. Flow of the resource	Continued, regular availability of harvested fish
2. Stock externalities	Economic, and therefore social, impacts of harvesting interactions among fishers
3. Technological (gear) externalities	Mutual incompatibility of various gear on a fishing ground
4. Assignment problems	Competition for access to a resource(s) distributed unevenly in space and time

the industry, and eventual impoverishment of fishing communities and immobility of labor.

To counteract these inherent tendencies, so the conventional theory runs, management by authorities external to fishing communities is required. It is generally accepted that the replacement of common-property (meaning "open access") regimes by systems of controlled access could either eliminate or alleviate excess effort. Although there is no unanimous opinion concerning the optimal design of such systems, they have been widely implemented, together with catch quotas, gear and/or seasonal limitations, licensing, or a combination of these and other elements. All share the common characteristic of assigning fish harvesting rights to selected individuals, who then receive all or part of the economic rent created by the reduction in effort (Keen 1983).

Generally, such schemes have been less than successful, because they are both often costly to implement and administer, and have not eliminated the excess effort problem since they induce increased investment by fewer individuals seeking to improve their share of the catch. So it cannot be assumed that limited access systems alone are either capable of reducing or eliminating the dissipation of resource rents, or that they are cost effective for government (Wilson 1987). Nevertheless, limited access has been advocated principally for its supposed economic efficiency; political acceptability and resultant ease of implementation; as well as a means of raising incomes in fishing communities (Keen 1983).

Techniques for regulating fisheries

In terms of changing the focus of coastal fisheries management, the important characteristic of regulatory techniques is whether or not they restrict access to the fisheries. Most techniques of conventional management do not.

Techniques that Do Not Restrict Access

Catch limitation or quota. Total allowable catch (TAC) is now the standard technique used in the developed world to regulate fishing effort. However, it is severely limited because it can solve only problems of resource conservation. Without the concurrent introduction of some form of allocation, overcapitalization will remain. Further, this regulatory technique is complex to apply and expensive to both operate and enforce (Derham 1984; Schowengerdt 1984). Calculation of TACs poses problems. The accurate and current data (needed to indicate the percentage of the TAC that has been taken, and so when fishing is to stop) demanded by this "information-hungry" (Caddy 1984) technique are expensive to obtain, and the task requires specialized personnel and elaborate networks of committees and working groups (Hoydal 1984). Although cheap, estimates are often extremely inaccurate, because adoption of TAC is often accompanied by a deterioration of data quality and underreporting, since this regulatory technique puts a premium on cheating, which enforcement fails to halt. Thus, expense and lack of locally available personnel put the TAC technique beyond the means of most Third World countries. In tropical multispecies fisheries, all such problems are exacerbated by the complexity of the fisheries, and by the problems of by-catches and associated discards (so as not to exceed the TAC and to concentrate the quota on only the most economically valuable species).

Enforcement of TACs is extremely expensive, both in terms of data and management. For the most part, high seas enforcement is either impossible or too costly. Point-of-first-sale monitoring and quota enforcement are hardly more feasible, given the characteristics of tropical small-scale fisheries (*vide infra*). Thus, using TAC

as a regulatory measure is not suitable for adoption by developing countries.

Gear restrictions. Regulation of size and spacing of net meshes, hooks and trap openings has been one of the main methods used to control fisheries, by allowing immature fish to escape being caught when small, and grow to an economically more valuable size before harvesting. One of the major problems is the initial decline in catch rates following their introduction. Thus, fishers are required to sacrifice in the short term to reap long-term benefits. Further, owing to random fluctuations in recruitment, for example, theoretically predicted improvements are hard to detect in practice, thus making the fishers sceptical. This may not be economically feasible, depending on whether the target is a fast- or slow-growing species, resulting in circumvention of the regulation, and a corresponding increase in enforcement costs.

This regulatory mechanism suffers from allocation problems. For example, if minimum mesh size regulations reduce the catch of fisheries aiming at young fish migrating inshore, then the resource will be reallocated to offshore fisheries which target them at a later growth stage. The total economic yield would improve, but the livelihood of the small-scale fishers would be immediately jeopardized. In fact, in economic terms there would be no lasting benefit, since the increased income in the offshore industrial fisheries would attract additional entrants to the point of rent dissipation, and the cost of regulation would cause an overall economic loss to the fisheries.

Prohibition of certain fishing methods; types of gear, such as trawls; and fishing aids, like acoustic fish-finders, has severe allocational repercussions. The ban on cheap but effective although extremely destructive methods of fishing, such as dynamiting or poisoning, allocates the resource away from the present-day poorest fishers to

both those who can afford legitimate gear and to future harvesters. Banning trawlers, as in Indonesia (Sardjono 1980), means that distant fishing grounds may be underutilized, since they are beyond the reach of small-scale fishing craft and gear. This has negative impacts on economic efficiency and innovation. Again, without entry limitation, area allocation, and the like, gear restrictions alone will probably create more problems than they solve. However, they are usually adopted for sociopolitical reasons.

Closed season. This regulation relies heavily on the relationship between catch per unit effort and stock abundance. There are two types. One prohibits fishing during the times of the year when there is a need to protect a particular stage of the life cycle, e.g., spawning, or juveniles. Its disadvantages are: effort can be increased in the open season and it causes discontinuities in supply, disrupting the industry "downstream". The second type occurs as a response to fishing effort; when some predetermined catch rate that corresponds to a level of stock abundance is attained, the fisheries are closed. This regulation does not solve the problem of overcapitalization either outside the season (first type) or at the beginning of the season (second type).

Seasonal closures alone are largely ineffective. Further, they often tend to work against small-scale fishers by allocating the resource to the offshore, capital-intensive fishery.

Closed areas. Another method of protecting stock during certain stages of the life cycle is area closure where fishing is banned. This technique has three main problems: effort tends to concentrate on the boundaries of closed areas; pressure increases on other species and the same species at different ages; and area closures are pointless if industrial fisheries target the same stock offshore as it comes into closed inshore waters for spawning. This

would be perceived as unfair by artisanal fishers who work inshore.

Areal closures are relatively easy and cheap to monitor and enforce inshore, but not offshore. But like seasonal closures, they tend to be inequitable because they reallocate resources away from the inshore fisher to the offshore operator. However, under some form of territorial self-regulation by fishing communities, both seasonal and areal closures can be highly effective.

Techniques that Restrict Access

Licensing. Access to fisheries is restricted under this technique because only persons with a license may operate in them. Licensing has been seen as an effective way to control effort and ensure stock conservation, if introduced early in the development of fisheries. More often than not, however, licensing is introduced when fisheries are overcapitalized. Based on a calculated maximum sustainable yield (MSY), issuance of license is limited to the number of vessels and/or gear required to attain that figure.

A wide variety of licensing programs exists, reflecting differences in social, economic and political conditions. Most are based on historical precedent, with "grandfather clauses" permitting continued entry to fishers with established precedents, however tenuous, owing largely to equity considerations. Those that have more restrictions and conditions are time-consuming and expensive to administer. Restrictions tend to be added to restrictions, as fishers find a way around previous ones.

But licensing is ineffective when data are few and unreliable, and in the absence of research. Data are hard to come by for most tropical small-scale fisheries; since catches are sold at many unmonitored rural points, data gathering is usually haphazard. Moreover, licensing programs are difficult to enforce, especially where the

level of professionalism among local officials is not high.

Individual fish quotas. These are essentially a particular form of license that limits the right of access it grants to specific fisheries by specifying the amount of fish that an individual operator is allowed to land. This can be done by apportioning a TAC among licensed fishers. While this regulatory technique has the advantage of both restricting access and specifying catch amounts, it suffers from the drawback of administrative and enforcement expense.

Property rights. The preceding regulatory measures have been applied to fisheries where property rights are either weak or ineffective. Where property rights exist, individual rights holders make their own regulations. There are various forms of property rights in fisheries (*vide infra*).

The choice of which among those regulatory techniques to employ must depend on local conditions. Inevitably the decision will be very much colored by the local political environment. But, under the best circumstances, and to ensure a reasonable likelihood of successful implementation, the following main factors should govern the choice of techniques. They should be supported by most fishers; amenable to gradual implementation and flexible enough to adjust to changing situations; encourage operations at minimum cost; account fully for all costs of research, monitoring and enforcement; and take full consideration of the allocational and employment generation aspects of the fishing sector (Panayotou 1982).

The inherent characteristics of fisheries limit the type of regulatory techniques that can be applied with any hope of success. In inshore tropical waters, the two principal types of fisheries to be regulated are coastal multispecies and sedentary species.

The diversity of species that characterizes tropical small-scale fisheries poses

special management problems (see Pauly and Murphy 1982). A major one is that catch rates can decline substantially with increased harvesting, as has occurred widely in Southeast Asia, owing to "ecosystem overfishing" (Pauly 1988). Species change toward smaller and less valuable species, with a higher proportion of "by-catches", is the result. An important basis for management is that effort reduction results in a more economically beneficial catch composition over time, and increased catches (Alcala 1981; Russ 1985; Alcala and Russ 1990).

Related is the problem of fish size composition and gear selectivity, since optimum mesh sizes vary by species. Further, the different species interact biologically, thereby complicating analysis of data on which management plans are predicated. Thus, at the present state of knowledge, regulation of effort and mesh size should not be considered primary management mechanisms for tropical multispecies fisheries.

Conservation of stocks is the principal management concern for fisheries for sedentary species. They are vulnerable to growth overfishing. Sedentary species can be effectively managed by the allocation of property rights. Where these do not exist or have been eroded and with no possibility of either creation or re-creation, such fisheries can be managed by area and seasonal closure and by size limits. Licensing for such fisheries is rare. Sedentary species are particularly vulnerable to mobile gear that damage or destroy their habitat, and should be protected from them by zoning.

Characteristics of Tropical Small-scale Fisheries

The experience and research of developed countries require considerable adaptation to be made relevant to the de-

velopment and management of tropical small-scale fisheries. Tropical small-scale fishing communities are characterized by their reliance on inshore resources located close to home; limited alternative employment opportunities; use of small craft and simple gear (although often sophisticated techniques); and traditional community norms of behavior. But there are exceptions.

Seven important aspects of small-scale fisheries must be considered in devising management programs for them.

1. ***Fishing activities are limited geographically*** to small inshore areas because craft are small and unmotorized; there is usually no way to keep fish fresh; and neighboring sea areas might be off-limits owing to territorial rights systems. Therefore, opportunities for increased catches are limited.

2. ***Fishing communities are dispersed geographically*** and often isolated in remote rural regions, since (unlike industrial fisheries) they are not dependent on onshore infrastructure. They are thus difficult and expensive to develop and manage.

3. ***Employment options are limited*** and alternative jobs are scarce, although these vary considerably, depending on local context. Cultural factors, like caste systems that limit or preclude occupational mobility, also limit employment alternatives, as does a lack of education and access to basic information. Persistent indebtedness through traditional credit systems also binds fishers to their communities and occupation, as well as the "ethos of the fisher" and the related sense of subcultural identity.

Bioeconomic models fail to consider situations where the opportunity cost of labor is zero or close to zero, and where there exist strong barriers to exit from the fisheries sector. Also, conventional models and the management mechanisms to which they give rise do not distinguish between the capital and labor components of fishing (Christy 1986). Labor costs are low but

capital costs are high, and the two are often complexly interrelated in ways that are not well understood (Christy 1986). For example, crew sizes may be determined not just by work load, but by the social imperative to share limited economic opportunities and benefits. It is also difficult to define the term "labor" precisely, since a great many people onshore have a role in the fisheries system, as in Indonesia (Collier et al. 1979; Emmerson 1980; Kendrick 1993). Introduction of capital-intensive techniques can devastate these relationships, as well as heighten inequity and eventual conflict among segments of the overall fisheries sector and within communities. In contrast, management that regulates capital equipment would give priority to preserving traditional employment patterns and concepts of social equity and sharing. Thus, distinction between capital and labor components of fishing effort is critical to the sound management of tropical small-scale fisheries (Christy 1986).

4. Discount rates and future returns also militate against conventional Western-style development. Small-scale fishers are severely limited in their ability to reduce present catches in anticipation of future higher yields. Such behavior always has associated costs. These may be as extreme as hunger or even starvation in impoverished communities. Thus, although dynamiting and poison fishing are destructive of fish habitats, and so reduce or eliminate future harvests, they will still be practised if the only alternative is hunger. High discount rates therefore make effective fisheries management based on conventional Western-style concepts virtually impossible. (They also illustrate the futility of planning for the fisheries sector alone, without consideration of job creation in other economic sectors.)

5. Geographical and social territoriality is widespread among small-scale fishing communities. In contrast to its positive

aspects, this limits the mobility of small-scale fishers and socially prevents access to other fishing communities.

6. Economic rent extraction is affected by the factors noted above. They combine to create market imperfections such that fishers receive less than the free-market price for their catch, yet pay excessively for inputs and usuriously for loans. These are the principal ways in which rents are extracted. Secondary is the requirement to share in small, traditional communities and among kin, as well as other customary practices, such as ritual performance and donation (Collier et al. 1979; Kendrick 1993).

7. Conflict is a characteristic of small-scale fisheries in the tropics, resulting primarily from its multispecies nature. Conflict is essentially of two types: gear externalities and target conflict, where the prime target species of one group of fishers is the incidental catch of another. The main source of conflict in Southeast Asia has been the development of the shrimp industry and the highly capitalized shrimp trawlers using fine-meshed nets and operating in inshore waters. Thus, they have a very high incidence of by-catch, up to 80%, of which a large proportion is undersized, immature specimens of commercially valuable fish (Sharom Majid 1984). This problem led to the trawler ban in Indonesia (Sardjono 1980). Conflicts have been widespread and severe (Thomson 1980). In Malaysia, for example, during the period 1970-1973, they involved 1,200 boats, of which more than 60 were sunk, and the death of 23 fishers (Smith 1979). In India, both life and property were lost as the result of such incidents (Silas and Alagaswami 1980). These conflicts are a symptom of both an institutional failure in the allocation of natural resources and a demand for decisions on the distribution of wealth. Solving these is the essential first step to effective fisheries management in developing countries (Christy 1986).

The Property Rights Alternative

Fisheries management through systems of specific property rights based on the sole ownership of resources has been advocated as the best way of averting the "tragedy of the commons" (Hardin 1968). Where the fisheries are the property of a sole owner, there is an inherent incentive to manage them wisely to ensure sustainable and lower-cost harvesting into the foreseeable future (Scott 1955). Here, sole ownership is invested in a managing agency with exclusive rights to control catching and marketing (Keen 1983). But the potential of sole ownership as a fisheries management tool has been relatively little examined, largely, it seems, because of ideology (Keen 1983), rather than as a consequence of any inherent weakness.

Yet the efficacy of sole ownership in fish management has long been recognized, at least in conventional economic terms, such as by Gordon (1953), who concluded that private rights, group property rights, sole owner management, or taxation appear to be the only ways of optimizing fishing effort, and who observed that in a monopoly, social optima and maximum monopoly revenue could be coincident (Gordon 1954); by Scott (1955), who pointed out that management by sole ownership would require a property that embraced the entire asset; by Crutchfield (1961) who argued that the principal need was to foster the formation of property rights that would permit the dismantling of contradictory and *ad hoc* fisheries regulations; by Crutchfield and Zellner (1962), who contended that hiring an optimal amount of labor and capital would maximize rents in such fisheries; and by Copes (1972), who observed that net social benefits under a public sole ownership agency could be higher than under a private one. The application of the sole ownership concept

to marine fisheries was discussed briefly by Crutchfield and Pontecorvo (1969) and more comprehensively by Keen (1983, 1988).

In contrast, Wilson (1982) asserted that no evidence shows that property rights schemes are clearly superior to other fisheries management designs or that they are socially economical, given that the costs of management should not exceed the social opportunity cost of the problem that led to the implementation of rules. But "clearly, given the dearth of detailed studies of sole ownership management systems of marine fisheries, these various views remain assertions in want of verification" (Ruddle 1988b).

Various forms of property rights in fisheries exist. These include territorial use rights in fisheries (TURFs) (*vide infra*). The TACs can be allocated as individual transferable quota, a form of property right, as in Canada and New Zealand. There has been a growing recognition that property rights probably offer "... the best possible management option for scattered, remote and fluid, small-scale fisheries" (Panayotou 1982). Particularly, awareness has increased on the potential modern role of traditional systems of community self-management for fisheries and coastal resources. But since many such systems have broken down, to accomplish this would require a removal of the factors responsible for that breakdown by: (1) a policy decision to explicitly allocate resources to small-scale fishing communities and to divide the resources among communities; (2) regulation of entry into the fisheries; and (3) facilitating exit from the sector by the creation of employment alternatives (Panayotou 1982).

One approach to implementing property rights in small-scale fisheries is the TURF concept (Christy 1982, 1992). Decentralization to create, recreate or protect TURFs is a means of improved fisheries management. The concept rests on

the ability to defend an identifiable boundary around a particular aquatic resource or resource assemblage. Thus, TURFs are best suited to easily definable tracts of coast, like bays or estuaries, and to areas without actual or potential complex or incompatible interactions of resource use. The TURFs also function best for sedentary rather than migratory species and for passive (fixed) gear.

The TURFs' advantage is that through self-regulation, a local community of fishers may itself select how to use its rights. On the other hand, especially in heterogeneous communities where social cohesion is weak, they may be abused by the elite who extract rents as free riders.

The TURFs also arise around fish aggregating devices (FADs) and artificial reefs, as in the Philippines, where the increased use of FADs for tuna has been accompanied by the establishment of *de facto* TURFs by the FAD owners, who control all fishing activity in their vicinity (Christy 1986). (But these have not prevented a very high rate of growth overfishing [Floyd and Pauly 1984].) Artificial reefs placed on the seabed in parts of the Mediterranean to prevent illegal trawling also provide habitats for shellfish and finfish. Exclusive rights to these devices can then be allocated to local communities, as in Italy (FAO:GFCM 1984).

One advantage of such property rights systems is that for small-scale fishers, risk and uncertainty about resources and social organization are reduced (Runge 1986). Risk and ill-affordable wasted effort are greatly diminished because fishing behavior is predicated on local knowledge of resources; socially, because cooperation and reciprocity, among other values, are emphasized, as is long-term resource sustainability; and by protection of the resource through the exclusion of outsiders.

Principal Organizational Characteristics of Traditional Community-based Fisheries Management Systems

In many parts of the world, and especially in the Asia-Pacific region, coastal fisheries are or were managed traditionally by community-based systems of property rights and associated regimes of rights and rules that closely reflect social organization and local power structure. Such systems seem not to have been based principally on ecological conditions, which would be the case were their primary purpose resource conservation. Rather, as would be expected, since property is a social relationship that defines its holder's security of claim to a resource or to the services or benefits it provides, they reflect a correlation among property, property rights and social organization (Ruddle 1988a). Management systems in the aquatic domain often, but not always, mirror those on land.

In these traditional community-based systems of marine resource management, an individual's sea rights depend on his or her social status within a corporate community, which ranges from villages through clans, subclans and lineages, to the family. Resource territories and user groups are defined. Resource use is governed by rules and controlled by traditional authorities who mete out sanctions and punishments for infringement of regulations. Conservation for sustainable resource use is a widespread objective of these systems (Ruddle 1988b; 1994a, b).

Authority

In these systems, resource control and management is usually vested in traditional authority, whose nature varies according to social organization. Four principal types can be recognized: traditional secular

leaders, traditional religious leaders, specialists and rights holders. These categories frequently overlap, and responsibility is divided and shared.

- **Secular leaders** - In many societies, a group of traditional leaders or an organization, usually some kind of "village council", manages marine resources by regulating the use of community sea space and protecting resources against overexploitation. However, in many Pacific islands, in particular, land and sea are disposed of by a chief, who exercises his authority on behalf of the entire community.
- **Religious leaders** - With a widespread role in conventional resource management in the Asia-Pacific region, these religious leaders can be traditional, as in Indonesia and in parts of the Pacific Basin, or members of a formally organized church, as in Sri Lanka.
- **Specialists** - Commonly, marine resources are managed by fisheries specialists, who function under some form of higher authority. Such "master fishers" are particularly common in Pacific Island societies.
- **Rights holders** - These commonly have management authority over marine resources. Frequently, this level of authority is vested in the senior person of a lineage, family or other small social groups.

Rights

Under traditional community-based systems, marine resource exploitation is governed by use rights to a property. A property right is a claim, consciously protected by customary law and practice, to a resource and/or the services or benefits that are

derived from it. Such a grant of authority defines the uses legitimately viewed as exclusive, as well as the penalties for violating those rights. The characteristics of property rights may vary situationally. Common characteristics are exclusivity; the right to determine who can use a fishing ground; transferability; the right to sell, lease or bequeath the rights; and enforcement, the right to apprehend and penalize violators of the rights. The right of enforcement, and in particular that to exclude the free-riding outsider, is a key characteristic, for without it all other rights are diminished either actually or potentially.

Almost universal throughout the Asia-Pacific region is the principle that members of fishing communities have primary resource rights by virtue of their status as members of a social group. Such rights to exploit fisheries are subject to various degrees of exclusiveness, which depends on community social organization and local culture. Most commonly, traditional fisheries rights apply to areas, but superimposed on these may be claims held by individuals or groups to a particular species or to a specific fishing technology.

Traditional rights to marine resources may be exclusive, primary or secondary, and may be further classified into rights of occupation and use.¹ The relationships between the two main types, primary and secondary, are an important and complex characteristic of many traditional management systems, in which overlapping and detailed regulations on the use of technologies and particular species are widespread. Individual rights as subdivisions "nested within" corporate marine holdings occur widely throughout the Asia-Pacific

¹Such traditional rights are better defined as those to use rather than to own. Moreover, rights to use can be exclusive, since they can imply primary rights holders' subsidiary right to prevent others from using certain resources within the area over which traditional control is exerted (Pulea 1985).

region. Rights of transfer and loan and shared property rights also occur.

Exclusive Rights

Exclusive rights have been handed from generation to generation through ancestral families, spirits or gods, and are validated by historical-mythological associations. In the Pacific Islands, myths, legends and oral history frequently allude to the inhabitants' exclusive rights to their islands' resources (Pulea 1985). Subsequently, fishing rights in defined territories have been defined by customary law.

Primary Rights

Most commonly, these are rights to which a group or an individual is entitled via inheritance (i.e., a birthright), by direct descent from the core of a corporate group. Primary rights are generally comprehensive, since only they confer access to all resources within a defined territory. Inheritance, ancestral interests, social obligations and cooperative relationships within a social group provide continuity of ownership and rights.

Secondary Rights

Secondary rights are more limited than primary rights, often being restricted to specific fishing methods. They are acquired through affiliation with a corporate group, by marriage, traditional purchase, exchange, as a gift, or as reciprocity for services. Sometimes they may be inherited. Secondary rights are often given to inland villagers lacking direct access to the coast, particularly when their villages have historical and kinship ties with a coastal village.

Systems with "Nested Rights"

In some societies, rights to fisheries, which are usually to areas, are overlain by other rights, generally those to species and gear types. Most are quite simple, like those to locations with stone fish traps.

One complex and unusual system of such rights is that of Ponam Island, Manus Province, Papua New Guinea, where ownership is composed of three main independent and overlapping elements: (1) reef and inshore marine waters, (2) species and (3) fishing techniques (Carrier 1981; Carrier and Carrier 1989). There, ownership of tenured sea and reef areas is not exclusive, owing to strict limits set by these countervailing, nested rights.

Right of Transfer and Loan

Some traditional management systems permit the permanent, temporary or occasional transfer of rights to other social units. Often, temporary and occasional transfer requires users to compensate rights owners in cash or more commonly, in kind, usually with a portion of the catch. In other societies, however, individual fishers are proscribed by either statutory or customary law from transferring their rights.

Shared Rights

In some parts of the Asia-Pacific region, areal rights are shared between or among different corporate communities. Commonly shared rights have deep historical roots, and invariably, sharing is done only for the most productive waters or where kinship ties are strong.

Rules

Rules give substance and structure to property rights by defining how a right is to be exercised, through specification of required, permitted and forbidden acts in exercising the authority provided by the right. Thus, whereas a right authorizes a fisher to work a specific fishing ground, his options in exercising it are governed by rules which may, for example, specify gear type used or seasonal restrictions, among other limitations. The more complete a set of rights, the less exposed are fishers to the actions of others.

Basic rules define the geographical areas to which rights are applied; identify those persons eligible to fish within a community's sea space; and govern access of outsiders. Operational rules govern fishing behavior, gear externalities, assignment issues, as well as specify unacceptable fishing behavior, conservation practices and distribution of the catch within the community.

Definition of Fishing Territories

In the Asia-Pacific region, the sea territory of a social group is commonly, but not always, defined by proximity or adjacency to its settlement(s), and by lateral and seaward boundaries. As a general principle, the exclusive fishing territory of a community is the adjacent marine waters within the reef. But this varies considerably according to both local history and the more recent processes of national modernization.

In most places, communities maintain exclusive rights to all known adjacent submerged reefs, which are named and owned exclusively by particular families, clans, municipalities, islands, groups of islands or atolls, as the local social organization dictates. Seaward of the reefs, the degree of exclusiveness of rights gradually declines.

Eligibility Rules

In addition to holding rights, in many societies the persons who can actually engage in fishing are limited by community-based, national or cultural rules. In a great many societies in the Asia-Pacific region, membership of a corporate descent group, and thus inheritance, and/or residence are the only rules that must be satisfied in order to become a fisher; in others, further preconditions must be met. Such eligibility rules include caste membership, gender and skill level, among others.

Intercommunity Access Rules

Access controls are applied to outsiders, people from other social groups. There is often boundary permeability between neighboring groups, a consequence of long friendship, kinship or other close association. Boundaries are less permeable the more distant the "outsider" group is either socially or geographically. But increased commercial resource use often leads to strong access controls, even for close neighbors.

Throughout the Asia-Pacific region, the rights of outsider fishers are usually closely specified by rules defining access conditions. However, there is considerable variation in local details. Invariably, such rules require that prior permission be obtained before commencing fishing. Failure to do so is usually regarded as trespass, the penalties for which can be severe. Commonly, rules specify that some form of fee, compensation or royalty be paid once permission has been granted.

In some cases, outsiders seeking fish for subsistence are allowed free access, whereas commercial fishers might be granted access on payment of cash or kind, or prohibited entirely. Almost universally, commercialization and "commoditization" result in a demand for fees or prohibition, even when the target species has not

traditionally been harvested by the "host" community. Species restrictions are sometimes placed on outsiders.

Use Behavior Rules

Gear rules. Gear rules are prevalent in the Asia-Pacific region. Gear perceived of as harmful to fish stocks or habitats is widely prohibited. Similarly, generally in the interests of equity, gear regarded as being too efficient or exacerbating socioeconomic divisions within a community is also often banned. Many gear rules are established to prevent gear externalities.

Temporal allocation rules. In many places, rules are enforced to promote both orderly and equitable fishing. Frequently, such rules limit the number of canoes in a line, and ensure that the position of canoes is changed in a specific order, so all fishers can share equally in the best spots. Lottery systems for allocating space-time among fishing groups are widespread, especially in South Asia.

Fishing behavior rules. Almost universal are local rules aimed at promoting orderly fishing as well as protecting fish schools. Such rules are detailed and usually locally specific. Examples include the ban on individual fishing with flares, in favor of group efforts; acceptable levels of noise; and the way in which boats and gear must be handled so as not to disturb schooling fish.

Species rules. Rules are common regarding the harvest of certain species; for example, turtles are reserved for high-ranking persons, such as chiefs in the Pacific islands. Other rules forbid catching totemic and sacred species.

Conservation Rules

The conservation intent within traditional community-based marine resource management systems is controversial (Ruddle

1994a). It is important, therefore, not to assume *a priori* that traditional management systems are intentionally conservationist. Rather, local rationale and possible conservational functions must be examined for in each case.

If traditional management systems were originally designed as a conservation measure (admittedly an unprovable assumption in most places), they would have been the most widespread one employed throughout the Pacific Basin. Prevalent in the Asia-Pacific region is the imposition of closed seasons that follow local knowledge about the spawning periods of key fish species and prohibit their capture during such times, together with other types of customary fishing regulations, often based on nonecological rationale, such as religious taboos, that appear to have similar conservational implications (Johannes 1978).

Such practices are not static. Some of the new regulations that village communities devise to cope with changing technology and fishing practices are explicitly conservationist.

A wide range of conservation rules was traditionally employed by many communities in the Asia-Pacific region, especially in Oceania (Johannes 1978, 1981, 1982), to ensure sustained yields. Some were clearly designed to conserve stocks; others also functioned coincidentally as conservation devices. Among these were the live storage or freeing of surplus fish caught during spawning migrations; setting up of closed seasons (particularly during spawning); placing taboos on fishing areas; reservation of particular areas for fishing during bad weather; size restrictions (although this was uncommon in Oceania); and, in recent times, gear restrictions (Johannes 1978).

Distribution of Catch Rules

Rules defining access to harvested fish are widespread in the Asia-Pacific region.

These are an extremely important set of rules in many societies, since in terms of equity within a community, access to fish once harvested can be as or more important than access to fishing grounds (Collier et al. 1979; Kendrick 1993). Such rules include those to provision the family and community; those required as subsequent and continual repayment for the acquisition of fishing rights; and those enmeshed in general community sharing, reciprocity and related norms concerning equity and fairness (Ruddle 1994a).

Monitoring, Accountability and Enforcement

If rights are to be meaningful, provision must be made within the system for monitoring compliance with rules and imposing sanctions on violators. Under community-based marine resource management systems in the Asia-Pacific region, monitoring and enforcement are generally undertaken within the local community; resource users police themselves, and are observed by all others as they do so.

For a variety of reasons, traditional authorities frequently imposed temporary or permanent bans, as well as spatial, temporal, gear or species restrictions on the exploitation of marine resources. These commonly took the form of taboos.

Sanctions

Sanctions are widely invoked throughout the Asia-Pacific region for the infringement of fisheries rights and the breaking or ignoring of locally formulated rules governing fishing and other marine resource uses. The four principal types of sanctions are social, economic, physical punishment and supernatural.

Social sanctions include ridicule, shaming, ostracism and banishment. Ridicule was

widely used in Polynesian societies. *Economic sanctions* consist of monetary and in-kind fines, destruction of gear and forced labor, among others. *Physical punishment*, including death, was a fairly common penalty in the region, especially throughout Oceania, for the violation of rules. *Supernatural sanctions* are all-pervasive throughout the region, and fear of them reinforces the other types of sanctions.

Determining a Future for Traditional Marine Resource Management Systems

For much of the tropical world, traditional fishing rights are an ill-defined factor that can be construed either as hindering the use and development of national fisheries or in contrast, encouraging their effective use and management. Two major problems commonly arise from traditional fishing rights:

1. that of providing "outsider" commercial fishers access to underutilized grounds and species from which they are now excluded by traditional fishing rights claimed by people who themselves do not fish commercially; and
2. that of preserving the valuable role played by social organizations associated with community-based traditional management systems and conventional rights.

Regardless of the precise legal situation, individuals, groups, clans or villages, as locally appropriate, claim exclusive fishing rights over certain areas. Further, despite their legal basis, or lack of it, such claims will be zealously guarded. Thus, outsider commercial fishing is not possible, and this hampers the development of a modern, efficient, inshore national fishery sector. That being the case, it has been suggested that for Papua New Guinea, legislation should be considered to oblige

traditional fishing rights holders to allow outsiders access to grounds that are not fully exploited (Anon. 1979).

On the other hand, these inherent difficulties need not preclude attempts to transfer some of the underlying principles on which some traditional systems are based. However, much interdisciplinary research - based on combined human ecological, biological and economic approaches - is first required to elucidate those principles, as well as to correct many of the misplaced concepts and erroneous interpretations that have characterized some of the earlier research on the topic (Ruddle 1988a, b; 1994a, b).

Policy Alternatives for the Future of Systems

Clearly, some traditional community-based management systems will have a future usefulness, both nationally and locally. But equally there will be valid grounds for either diluting, modifying or abolishing outright other systems. Deciding which alternative course to follow will certainly depend on national priorities. But it should also be based on national fisheries management capacities. In virtually all cases, however, the future of community-based marine resources management lies in a form of co-management with some higher level of government.

Essentially, there are three basic alternative policy approaches regarding traditional community-based fisheries management, particularly with respect to its relationship to the development of fisheries and other economic sectors.

Ad Hoc Approach

Basically, this implies that no clearcut policy is established and legislated for, and that each problem is resolved as it arises,

based on its merits in terms of the relative costs and benefits to the nation, region and local community. This has the advantage of political acceptability, since no changes are required, and traditional sentiments and rights are reinforced. The disadvantages are that traditional rights holders incur no obligations, such that development of other sectors will be difficult at best and impossible at worst. Moreover, because this process is *ad hoc*, solutions to problems will be piecemeal, and no guidelines will emerge for the legal interpretation of traditional fishing rights and their articulation with national development priorities. It is therefore at best a stopgap approach, since it is obviously unsatisfactory in the long term.

Legislation to Dilute Traditional Systems

This approach requires legislative action to curtail and strictly define the powers of traditional rights holders. It could also modify traditional management systems to enable the use of certain fishing rights areas for other economic activities, including commercial fisheries. Under certain conditions, systems would be abolished entirely.

It makes little sense in terms of overall national development to prolong unnecessarily the existence of community-based management systems that have outlived their historical usefulness. Such a situation arises most clearly near urban-industrial centers, where, depending on the density of onshore developments, the invalidation of systems could also be justified by the potential health hazard of fish taken from polluted waters. Weakening or invalidating traditional systems is a course of action that can be justified where such systems impede alternative and more important uses of coast-marine space, as in those parts of Japan where they have

become a "living fossil" (Ruddle 1985, 1987, 1989, 1990).

But some would demur. Johannes (1988b), for example, believed that the invalidation or weakening of systems is unjustified, except where they are finely subdivided through "nested" rights, since rights within rights seem to have a great potential for problems, and little or none for conservation. Regarding situations where traditional authority has lapsed beyond the point of possible revival, as around urban centers, Johannes (1988b) felt that fisheries management may best be pursued by cooperatives. This was done in Japan (Ruddle 1985, 1987). Nevertheless, this is no easy task, and failures have been legion.

The advantages of this approach are that it allows both commercial fisheries and other economic sectors to develop rapidly; clarifies the issues; and defines the modern rights of traditional rights holders. The disadvantages are that the approach is often politically difficult and numerous implementation problems would arise. In many cases, the losses of rent, administrative costs and problems, and possible social unrest would outweigh the economic and other benefits derived. Further, once systems were either abolished or severely eroded, they would be difficult if not impossible to re-introduce at some later date, should the need arise.

In many cases, community-based management systems ought to be invalidated or weakened locally, but in the national or regional interest, such a policy implemented nationwide carries with it enormous costs. This is particularly obvious in far-flung archipelagic nations, such as Indonesia, the Philippines, Kiribati, Tuvalu, Solomon Islands or Vanuatu, but no less in any developing nation that lacks the financial and physical ability and personnel capacity to police its inshore waters. Solving this major problem of costs provides one of the most valid reasons for retaining well-functioning community-based marine resource management systems.

Invalidating traditional community-based systems together with the local knowledge base that underpins them also eliminates local policing of resources, which results in increased financial, administrative and personnel burdens on governments that cannot handle them. In dispensing with such systems "the government would thus be disposing of services it got for free and assuming expensive new responsibilities it was ill-equipped to handle" (Johannes 1988b). As Bailey and Zerner (1992) observed of Indonesia:

The Indonesian government is incapable of designing effective fishery management systems due to limited understanding of the complex and highly variable nature of fisheries resources. Government management policies which fail to recognize local institutions and economic needs may be creating more problems than they solve. Moreover, the Indonesian government has limited ability to enforce what regulations are in place due to staff and budgetary constraints.

But the ability of local community management systems, based on a depth of traditional ecological knowledge, is quite the opposite. However, apart from the exceptions noted in the previous section, to be effective, these local rules require recognition, acceptance and protection under state law.

In many instances, practical considerations, such as the inability of a poor and/or large nation to police its fisheries, logically lead to the alternative of community-based management. It has been demonstrated that under certain conditions, traditional systems represent a viable solution to the inadequacies and inefficiencies of centralization and unisectoralization. Co-management is a logical approach (Bailey and Zerner 1992).

In those rural, mostly subsistence-level societies, where conventional authority remains strong, enforcement and punishment are often largely traditional. This can also be used to serve a modern purpose. Traditional punishment can be severe and feared more than that meted out by government, as in Okinawa (Ruddle and Akimichi 1989), Palau (Johannes 1981) or American Samoa (Wass 1982). As Wass (1982) observed of American Samoa, "Management regulations instituted on the village level are much more effective than those of the territorial or federal governments because they are promulgated within the cultural context by traditional leaders and, consequently, are more likely to receive the approval and fealty of the villagers." Thus, where traditional authority remains strong, a community-based management system can still provide a solid foundation for modern fisheries management. However, ironically, when such authority is eroding or has disappeared, it is often the fault of the government (*vide supra*).

In summary, replacing a traditional system with "open access" would entail all the discouraging results so familiar in open-access fisheries. In tropical small-scale fisheries, those problems would be compounded by the following factors.

1. The multispecies nature of fisheries would require more cumbersome regulations and correspondingly more enforcement than systems in temperate waters.
2. The scantiness of biological data for use in management and the large percentage of the small-scale catch used for subsistence would create immense logistical problems in developing essential data sets from very widely scattered fishing communities.
3. The vast number of geographically scattered fishing units would cause almost insuperable financial and logistical problems for regulation and

monitoring compared with Western commercial fisheries.

4. The zeal with which data are collected and analyzed, together with official enforcement of regulations and honesty among officials leaves much to be desired.
5. Most governments are too poor (or fisheries have too low a priority) to implement conventional regulatory systems required by open-access regimes or to handle the resultant problems.

Legislation to Reinforce but Specify the Scope and Power of Traditional Rights

The advantages of this are a recognition of historical and present situations and, possibly, the promotion of resource conservation. That this approach would make conventional development difficult is certainly not a bad thing, although many would regard it as a disadvantage. The reduction of the powers of the central government while placing responsibility on the rights holders would likely be construed as a disadvantage by vested interests. However, this could be overcome by reinforcing the scope of traditional systems within a concurrently legislated framework of co-management.

Selecting among those three alternative approaches is not easy; there are no quick and simple solutions to the problem. In the Asia-Pacific region, for example, the question of traditional fishing rights is one of the most interesting and vexing practical, political and philosophical problems confronting fisheries management. If the present situation is maintained and rights reinforced, fisheries development will have to take place within the context of exclusive properties, which is the historical pattern of the Pacific. Full debate on the issue is required at village, local and national levels,

and the national government should thoroughly appraise local governments and villages of their rights. Before any action is taken, however, it is imperative that local governments document the nature of existing fishing rights systems nationwide, particularly those that have been or are being exercised.

Criteria for Determining a Role for Traditional Management Systems

Johannes (1988a, b) and Johannes and MacFarlane (1990, 1991) suggested basic criteria for determining whether marine resource management should be tailored to an existing traditional management system or whether an entirely new system should be created: (1) contribution to conservation; (2) definition and robustness of rights; and (3) compatibility with government policy.

The order is reversed here to better reflect what I regard as a more realistic priority for evaluation, in what is after all a highly charged political process. Compatibility with policy - where one exists - would be the principal basic criterion in most nations (Ruddle 1994b).

Compatibility with Government Policy

National development policies and fisheries policies within them, differ widely in objective and definition. But it should be determined if policy favors maximizing rents, food or employment. The future role, if any, of traditional resource management would vary depending on policy priorities.

Formerly, colonial governments often ignored or overrode traditional systems, granting access to industrial fishers lacking

traditional rights in an area (e.g., Johannes 1978). Nowadays many governments, especially in the Pacific Islands, recognize the legitimacy of traditional management systems. When such systems are likely to hamper fisheries development, they may reconcile through mediation the needs of traditional and industrial fishers. This is sometimes done by compensating traditional rights holders for allowing access to outsiders (e.g., Johannes 1982; Baines 1985). Thus, a balance is sought between employment and rent for national development.

If maximizing economic rent is the main government fisheries objective, then it should be determined if traditional rights holders exercise their property rights in a manner that discourages overcapitalization as well as overfishing. When a traditional system operates to discourage outsiders from entering heavily exploited fisheries, this helps limit overcapitalization. But overcapitalization may still occur within the traditional rights-holding group itself.

Such a performance test of the ability of a traditional management system to forestall rent dissipation was performed in Sri Lanka by Panayotou (1984, 1989). If fisheries are being managed successfully by such a system, then the members ought to be earning incomes above their opportunity costs, which can be estimated by comparing what other socioeconomic groups earn in other sectors. Incomes of boat owners and crewmen were estimated and compared with their opportunity costs. Boat owners were found to have average annual incomes ranging from US\$1,150 (for traditional vessels) to US\$5,000 (for 3.5 t-mechanized vessels). In comparison, owner-cultivators, sharecroppers, office workers and state employees earned an average of less than US\$500 per annum. Crewmen earned an average of US\$5/day, 2-3 times more than the daily earnings of agricultural laborers or unskilled and

semi-skilled workers. In contrast, in Thailand and the Philippines, where traditional systems of fisheries management have totally or largely disappeared, small-scale fishers earn incomes far below their opportunity costs, and must engage in a range of other economic activities to earn a living (Panayotou 1985). The relatively higher incomes enjoyed by Sri Lankan fishers were attributed to the efficiency of the traditional restricted-access management system, after competing hypotheses, such as religious prohibitions on Buddhists taking life, were rejected (Fernando et al. 1985).

Definition and Robustness of Fishing Rights

The clarity of definition, strength with which they are upheld and permeability of fishing rights vary enormously. This is potentially a major difficulty. One main problem might be precise determination of the location of traditional boundaries; they may be imperfectly remembered, and written record would but rarely permit a legal settlement of conflicting claims (e.g., Johannes 1982, 1988b). Equally complex is the identification of traditional rights holders. Deliberate relocation of settlements by churches or governments is compounded more recently by urbanization having diminished the role of kin groupings, such that individuals' rights are only hazily recalled. Thus, efforts to resuscitate or resurrect a traditional system under such circumstances might lead to territorial disputes and long-lasting conflicts (e.g., Johannes 1982). Given such potential problems it is not surprising that governments might be loathe to codify traditional tenure systems within state law, unless they have functioned continuously or at least until historical times, as in the Solomon Islands (Allan 1957).

Contribution to Marine Resources Conservation²

Although traditional management systems generally provide an incentive to harvest in moderation, some rights holders do not limit their own fishing pressure (e.g., Polunin 1984; Carrier 1987). In some communities, for example, a causal relationship between the contemporary rates of exploitation and future fish yields is not perceived (e.g., Carrier 1982, 1987). Sometimes this might be because there has been no such relationship, abundant supplies having always exceeded demand, as in parts of Melanesia where human population densities are low, or in the Torres Strait Islands (Johannes and MacFarlane 1991). Later, when marine resources in such areas are threatened by increased fishing pressure, as when they become commoditized, for example, fishers may not recognize the need for conservation because there is no cultural precedent (e.g., Johannes and MacFarlane 1991).

But this is not to say that traditional management systems serve no conservation purpose. Almost universally, rights holders limit fishing by outsiders. Regardless of motive, and although not guaranteeing efficient marine resource management, this is a vital prerequisite for conservation in fisheries threatened with overexploitation.

The common assertion is that the traditional practice of area or temporal closures on reefs enhances fish stocks by: (1) maintaining species abundance and diversity and possibly enhancing these characteristics over the long term; (2) providing undisturbed breeding sites; (3)

²To evaluate a system in terms of its actual or potential conservation value presupposes a prior assessment of whether or not marine resources involved are now or likely to be overexploited and/or degraded or destroyed by pollution, destructive fishing practices or other human activities.

exporting biomass by emigration of adult individuals; and (4) exporting biomass over a wider area via larval dispersal. However, there have been few direct tests to verify this assertion through natural or manipulative experiments. This is a severe drawback, since further advances in tropical coastal fisheries management depend on experimenting and testing empirically the consequences of various management regimes (Larkin 1984).

In one such test, Alcalá (1981) attempted to relate protective management to fish yields at the Sumilon Island Reserve, Central Visayas, Philippines, which was closed to all fishing from 1974 to 1984. At $16.5 \text{ t} \cdot \text{km}^{-2} \cdot \text{year}$ over a five-year period, the areas adjacent to the reserve produced one of the highest average yields of any reef area in the world. However, because no data were available on reef fish abundance at Sumilon before the reserve was established, it was impossible to verify the assertion that protective management caused the high abundance and species richness at the site. But given the extremely high fishing pressure on Philippine reefs, it can be argued that protective management was a major factor in maintaining the high abundance of many species. Also in Central Visayas, Russ (1985) compared three sites at Sumilon Island, Apo Island and Balicasag Island, and focused on Serranidae stocks, a highly favored target species worldwide, and therefore vulnerable (Randall 1982).

Limited evidence in support of the first three of the assertions noted above is provided by the Sumilon study. The fourth needs detailed research on the patterns of dispersal and recruitment of coral reef fish.

Alcalá and Russ (1990) reported further on a natural experiment to test directly the use of area closure as a management strategy on Sumilon Island. After a ten-year closure, protective management broke down in 1984, resulting in intensive fishing by 100 municipal fishers. In the 18

months following the breakdown of protective management compared with the same period while it was in operation, there was a 54% increase in the total yield of reef fisheries. Their research indicated that protective management maintained high abundance of fish in the reserve and resulted in significantly higher yields in adjacent areas, presumably owing to the migration of adult fish.

Other such tests have been performed on St. Lucia, in the Caribbean (Smith and Berkes 1991) and some coastal lagoons of Ghana, West Africa (Ntiama-Baidu 1991). In both areas, the beneficial qualities of community-based fisheries management were substantiated.

Conclusion

Most nations face an array of dilemmas in determining rights and delineating responsibilities in marine resources management and development. These include deciding what institutions should manage and enforce regulations for subsistence fisheries; legal support for traditional regulation and enforcement; the managerial and developmental role of the central government in small-scale commercial fisheries; the feasibility of centralized management plans versus local decisionmaking; and the nature of the consultative and collaborative process among fishers, local governments and national authorities. Initially these look like local versus central jurisdictional matters, but the underlying issues are policy, and the means of managing marine resources and adapting traditional concepts to modern needs and frameworks, such that the range from subsistence fisheries to the highly commercialized industrial fishing is served properly.

It is becoming increasingly asserted that traditional community-based marine resource management systems may have an important role in the co-management of

inshore fisheries. That may well be the future for many such systems. But it is important to exercise caution, lest yet another poorly conceived, fisheries management fad blossom, with all the failures, disappointments, disillusionment and wastage that would inevitably result.

There are several important cautionary points to be borne in mind (Ruddle 1994b):

1. Verification of the assertions about traditional systems is still lacking.
2. Wholesale transfers of concepts would be hazardous at the very least, since such systems, by definition, arise from the deeper cultural patterns of the societies in which they are enmeshed (Ruddle and Akimichi 1984; Durrenberger and Pálsson 1987). So, much more than an understanding of just the local, traditional fisheries alone is required; entire national systems of fisheries production, particularly the relationship between household (traditional) and capitalistic (modern) production, need comprehension (Ruddle 1988a).
3. Traditional systems could be "fossilized" through explicit, detailed legal definition in the terms of state law. This may weaken the adaptive flexibility of a traditional system (Ruddle and Johannes 1985).
4. The application of traditional knowledge and management practices to the solution of contemporary resource management problems is also a relatively new approach, at least in Western terms, but is now the focus of considerable academic and applied interest, partly because of the inadequacy of the biological and economic models usually applied. Largely as a consequence of this newness, the relevant concepts and methodologies are not yet well-defined.
5. Perhaps most important, traditional community-based management systems are not an automatic godsend

to fisheries managers. They create difficulties. Not uncommonly, therefore, governments and entrepreneurs attempt to either weaken or invalidate them.

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Forest Farmers and Fishers as Stewards of Community Resources

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Introduction

In the mounting frenzy over our endangered natural resources, traditional conservationists have been quick to accuse forest farmers and coastal fishers of environmental rape. They cite intensive swidden cultivation as the despoiler of upland watersheds, and overfishing coupled with the use of poison or dynamite as the equivalent in coastal waters and coral reefs. Nothing less than strong punitive measures, they argue, can restrain these environmental criminals from performing their dastardly deeds.

For many years, therefore — indeed to this day — upland dwellers have been harassed by government forest guards bent on driving out “squatters.” Erring fishers face arrest, fines or confiscation of their catch and equipment by the local police or military. Fortunately, the punitive ap-

proach to natural resource management has in recent years fallen upon hard times. The inability of state- or private-property regimes to slow down, much less reverse, environmental degradation despite authoritarian tactics, has forced a redefinition of the problem and its solutions. Underpinning this transformation has been the emergence of people-centered, sustainable development movements. The resulting alternative paradigm embodying an equitable, participatory, environmentally sound and holistic approach is forcing out authoritarian modes in favor of democratic ones.

Revitalizing Stewardship

Former forest “squatters” are thus gaining recognition as citizens with a right to permanent tenure in their mountain habitats or seaside dwellings. Those who have

obtained secure tenure now have a stake in the protection and nurturing of their environment. The government's former policing role is shifting to one of service. The new orientation stresses people's stewardship capacities; guarantees their tenure rights; and affords them access to tools and technology, livelihood opportunities and basic services like health, nutrition, education, housing, clean water and sanitation.

Community-based nongovernmental organizations (NGOs) facilitate these developmental thrusts through community organization, management skills training and technology transfer.

Where organized community groups of poor people once risked identification as "Communists", with its accompanying persecution, the label has lost its meaning in the aftermath of the Cold War. The resulting democratic openness has led to a virtual explosion on the scene of NGOs and people's organizations (POs). In the Philippines, the 1986 people power overthrow of the Marcos dictatorship accelerated this process. Local government initiatives, too, have grown in strength with the demise of top-down, centralized, authoritarian regimes of the left and the right and the passage of local autonomy laws. Grassroots movements, honed by years of struggle, find further support in the global environmental movement's championing of citizen participation as crucial to genuine development.

People empowerment, then, is intrinsic to the sustainable development paradigm. It is also the basis for effective community resource management. People aware of their rights and ready to exercise them; building new forms of technology and information into their indigenous knowledge systems; and convinced that government can provide basic social and support services while maintaining an orderly and peaceful environment — this is the context in which people as genuine stakeholders of com-

munity resources re-establish their stewardship over forests and coastal waters.

Shifting to Community Management

People who are chronically poor, malnourished, in ill health; unsure of their residential tenure and sources of livelihood; and afraid of defying exploitative and entrenched power groups can emerge from this vortex only if they find ways of exerting significant control over the resources around them. This transformation can come about through an empowerment process nurtured by specific catalytic forces.

Community organizing

Various modes of community organizing exist, some more effective than others. Among the best in terms of sustainability is basic issue organizing. Here community groups define, analyze and prioritize the problems they face. These may include eviction threats; poor quality seedlings from the government; an abusive policeman; a rural health team reluctant to visit the village regularly; mangrove swamp conversions into shrimp cultivation ponds; dynamite fishing protected by local officials; and others. A next step is for the people to identify power figures who are in a position to change the situation but are usually unwilling to do so. People then decide on actions they will take; work out strategies and tactics for confrontation and negotiation; take action, then assess the outcome collectively. The resulting problem redefinition generates the next action-reflection cycle.

A series of victories enables formerly disadvantaged individuals to achieve through group action a sense of power and self-realization about their ability to address and solve local problems. In the course of

this empowerment process, they also learn to plan and manage community concerns. Usually, trained local or outside organizers initiate this empowering process, focusing on the more disadvantaged people. Actual managerial projects come later as people's confidence in their own efficacy grows. In time, conscientious, organized groups learn to deal effectively with both power and management issues on a continuing basis even after outside organizers or project initiators have departed.

Social development or project-based organizing represents another mode. Here, outside organizers have usually predetermined the kinds of projects they will encourage a community to undertake, based largely on the outsider's affiliation and corresponding analysis of what the people need. Sometimes needs are defined through a participatory rural appraisal scheme, which promotes joint learning and commits the collaborating parties to carry out the resulting projects together. Particular thrusts may range from health, family planning or nutrition to agrarian reform, forest conservation, modern fishing technology and women's income generation. Government extension agents and NGO technicians alike focus on technology transfer and management training through collaborative community efforts. A variation on this is the *community development mode* that also starts by helping people identify needs and problems but tends to prioritize these in the context of the agency's own service delivery capacity.

A major difference between issue-based organizing and the various social development thrusts is the initial confrontation-negotiation mode of the former versus the collaboration-harmony relationships favored by the latter vis-a-vis powerful figures in government or the private sector. In the end, issue-based organizing combined with sound project management activates sustainability. This process is enhanced if the government forces are open to a genuine

tripartite government organization-PO-NGO partnership. While project organizing leaves POs with the capacity to handle the introduced technology fairly efficiently even after the departure of the NGO, they are less able to tackle different types of projects or address the recurring problems of inequitable and arbitrary resource allocation decisions by local or national power figures. Combining issue-based, or empowerment organizing with project management organizing therefore is a strategy worth pursuing.

Clearly, community organizing should be recognized as a process of confidence and solidarity building derived from people's actual experience of struggle to attain a common objective. Although confronting the basic power issues is essential from the beginning, success is more likely when groups start with small, manageable issues within that context, like demands for improved seedlings or better transport facilities for sending goods to the market. As the groups analyze and learn from each small victory or defeat, they gain the confidence to tackle increasingly complex resource allocation matters, like government contract reforestation requirements, land titling and illegal loggers and trawlers. New values are reinforced, namely, solidarity, fighting for one's rights and democratic community resource management.

Security of tenure

If people residing in upland or coastal areas remain unsure of their tenure, they are not likely to invest their time, talent or hard work in their surroundings beyond minimal survival levels. Hence, any program aiming to foster sound community resource management must necessarily face this problem at the outset. It need not be solved before other project activities start, but should be addressed concurrently with them.

Sensitivity to gender, age, ethnicity and social class

These factors, too, have an important bearing in the design of programs. Local residents themselves may fail to include these sector-specific concerns into their planning. Men tend to undervalue the contributions of women to production, even though the latter often handle a major if not dominant share of subsistence plus other work. Encouraging women to speak out and take leadership positions in community matters must be a part of all community organizing, not only for egalitarian reasons but also for efficiency. Adults also ignore the voices of youth and children, and sometimes leave out the views of the elderly as well. Ethnic minorities have little say in the deliberations of the majority, even though the land may have once been under their control, tilled according to the precepts of indigenous knowledge about sustainable land and sea use. The wealthier families assume to represent the interests of the entire community, even though their comprehension of the lives of the poor shows little connection with reality or social justice. A balanced judgment is needed, therefore, to ensure that these and other marginalized groups participate actively in deliberations about the future of their community. Targeting poverty and then designing and monitoring project activities with a systematic bias toward the poor complete the picture.

Attention to livelihood and its sociocultural context

Those who work with upland or coastal people for improved resource management need to understand the problem from the people's holistic perspective. Given the context of structural poverty, most of the rural poor seek merely to grow enough food

for subsistence; earn some cash income; acquire value-enhancing technology; and gain access to markets so their families can survive and prosper and their children can have a brighter future. While the professional forester may focus on reforestation and conservation programs, and the coastal resource technician on minimizing damage to fish and coral species, both need to recognize that rural families must daily engage in a mix of activities whose priorities change from one day to the next. If this is the fishing season, the father may go out to sea while his wife dries and sells last night's catch assisted by the children and other family members. The following week may find the entire household weeding the irrigated rice plot; followed by a climb to their forest farm to harvest sweet potatoes, build soil-retaining rock walls, plant tree seedlings or cut rattan for the market.

Rural families must also address recurring health problems. Many a farming couple have had to surrender valuable working time to illness, their own or more commonly that of their children. Diarrhea brought about by unsafe drinking water and exacerbated by inadequate food intake; unchecked measles epidemics stemming from out-of-reach immunization services; chronic colds and chills leading to pneumonia—all of these and more take their toll on people's lives. Women in particular suffer from too frequent childbearing, anemia, reproductive tract infections and chronic malnutrition. Parents anxious to ensure the survival into adulthood of at least some of their children and convinced that a few of them are bound to die young will understandably resist family planning measures. Many of these illnesses and resulting deaths can be prevented by effective social service outreach programs emphasizing preventive and primary health care, nutrition, environmental sanitation, education, responsible parenthood and women's health programs.

Pursuing a constantly changing mix of activities represents a typical survival

strategy of poor families. Forest farmers and fishers have woven together over the years an intricate tapestry of activities to maximize their livelihood options and economic security. Kinship and broader alliance ties, reciprocal obligations, power relations, religious tenets and cultural values keep the system going by clarifying who should do what with whom, when, how and why. External agents who demand priority attention to *their* single-facet program; ignore the wide array of other demands on rural dwellers' time; and fail to integrate their own innovations into the people's lives cannot be serious about helping.

Partners in Community Management

While the people of a community are best situated to manage local resources most effectively, they can benefit from the contributions of several important partners. Among these are other forest farmers and fishers with experience in modern community resource management; issue-based and social development NGOs; academics committed to participatory research with the people; and enlightened government groups. Empowered community resource management emerges from an organizational process that highlights creative tension leading to healthy confrontation and negotiation, with mutually beneficial collaboration as the outcome.

Experienced forest farmers and fishers

Probably the most credible promoters of new approaches and technologies are those with whom one can identify. Forest farmers will readily listen to and believe their peers who work side by side with them on the farm, showing them how to build A-frames and retaining walls or plant hedge-

rows against soil erosion. Fishing families are more likely to follow the examples of their counterparts farther down the coast, who have banded together and successfully pressured local government officials to stop trawlers from encroaching on their territory. The men, women and youth who manage these resources well should have the opportunity and financial support to share their skills and conduct on-site training/learning workshops in neighboring villages—farmers teaching farmers, fishers teaching fishers.

Nongovernmental organizations

It often takes an outsider to jar rural dwellers into alternative ways of thinking and doing. Accustomed to following traditional risk-minimizing patterns of resource use and local power relations and also lacking information on and control over new technology, most follow the safe path of repeating and reinforcing the known. Into this picture come NGOs committed to helping local residents understand and adopt promising new options. Their ideas, training and other forms of support lead to community actions that can reverse the drift of inertia, transforming a once passive group of people into active managers and citizens willing to challenge the status quo. The NGOs organize and facilitate meetings, conduct learning workshops and link the village with the outside world in productive new ways. They serve as advocates for the interests of the poor among government officials, local elite and policymakers. The best among these intermediary organizations ensure, however, that they do not speak for the people but enable people to think, decide, act and represent themselves. Since self-reliance is their criterion for successful community organizing, NGOs strive to wean POs away from any dependency that may have developed earlier in the process.

At the same time, the notion of NGOs "working themselves out of a job" has come under question in the light of long experience. While POs should and do take over the direction of their activities, the situations in which they operate change so rapidly, with new opportunities continuously emerging, that NGOs able to stay on the cutting edge of innovation benefitting POs can keep revitalizing their partnership without apology. The key element is to build a relationship of trust and equality in which the NGO shifts from its initially dominant facilitating role to one of technical assistance at the behest of the PO.

Government officials

Providing technology, services and effective governance is the role of public officials. A people-centered development paradigm, however, demands a shift from the traditional authoritarian, controlling and patronage mode of governance to a democratic, enabling and egalitarian one. This requires a new kind of public official, who is comfortable interacting with ordinary people as equals; listens to and learns from them; is service-oriented; and builds his/her credibility through transparency in dealing with them. This model official also respects people's rights; recognizes the wisdom of much of their indigenous knowledge; accepts the validity of their technology in particular contexts; values their worldview and way of life; and takes quick and effective action to address their concerns. Appreciating the salutary role played by people-oriented NGOs constitutes part of this new orientation in public administration.

Academic researchers

Acceptance of the alternative paradigm should likewise affect the ways in which

university scholars conduct their research on community resource management. More of them must start by attempting to see the world through the eyes of the community, adjusting the conceptual framework for data gathering to reflect the people's insight. Problem identification with the people and academics as coresearchers will emerge from this framework and provide a realistic guide to the subjects for study, the specific information needed, the selection of respondents, the types of analysis required, and the conclusions reached. The people, assisted by NGOs, technicians, government officials and academics, can thus devise sound solutions for enhancing community resource management. Participating in a practical, productive activity can bring added benefits to researcher who can continue writing up the research for their peers and advocating among policymakers their scientific perspective, now validated by the community.

Donors

If donors are to do their share in fostering community resource management, they need to understand well the wide range of situations at the grassroots level. This can be facilitated by visits to rural communities, where they can talk with POs made up of men, women and youth actually engaged in resource management activities, and ascertain the kinds of concerns that alternatively drive and constrain them. Close contact with community-based NGOs and their linked urban-based networks, alliances and federations is crucial for keeping abreast of developments on that front. Following the writings of participatory researchers will further expedite comprehension. Meeting government officials not only in the capital but also in provinces, municipalities and villages will round out their information and better guide their efforts toward giving useful grants or loans.

Conclusion

The world's resources are declining at such a rapid rate that unless new and imaginative measures promising significant levels of success are established, succeeding generations will have few benefits left to inherit. People-centered resource management is the key principle of our time. As Senior Forest Specialist Barin N. Gangull (1993) of the Asian Development Bank categorically stated:

...developmental assistance to the forestry sector will succeed only if the projects make a deliberate attempt to bring about changes in policies which will encourage handing over the forests to the community for management and protection. Common resource ownership and management regimes are the most effective Institutions for sustainable development

of forests in developing countries. Forest resource development projects that do not actively involve local users will not succeed.

All parties stand to benefit from the collaboration of forest farmers and fishers, NGOs, local and national government officials, academic researchers and donors in a synergistic, mutual learning process yielding effective systems of community resource management. The real winners will be the people, their resources and environment.

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Research Directed at Developing Local Organizations for People's Participation in Fisheries Management

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Introduction

This paper has four primary objectives: first, to briefly review arguments for people's participation in co-management through fishers' cooperative-type organizations; second, to go over quantitative research directed at isolating factors influencing success of these organizations; third, to examine factors identified as potentially influencing the success of these organizations in co-management; and fourth, to outline a quantitative research agenda directed at determining factors associated with the success of the use of the fishers' organizations in co-management. The proposed research is not expected to provide a fool-proof, cookbook approach. Local

differences require a certain amount of incrementalism or "muddling through" to develop policy directed at this type of co-management. Nevertheless, most governments, development banks and development agencies prefer project guidelines much more specific than an open-ended type of incrementalism permits. As McCay (1989) noted, research on "muddling through" projects enable "...more informed incrementalism in the future." It is argued here that quantitative research based on many such projects will reduce the amount of "muddling" necessary and more clearly specify where and why in a specific project an incrementalist approach is needed, thus increasing the likelihood of success and cost-effectiveness.

Use of Fishers' Cooperative-type Organizations In Co-management

To begin, it is assumed that there is sufficient justification for the claim that people's participation, when appropriately used, can improve the fisheries management process (McGoodwin 1990). How then can such participation be implemented? There are numerous, obvious reasons that local organizations, rather than individuals, can efficiently function to facilitate people's participation in fishery management. One is the difficulty of determining an appropriate time and place to convene a potentially large, heterogeneous group of individuals with interest in the fisheries. By appropriate is meant a time suitable to the work hours of fishers and other interested parties and a location convenient to all. Second is the onerous and sometimes impossible task of achieving agreement in a large group. The larger the group, the more people who will want to have input, and the greater the chances for conflicts to arise which will inhibit the decisionmaking process.

A third argument is that those who usually participate effectively in public forums directed at achieving people's participation rarely represent the masses of people who will be affected by proposed changes. Effective participants are often the relatively well-educated, wealthy elite who either have or plan to have some interest in the resource. The poor and less educated frequently have difficulty finding time to participate, and when they do, their lower level of education reduces the effectiveness of their input. It is assumed that the person or panel representing the members of the local organization at management meetings would be able to overcome these limitations.

Fourth, obviously an individual participant is more vulnerable to pressure than one supported by and delegated author-

ity by an organization. Pressures applied to the individual can range from obviously illegal (e.g., threats of bodily injury), to marginally legal (e.g., finding "cause" to have the individual terminated from present employment), to the legal (a wealthy vested interest instigating a costly, time-consuming lawsuit against the individual petitioner). Most private individuals could afford neither the time nor the expense to defend themselves against this type of legal action. Such "legal" maneuvers have occurred frequently enough in the United States that they are referred to by an acronym—SLAPP (strategic lawsuit against public participation). Organizations would be less vulnerable to such threats.

It is thus relatively simple to establish that there are numerous reasons to advocate use of organizations to facilitate people's participation in fisheries management.

Factors influencing the success of fishers' organizations

The next question tackles the type of involvement in fisheries management. If we eliminate the polar extremes (e.g., dictatorial management by government or self-management), most researchers dealing with this issue distinguish between consultative management and cooperative co-management (e.g., McGoodwin 1990). Consultative management would involve establishment of government entities which would consult with fishers' organizations before and during the preparation of management plans. The content, style and frequency of consultation will, of course, vary from system to system. Co-management is succinctly defined by Pinkerton (1992) as "...power-sharing in the exercise of resource management between a government agency and a community or organization of stakeholders." The realization of this concept also includes several variables such as content, structure,

and most importantly, degree of power sharing. For example, a precise description of any system of co-management must evaluate the degree of rights and responsibilities of both the government and the fisher organization with respect to information generation, rulemaking, surveillance and enforcement. Given the growing support for some type of co-management (Pinkerton 1989a; McGoodwin 1990), it will be the focus of this paper.

The next question involves the type of organization. While various types of organizations such as nongovernmental organizations (NGOs) (Thomas-Slayter 1992), regional native associations (Anders and Langdon 1989), fishers' wives' associations (Biro 1993) and others (Pinkerton 1989a, 1992; McGoodwin 1990) have been suggested as facilitators for people's participation in resource management, numerous researchers have provided evidence suggesting that fishers' cooperative-type associations¹ are appropriate for this activity (e.g., McCay 1980; Berkes 1986; Jentoft 1989; Bailey and Jentoft 1990). Although this suggestion has detractors and potential problems (cf. Kearney 1985; McGoodwin 1990), it should be taken seriously for two important reasons. First, some management plans about to be implemented (e.g., the Lingayen Gulf Coastal Area Management Plan) include the use of fishers' organizations (NEDA 1992). Second, the fishers' cooperative is perhaps the most widespread and best known formal organization among fishers worldwide.

¹In many countries, cooperatives are subject to regulations which, in some cases, are viewed as too restrictive by fishers. As a means of obtaining some of the benefits of a cooperative organization without the restrictions, they sometimes create fishers' associations which perform many of the same functions as cooperatives. In this paper, the term "cooperative" includes both formal and cooperative-type associations.

Jentoft (1989), basing his position on an extensive literature review and his own research experience, argued that fishers' cooperatives provide an excellent organizational framework for their participation in the management process. He did, however, indicate that the involvement of fishers through cooperatives does not guarantee successful management; that perceptions of "unfairness" and conflicts can develop among fishers within and among cooperatives; and that the level of success of a cooperative as a functioning organization influences its effectiveness as an entity involved in management.

Factors potentially influencing the success of fishers' organizations

It is essential to keep in mind the final point mentioned above when assessing the potential of fishers' cooperatives in management, for two major reasons.

First, one frequently finds inaccurate statistics concerning the level of cooperative development in many countries. There are many reasons for these inaccuracies (see Pollnac 1987), but it should suffice to note that this author has spent much time in developing countries, bouncing over back roads in search of "on paper" fishers' cooperatives only to find an empty building, rumors of "managers" who ran off with the funds, or nothing at all. Hence, before deciding to use fishers' cooperatives as a basis for people's participation in management, it will be essential to go beyond government reports on the existence of the organizations and determine their present levels of effectiveness as well as structural capability to take on the additional effort and responsibility of involvement in management. This may seem obvious, but I have observed fisheries development projects based on nonexistent, "on paper" fishers' cooperatives.

Second, fishers' cooperatives are notoriously difficult to develop (Pollnac 1988, 1991). In many areas, the failure rate is so high that the reputation of the institution has been damaged.² This suggests that special care must be taken in projects aimed at developing fishers' cooperatives to enhance people's participation in management.

Research to determine factors influencing the success or failure of fishers' cooperatives

A fair amount of literature reviews case studies and research on factors influencing the success or failure of fishers' cooperatives (e.g., Jentoft 1986; Pollnac 1988, 1991; Meynell 1990). Most of the case studies and research involved individual cooperatives or reviews of case studies which were difficult to compare due to differing research approaches and lack of systematic data collection (e.g., different researchers focusing on and recording different categories of data). Only recently have researchers gone to the field and systematically gathered comparable data from a reasonably large sample of fishers' cooperatives (see Poggie et al. 1988; Lubls 1990, 1992; Poggie and Pollnac 1991; Pollnac et al. 1991; Meynell 1990). These studies have systematically and quantitatively identified numerous factors influencing the relative success or failure of fishers' cooperatives. These same factors need to be evaluated concerning existing and proposed organizations to be used to facilitate people's participation in fisheries management.

²For example, in Indonesia the fishers' cooperative Koperasi Unit Desa-Mina, referred to by its initials KUD, also stands for *ketua uang dulu* (head [of the cooperative] gets the money first) or *kemana uang desa* (where did the village money go?).

Evaluating Fishers' Cooperatives

This section focuses on aspects of evaluating fishers' cooperatives as facilitators for people's participation in the fisheries management process. In situations where the organizations are in the process of formation, it is important to evaluate the plans in terms of factors known to influence relative success of fishers' cooperatives. Where there are pre-existing cooperatives, current organizational effectiveness needs to be assessed along with evaluation of factors that can be used to predict sustainability of the organization. If the organizations are, or can be predicted to be relatively successful, they must be assessed as to whether they could or should be used to facilitate people's participation in the management process.

Cooperative success

Review of project documents and other published literature led Pollnac (1988) to develop a checklist for fishers' organizational development composed of 29 distinct categories of information. He concluded that characteristics of the occupation of marine capture fishing influence sociocultural aspects of fishing communities that result in the need for organizational development methods different from those used for other occupational subgroups, such as farmers. The literature review (Pollnac 1988) was, in part, funded by the United Nations Food and Agriculture Organization's Fisheries Department, which commissioned 13 authors in 11 developing countries to prepare case studies of 1 failed and 1 successful fishers' organization, resulting in 26 case studies. Each case study was conducted using a similar format and detailed questionnaire to facilitate comparison. Many of the data categories in the questionnaire paralleled those

identified by Pollnac (1988), and the results of the data analysis, for the most part, confirmed his conclusions (Meynell 1990).

These conclusions were tested more rigorously in a comparative analysis of factors influencing the success or failure of 48 fishers' cooperatives in Ecuador (Poggie et al. 1988; Poggie and Pollnac 1991; Pollnac et al. 1991). This type of analysis controlled for variance in national government factors (e.g., legislation governing cooperatives, number of agencies involved, degree of government involvement, etc.; see Pollnac 1988) and minimized variance in the cultural context. The sample of cooperatives also included shrimp mariculture cooperatives, allowing tests of hypotheses concerning influence of aspects of the occupation of marine capture fishing on organization formation. Finally, the measurement of degree of cooperative success went beyond the dichotomy of failure or success. Degree of success manifested a range of values, being based on factor scores derived from a factor analysis of seven indicators of cooperative success.

Briefly, Pollnac et al. (1991) collected information from 48 fishers' cooperatives along the coast of Ecuador. Information included 17 items concerning community context (e.g., types of services, schools, health care); 17 items about material property of the cooperative (e.g., boats, motors, types of facilities); 18 items reflecting the operating style of the organization (e.g., behavior of members, characteristics of administrators, functions); and 7 items indicating relative success.

Each category of items was factor-analyzed to determine if interrelationships among individual items reflected some underlying commonality. The community context, cooperative material and operating style items were reduced to two dimensions each: basic and advanced development context; productive and facilities cooperative material items; and managerial and social solidarity operating char-

acteristics. As discussed above, the factor analysis of the cooperative success indicators resulted in one factor. These analyses resulted in one dependent and six independent variables.

Zero-order correlations among these variables indicated that among shrimp culture cooperatives, entrepreneurial management style was the most important predictor of cooperative success followed by activities promoting social solidarity, then productive equipment. Other variables were not significantly related to success. Among capture fishers' cooperatives, factors promoting social solidarity (meetings, social events, etc.) were most important, followed by facilities. It is important to note that facilities promoted solidarity by making the cooperative a convenient place for socializing (e.g., furniture, TV, toilet, lights). Other variables, examined one at a time, (e.g., community context, productive equipment and entrepreneurial management style) were not statistically significant predictors of success for capture fishers' cooperatives. Best subset regression analysis, which accounts for interrelationships among the independent variables, indicated that the best combination of variables for predicting success of both types of cooperatives was the managerial and social solidarity operating styles. However, while social solidarity operating style accounted for 52% of the variance in success of capture fisheries cooperatives, it contributed only 15% with respect to shrimp culture cooperatives, again indicating the importance of fostering social solidarity among capture fishers. In contrast, managerial operating style accounted for only 7% of the variance in success of capture fisheries cooperatives.

The findings confirm many of the conclusions in Pollnac (1988), as well as the basic argument that psychocultural adaptation to the occupation of capture fishing selects a personality profile emphasizing self-reliance and independence

— factors antithetical to effective cooperative membership unless corrective measures are taken. These measures could include training and development of activities and facilities to promote social solidarity. Most importantly, however, the more rigorous approach permits one to assess the relative significance of different factors contributing to cooperative success or failure. For example, it is argued that emphasis on factors influencing social solidarity is most essential for establishing capture fisheries cooperatives. Such recommendations can result in more efficient allocation of scarce development funds.

The foregoing discussion of cooperative success has two purposes. The first, and most obvious, is to delineate the factors useful for evaluation of these organizations. The second, and less obvious, is to illustrate the type of methodologies necessary for a more rigorous understanding of factors influencing the successful use of fishers' cooperatives.

Thus far, I am aware of only one rigorous, comparative research project investigating factors influencing people's participation in a marine management issue, i.e., in 11 estuary management programs in the United States (Imperial 1993). A sample of respondents from each program (e.g., program managers, public participation coordinators and citizen advisory committee chairmen) completed a questionnaire concerning aspects of the program, including outreach activities and perceptions of degree and effectiveness of public participation. Contextual variables such as population density, percent of urban land use, surface water area, drainage area, were also examined for their effects.

While not definitive, Imperial's (1993) research is a first step in the right direction, and illustrates the type of research necessary for the issues we are addressing here. The remainder of this paper will outline the elements to be considered in developing research for investigating factors

influencing success of the use of fishers' cooperatives.

Research Needs

Good quantitative research rests on a foundation of careful qualitative research. As with the identification of factors influencing the success of fishers' cooperatives, early comments concerning use of cooperatives in management were anecdotal, after the fact, unsystematic interpretations. Jentoft (1989) made a first step from the anecdotal to the analytical by reviewing the literature and conducting unstructured interviews to identify factors facilitating or inhibiting the involvement of fishers' cooperatives in co-management.³ Jentoft's (1989) summary of critical factors facilitating involvement include the: (1) existence of legislation delegating to fishers' organizations the responsibility and authority to implement and enforce regulations; (2) relatively small organizational scale in terms of size of membership and regional scope; (3) socioeconomic homogeneity of the organization's members; (4) tradition of cooperation and collective action among members; (5) fishers' degree of trust in organizations; (6) existence of long-term, multifaceted interactions among members or proposed members; (7) multiple functions performed by the organization (e.g., marketing, supply, as well as co-management); and (8) nonincremental as opposed to incremental introduction of the co-management function.

The eight factors mentioned above have been derived from case studies involving co-management with fishers' cooperative-type organizations. If the measure of success

³Not all of Jentoft's case studies were strictly cooperative-type organizations. The fishers' organizations in the Lofoten fisheries were committees formed specifically for management purposes (Jentoft and Kristoffersen 1989).

will rely on co-management, factors facilitating co-management, irrespective of organizational base, should also be examined in a research framework. Pinkerton (1989b) derived 20 propositions concerning successful co-management in fisheries from the case studies found in her book (Pinkerton 1989a). Those not overlapping with the factors above are summarized below.⁴

According to Pinkerton (1989b), favorable preconditions for co-management include: (1) a perceived crisis in stock depletion on the part of fishers and government; and (2) a situation where fishers are willing to contribute financially. The best mechanisms and conditions for co-management consist of: (3) returning some of the wealth generated to the communities involved; (4) using the same mechanisms to conserve and enhance both the fisheries and the cultural system; and (5) involving external support and forums for discussion (e.g., nongovernmental, for example, university scientists) in co-management. Co-management operates best where (6) government bureaucracy is small with a regional or local mandate; (7) boundaries can be clearly defined resulting in clarity of membership and effective application of allocations and regulations; (8) crew as well as skippers belong to the managing body; (9) there is a higher authority to appeal to on questions concerning local equity; (10) bureaucrats have direct industry experience and willingly work with fishers; (11) technical concerns such as stock size are separated from allocation decisions when there are more than one group of stakeholders; (12) but both are made on the same level when one large group is involved; (13) opportunities exist for informal problem solving among multiple stakeholders; (14) "...a culturally cohesive

group practices self-regulation, the use of individual quotas may be an acceptable management tool, if accepted cultural mechanisms rather than the market are used for allocating and transferring quotas." Finally, several of the case studies clearly demonstrate that (15) "...motivations and attitudes of key individuals can make or break co-management..." and there is a need for constant pressure by a core of one or more dedicated individuals.

Several other researchers' observations can supplement Pinkerton's (1989b) list. In a review of problems involved in instituting fisheries co-management, Felt (1990) also listed a number of factors influencing its success. Among those not similar to the above, Felt (1990) suggested that successful co-management is positively related to the: (1) amount of decisionmaking authority granted to participants; (2) degree of equity in allocation of cost and restrictions among participants; (3) degree of involvement in enforcement; and (4) amount of agreement in the content of regulations and participants' perceptions of the phenomena being regulated. As an additional factor, Douman (1993) stated that community-based management systems may be least effective in urban areas where customary practices have been weakened by inward migration. Finally, Pomeroy (1991) pointed out that the short-run, survival strategy of many subsistence-level fishers, although rational given their circumstances, is antithetical to management directed at long-run productivity of the resource. In this type of fisheries, co-management schemes will be more difficult to implement.

Some of the proposed relationships listed above deserve further comment. While most of the factors identified by Jentoft (1989) as influencing the success of fishers' organizations in co-management parallel those affecting the relative success of fishers' organizations in general (Pollnac 1988), two factors differ. First, it is suggested that

⁴Factors 1, 2, 3 and 8 derived from Jentoft (1989) overlap with propositions 4, 8, and 9, 11 and 3, respectively, as originally numbered in Pinkerton (1989b).

multiplicity of functions beyond co-management would serve to reinforce the management function. It has been argued elsewhere (Jentoft 1986; Pollnac 1988) that multiplicity of functions in fishers' organizations can lead to increased complexity and conflicts that could alienate members. Perhaps there is a nonlinear relationship between organizational success in co-management and multiple functions—as the number of functions increases, the degree of success rises up to a certain point, then begins to fall. For example, perhaps only one or two functions in addition to co-management are advisable. Beyond that relatively small number, the added complexity may lead to failure. This is an empirical question that can only be resolved through further research.

Second is the incremental issue. One case study reviewed by Jentoft (1989) suggested that incremental implementation of co-management through fishers' organizations may result in its operation in a dysfunctional or hostile environment. It is not clear if Jentoft referred to a social environment turned hostile by an island of co-management or to micro-environmental differences (socioeconomic, cultural, physical, etc.) which may affect implementation. If it was the former, the degree of isolation of the community would be an important consideration. Otherwise, with the latter, there is clearly a need for quantitative analysis of these environmental factors influencing implementation success. In this author's view, both aspects require attention.

Another essential consideration for cooperative success in co-management implicit in Jentoft's (1989) review is the degree of an organization's freedom to fine-tune the management options. Jentoft and Kristoffersen (1989) noted that one of the salient features of the Lofoten (an island group in Norway) fisheries co-management system is its adaptability to local variations and flexibility in response to chang-

ing conditions. The degree of adaptability obviously depends on the specificity and flexibility of government guidelines and/or directives within which the organization must work. It is unrealistic to assume that the government would delegate all management responsibility to the fishers with no guidelines whatsoever.⁵

More explicitly, Ruddle (1987) noted that the rules and regulations for fisheries cooperative associations set by the Japanese Ministry of Agriculture, Forestry, and Fisheries permit a wide latitude for interpretation, facilitating adaptation to local needs and fisheries conditions. Both the Lofoten and Japanese cases suggest that the degree of specificity and flexibility of government guidelines is an important variable with a potential impact on the success of fishers' organizations involved in co-management.

Exclusivity in fishing rights was mentioned by Jentoft (1989) but not one of the critical variables in his conclusion. Clearly, exclusivity in fishing rights would act as a powerful incentive to join the cooperative; nevertheless, mere existence of a cooperative does not guarantee either successful cooperation among fishers or successful co-management. It could, however, be a beginning (Ruddle 1987), as well as influence members' willingness to manage

⁵As evidence accumulated, some researchers (e.g., McCay and Acheson 1987; Cordell 1989; McGoodwin 1990; Pollnac and Poggie 1991; Ruddle et al. 1992) questioned the idealistic assumptions in the early 1980s on the ability of indigenous peoples or local communities to manage their marine resources. Although some of the early optimism on the potential of traditional marine management was generated from a study of Oceania (Johannes 1978), a look at the archaeology of the Pacific provides extensive evidence of the negative impacts of prehistoric peoples on the flora and fauna of their environments (e.g., Cassels 1984; Kirch 1984, 1985; Dye and Steadman 1990). This is not meant to imply that the various forms of self- or co-management will not work; it merely suggests the need for more research and a cautious approach.

the resource (Miller 1989). Miller (1989), however, cautioned that exclusive access can be affected by technological changes as well as by-catch, especially where exclusive access to a specific species is granted in an environment of open access to other species. Impacts of technological changes on use rights have also been noted by several other researchers (e.g., Akimichi 1984; Matsuda and Kaneda 1984; Ohtsuka and Kuchikura 1984; Pollnac 1984). Finally, Pollnac (1984) reviewed evidence indicating that changes in levels of commercialization; human population density; occupation structure; environmental features influencing boundary definition; and species composition and distribution can have effects on use rights. Dahl (1988) provided further evidence emphasizing the importance of some of these variables. Hence, if some form of exclusivity in use rights will be part of the co-management scheme, all these variables must be considered as having potential impacts on the system.

Although not corroborated by a case study, Jentoft (1989) also suggested that the more organizations involved, the fewer the functions that can be delegated. This was based on the assumption that large numbers of organizations with many resource management functions would increase the probability of interorganizational conflict. I would assume that the probability of conflict is related to the density of organizations in terms of the dispersal of the target resource(s). This is again an empirical question for further research.

The variables derived from the literature reviewed above are organized into the categories' organizational context, membership and structure in Appendix 1. These same variables can be organized into the research framework suggested by Pomeroy (1993). It can be argued that these predictor variables should be considered in all attempts to develop co-management programs with fishers' cooperatives. Perhaps a stronger argument is that we should

conduct quantitative analysis of these various predictors in terms of both their interrelationships and relative importance in determining the relative success of such co-management programs.

The first step in this type of analysis would be to operationalize the independent and dependent variables. In some cases, this would be relatively simple; e.g., crew members either are or are not members of the managing body—a simple dichotomy; the size of the management area can be relatively easily quantified in terms of square kilometers, etc. In other cases, e.g., homogeneity of membership, measurement would be a bit more difficult. Cultural heterogeneity might be measured by the number of ethnic groups or relative sizes of different groups; economic heterogeneity on the basis of income distributions; technological heterogeneity by distributions of different gear types within the organization, etc. Cohesiveness of social systems would be relatively difficult to operationalize, and would probably be measured on an ordinal scale (e.g., slightly, moderately or extensively cohesive). The variables must be operationalized, however, in a manner that allows for reliable comparisons among cases.

The dependent variable, success in co-management, could be measured on a scale (or scales) derived from the ten items suggested by Pinkerton (1989b). These items could be operationalized and factor analyzed like the cooperative success scale discussed above (see Pollnac et al. 1991) or used as ten independent indicators of success. In addition, it would probably be advisable to append a success measure dealing with the status of the resource, e.g., its maintenance or improvement since that is the primary objective of resource management.

Drawing the sample for such a study would be an interesting problem. The first sampling universe that comes to mind is the thousands of inshore fishers' cooperatives in Japan. There, certain variables would

apparently be held constant (e.g., cultural homogeneity, legislation) while others would vary (e.g., size and density of cooperatives, technological heterogeneity, etc.). This would permit a study comparable to the cooperative studies conducted in Ecuador (Pollnac et al. 1991) and Indonesia (Lubis 1992). Another approach, which could maximize variance on the legislative and cultural variables, would be to select case studies from various regions around the world, as was done for the Meynell (1990) analysis. Finally, where a project is being implemented, a monitoring and evaluation program targeting identified variables would provide comparable data across areas involved in the project.

Conclusion

Quantitative analysis of factors influencing the success of fisheries co-management using fishers' cooperative-type organizations will allow one to determine development tactics that need to be emphasized under differing circumstances. Thus, scarce development funds may be allocated more appropriately. "Muddling through" is acceptable where project costs are relatively low (in comparison to available funds and personnel) and the scope is relatively narrow (e.g., one fishery in a small region); it is less easily justified when costs are relatively high and the scope is grand (e.g., involving 15 or 20 cooperatives spread across a relatively large region). In the latter case, focus on factors (or combinations of factors) with the highest probability of success is the most rational approach, as well as being the one most likely to be funded. Only research, such as that described above, will furnish the information necessary for this type of approach.

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Appendix 1. Factors potentially influencing success or failure of co-management systems using fishers' cooperative-type organizations.

1. Organizational context

Enabling legislation

- Degree of generality and flexibility
- Exclusivity in fishing rights
- Amount of decisionmaking authority granted to participants
- Fisher involvement in enforcement
- Distinctness of boundary definition

Perceived crisis in stock depletion

Small government bureaucracy with a local or regional mandate

Tradition of cooperation and collective action

Bureaucrats with industry experience willing to work with fishers

Degree of urbanization

Degree of dependence on fisheries for survival

Technology

Population density

Species composition and distribution

Level of commercialization

Occupation structure

Environmental features influencing boundary definition

2. Membership

Homogeneity of membership

Fisher's degree of trust in organizations

Long-term, multifaceted interaction among members

Both crew and skippers as members

Dedication of core individuals

Financial contribution by fishers

3. Structure

a. Organization

Organizational scale

Multiplicity of organization's functions

b. Decisionmaking

Nonincremental introduction of management function
Use of external support and forums for co-management
Higher authority for questions involving local equity
Technical concerns such as stock size separated from allocation decisions where more than one group of stakeholders are involved
Technical concerns such as stock size made on same level as allocation decisions when one large group is involved
Opportunity for informal problem solving among multiple stakeholders

c. Regulations resulting from co-management

Mechanism for returning some benefits to involved community
Use of same mechanisms to enhance the fisheries and the culture
Use of individual quotas within a culturally cohesive group with allocation and transferability based on accepted cultural mechanisms rather than the market
Degree of equity in allocation of cost and restrictions
Agreement between regulations and fisher's perceptions



Towards an Integrated Community Management of Coastal Fisheries

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Introduction

In the recent past, there had been a variety of initiatives aimed at creating an awareness about the necessity of institutions at the community level for sustainable development and management of natural resources. The call for community development and management of coastal fisheries is but a specific case of this rapidly growing global preoccupation.

Based on my academic background and experience as a social activist working with coastal fishing communities, I want to stress that integrated community management of coastal fisheries can be assured only by (1) a rebuilding of the "community" in coastal villages and (2) the simultaneous and conscious multisectoral and transnational awareness and action on the ecological and economic fronts.

The primary reason for this is that the "community" referred to has undergone significant socioeconomic and cultural metamorphosis as a result of "incorporation" into larger national and international ecological and economic processes. We are therefore talking about a "community" which has significantly altered its relationships both within and without. It also continues to be in a process of dynamic transition.

Consequently, this paper is structured along the following lines: first, a sketchy generalization of what the early community was probably like; second, a brief history of the incorporation process and the resultant breakdown of community in the coastal villages; and third, the efforts taken to revive small-scale coastal fishing. Finally, measures are recommended to redefine and rebuild the community which will take the new initiatives for an integrated and

sustainable community management of coastal fisheries.

Early Community

The Asia-Pacific region has had a long history of maritime contacts for trade. It was the sea—the *samudra*—which brought the old societies in the region closer together. I have argued elsewhere that such a maritime tradition must have had its origin in the humbler occupation of coastal fishing. These maritime contacts have left their mark on many coastal fishing communities. The most obvious of these was the strong exotic element in the craft and gear designs of many artisanal fishing communities in the region (Kurien 1990).

It can be argued that coastal communities of the region had earlier been more open to influences from other societies across the sea and relatively less to their own land-based neighboring communities. This latter phenomenon is more pronounced in large nonisland societies like India.

This isolation and the compulsions of a maritime occupation created a special psyche and culture among these communities, thus retarding their integration into the sociocultural and ecopolitical mainstream of land-based society.

There was possibly a time in Asian societies when small communities were autonomously in control of the ownership and use of coastal fisheries resources through various institutional forms. The institutions were probably not all very egalitarian, yet it is certain that due to socially sanctioned community caring and sharing mechanisms, no one was too poor or destitute.

The Asian reality of today is remote from these idyllic village societies. However, the revival of some of these communitarian dimensions is still possible in some "islands".

Incorporation and Breakdown of Community

The process of incorporation into the large socioeconomic fabric was initially primarily through the trade of the output of the sector—the fish. Fishers could not live by this perishable commodity alone. A fisher who netted more than two fish had a "surplus". The compulsion for trade thus came very early in the development of the productive forces.

With the advent of independence and the modern state in most developing Asian countries, the coastal fisheries were considered "backward" and sought to be "modernized" through a variety of means. As a result, the incorporation process was hastened through the input markets. The most popular of these were the introduction of mechanized crafts and the use of nylon for net construction. This big dose of capital was infused into the traditional artisanal fishery presumably to raise the "production of fish for food by exploiting deeper waters more efficiently"¹ (Platteau 1989).

In general, these new technologies were introduced without due recognition of the existing artisanal fishing methods or the traditional community institutions which held the key to the customary-use rights of the coastal commons. This new production-oriented approach to fisheries development introduced a strong element of multisectoral linkages between the fisheries and the other sectors of the national and transnational economies.

It is important to note that the *intended* objectives of the new development

¹Much of this modern "hardware" was state-sponsored and came largely from outside the developing Asian countries—Germany, Norway, Canada and Japan, to name a few. Rarely, if ever, were these inputs accompanied by the "software" of the management measures/institutions which existed in these countries.

programs went adrift in most Asian countries around the 1960s. One common factor can be isolated for this: the strong market compulsions resulted in a continuing demand for prawns for export.²

This new production and export orientation also caused a major change in the property regime of the coastal waters: what was until then considered a "community heritage" was converted into an "open-access" realm.³ The main beneficiaries were investors from outside the fishing communities who were best able to control and manage these new capital-intensive technologies for fish harvesting.

Consequently, the pace and direction of coastal fisheries in developing Asia were thereafter largely determined by two exogenous factors: investors from outside the coastal fishing communities, and the demands and preferences of the developed world.

The incorporation process through the market was nearly total. Fishing villages in isolated parts of South and Southeast Asia were instantly "linked" to Japan and the United States the moment they netted prawns (shrimp), even if they continued to use the most rudimentary craft and gear.

By the mid-1970s and well into the 1980s, the coastal waters of Asia were ridden with physical and socioecological conflicts between the vast majority of fishers from coastal communities who continued to use artisanal technologies and

the operators of larger mechanized boats, particularly trawlers (Kurlen 1991).

An important dimension of these conflicts, not usually highlighted, is that their intensity and ramifications depended largely on who were the owners and operators of the larger vessels. Across Asia, the owners were rarely *active fishers* from coastal fishing communities. They were generally fish merchants, investors from outside the fisheries sector or nonfishers from among the coastal village communities. The owners were mostly nationals but often from an ethnic group different from the coastal communities.

The crew of the mechanized vessels belonged to diverse socio-occupational groups in the economy but often came from the coastal communities themselves. The most common crew composition was a mix of skilled workers from coastal fishing communities and the relatively less skilled peasants and/or indigenous peoples of different ethnic backgrounds.

These new ownership and occupational patterns have brought many socioeconomic changes into coastal fishing communities and deprived them of their earlier relatively greater community harmony and equality.

Consequently, the often-mentioned "conflicts between the coastal small-scale fishermen and the trawlers", were not without contradictions from the perspective of the coastal communities. Moreover, the inequalities in wealth and income between the coastal fishworkers and the owners and operators of trawlers exacerbated social tensions on land.

In most countries, the state had been inclined to view these conflicts at sea and on land as "law and order issue." They were rarely perceived as an expression of dissent against a distorted fisheries development process which deprived the coastal artisanal fishing communities of their commons and resulted in deprivation not previously experienced by them.

²There had been a thriving trade in dried prawns among Asian countries prior to World War II, but this never resulted in a continuing demand for prawns alone. Prawns were earlier harvested using gill nets, encircling nets and trammel nets in the seasons when they came up to the surface coastal waters from their usual habitat at the bottom.

³In many Asian coastal fishing communities, a rich tradition considered the coastal waters the heritage of "the dead, the living and those yet to be born".

In the ultimate analysis, the conflicts also reflected the breakdown of "community" in the coastal fishing villages.

Reviving Small-scale Fisheries

The late 1970s and the early 1980s—that is, the middle of the phase of conflicts in the fish economies of the region—saw a revival of academic interest in small-scale coastal fisheries. The most concerted effort in this realm has emanated from the International Center for Living Aquatic Resources Management, thanks to the perseverance of our late friend Ian R. Smith and his colleagues. The Food and Agriculture Organization (FAO) which had earlier given technical assistance for the modernization programs in Asia also took an interest in the said revival (Smith 1979; Panayotou 1982). International donor agencies began to review their assistance programs and sought to give a greater thrust to funding which explicitly promoted small-scale fisheries. The 1984 FAO World Conference on Fisheries Management and Development, though preoccupied with the implications of the United Nations Conference on the Law of the Sea, was also pressured from within and without to make significant pronouncements about the status of coastal communities and the role of small-scale fisheries in the future strategy for global fisheries management and development.⁴

A closer look at these concerns shows that with a few outstanding exceptions, the emphasis was entirely on the issue of scale alone. Concretely it merely meant

stressing beachlanding craft rather than harbor-based vessels or outboard motor-fitted canoes instead of large mechanized trawlers. There was certainly no appreciation of the linkages among smallness of scale; the nature of tropical coastal resources; the knowledge systems of coastal fishing communities; and their traditional sociocultural institutions (Ruddle and Johannes 1985).

Fortunately for us, some of the encyclopedic knowledge of coastal fishing communities and their traditional institutions for managing their resources as well as caring for individuals, have survived through the modernization phase. Quite often, this had happened because these communities were not fully "incorporated" into the divisive dimensions of modernization, or as in some cases, they were able to "contain" modernization within the purview of their earlier institutions. We need to blend this concern for scale with the revival of traditional knowledge and community institutions to begin rebuilding community.

Rebuilding Community

Given the socioeconomic realities of Asia, particularly South Asia, where pressure on coastal resources is still on the increase and gainful employment opportunities outside the fisheries sector are hard to come by, it is my assessment that for another generation at least, the solution to the problems in the coastal fisheries must be found largely *within* the sector itself.

In the reality which confronts them, fishers have devised many individual survival strategies to keep their necks above water. These have taken diverse forms ranging from investing in more fishing assets; devising various crew rotation and mutual assistance measures; taking to destructive fishing; migrating to other countries in search of jobs; turning to other sectors of the economy to eke out a living;

⁴Parallel to this was a conference of 100 small-scale fishworkers and their supporters from 34 countries which highlighted the plight of coastal communities and stressed the need to reorient fisheries development and management to focus on their needs and aspirations.

and making efforts to rejuvenate the resource (Kurien 1988).

Equally important have been their efforts at collective action to pressure the state to intervene, bring order into their commons and initiate measures to manage the coastal fisheries resources. The best examples of these come from Indonesia, the Philippines and India.

There are potentials and limits to both these forms of action by individuals and the state. The evidence, again from India and the Philippines, seems to be that unless there is some form of mediation between individual and state action, coastal fishing communities face a bleak future.

The basic need of the times is therefore to redefine and rediscover the "community" in coastal fishing villages in the context of the socioeconomic and political realities.

It is very unlikely that all those who live along the coastal zone today have common interests as regards the coastal fisheries and their future. There is thus a need to identify and bolster a core group among these communities who can become the "beacons and guardians of the sea" around whom one can envisage concentric circles of supportive interests.

At least three supportive conditions must be ensured to achieve this objective: (1) aquarian reform, (2) community development and (3) new relationships.

Aquarian reform

A key condition for rebuilding community will be the successful implementation of an aquarian reform package. Initially, this has four facets. First, the right of access to harvesting technology should be restricted exclusively to fishers. Second, there must be a ceiling on the number of units such persons can own. Third, with an increase in the scale and capital investment in the harvesting units of such in-

dividuals/groups, their realm of fishing should be appropriately restricted to the specified area of access in the exclusive economic zone. Fourth, such persons should be vested with the right of first sale of their catch.

Under the stewardship of such a class of workers and owner-workers, the coastal waters can regain their status of "community property".

Such reforms are obviously rarely granted on a silver platter. They will only materialize if there is sufficient pressure from the grass roots. Again the evidence from the Philippines and from Kerala State in India gives room for optimism.

Community development

Rebuilding community implies not merely regaining the rights to the coastal commons but also simultaneous action on the socioeconomic development front.

Despite three to four decades of consciously planned development efforts in many developing Asian countries, coastal fishing communities continue to be at the bottom of both the social and economic ladders. Changing this situation is imperative if the gains from aquarian reforms are to be consolidated and sustained into the future.

Spelling out a general strategy to bridge the socioeconomic gap between fishing and other communities would be a futile exercise given the diverse sociopolitical considerations that determine the degrees of freedom available for action on these fronts. However, concretely, this calls for better organization of the fish marketing activities to be able to earn more income; better credit arrangements; easier access to improved education and health facilities; and more job-oriented skills for the youth and women.

Based on my personal experiences in community development work and an

understanding of what is happening in some other countries, it can be said with confidence that people-managed and people-controlled organizations supported by voluntary agencies are the best bet to achieve a participatory and holistic development process in coastal fishing communities.

This is not to minimize the role of the state and enlightened public policy in rebuilding community. To achieve this calls for a reorientation of fisheries development policy to focus more on the nature, human and social capital in the sector and less on the manmade capital in the form of artifacts alone.

New relationships

Rebuilding community is not achieved by redefining and changing property relations and socioeconomic institutions alone. Reinstating the relationships of nurturing, caring and sharing among humans and nature and among human beings themselves is an intrinsic goal of this endeavor.

In this context I see a very central role for women in the coastal communities, particularly those from fishing households. Motherhood bestows on women the very special trait of caring without counting the cost or being calculative about future returns. Such values are essential to underscore the need to move towards a "nurturing, caring and sharing approach" to coastal fisheries.

Integrated Community Management

Integrated community management cannot be seen as an isolated project of the inhabitants in a series of coastal villages who have been able to rebuild a community as sketched out above.

Ecologically, integrated community management of coastal fisheries starts in the forests. Economically, it begins in the village but its linkages are often in Japan, the United States or Europe. Therefore, this strong multisectoral and transnational dimension is totally outside the control of this community. This fact seems often ignored in much of the discussions on community management. Thus, a more concrete explanation is called for.

Multisectoral ecological action

The coastal fisheries of a country are not just affected by the fishing activity in the seaward side of the coastal zone. They are also greatly influenced by all the negative externalities of the economic activities in the hinterland, largely via the links in the aquatic systems.

Increased silt loads due to deforestation; reduced river water flow following dam construction; effluents from agriculture, industry, urban settlements and tourism which dumped into the rivers and the sea, all affect the ecological integrity of the coastal ecosystems. In the initial stages, such externalities cause no harm. They are quite easily "managed" within the capacities of the natural physico-chemical processes in the coastal waters (Scura et al. 1992).

However, a point is reached when these negative externalities "accumulate" at a rate faster than they can be "absorbed", thus pushing the system to an ecological precipice.

Most coastal ecosystems in Asia seem to have reached the fringes of this cliff. To retrace steps back to the plateau of ecological stability requires an awareness of coastal communities that collective action *on their part alone* for the management of their common resources is only a partial solution, and a poor one at that.

Since the "sea starts in the forests", cooperation from the "upstream" sectors of the economy is a prerequisite for total success of the community venture. This in turn implies a willingness on the part of these upstream sectors to regulate their polluting and resource degrading activities. Such are the multisectoral compulsions of integrated community management of coastal fisheries.

A beginning on this front calls for both state intervention and community action.

We do see some new, enlightened, high-level state initiatives for more holistic ecosystem planning and project implementation. However, the earlier compartmentalized approach has become very rigid and it will take a long time before such integrated practices trickle down to the lower levels of state administration. One way to hasten this is for more concerted, popular community action across sectors of the economy.

My personal experiences of the latter has been in assisting the National Fishworkers Forum of India (a confederation of artisanal fishworkers' unions/associations) to organize an all-India people's awareness *jatha* (march) in 1989 on the theme "Protect water, protect life". This socioecological march which covered about 5,000 km of coastline was uniquely spearheaded by the laboring men and women of the coastal fishing communities—the beacons and guardians of the sea. They were joined by many middle-class environmental groups, other workers' groups and people's organizations from the "upstream" sectors of society. The march provided a broad platform for creating awareness of the fact that our common linkages to life are through water!

Transnational economic solidarity

The transnational dimension of integrated community management of coastal fish-

eries requires greater attention than it now receives. This is because a significant share of the value of the coastal fisheries resources' output in developing Asian countries is obtained from exports to the developed world. There is no reason to expect any change in these economic linkages in the near future. Consequently, the *nature* and quantum of coastal fishing effort, even assuming community management, will largely be dictated by consumer demand in Japan, the United States and Europe.

Will local community efforts for sustainable coastal fisheries succumb to the insatiable demand for exotic tropical coastal seafood in the developed world?

The answer is a big "YES".

The solution to this dilemma is to integrate community management efforts with global initiatives to reduce the degree of discord in the nexus between transnational trade and consumption patterns on the one hand and sustainable community management of coastal resources on the other.

To achieve this we need NOT ban all fish exports from developing Asian countries or stop the imports of fisheries technology from the developed world. That would jeopardize the livelihood of millions of fishworkers. The need of the hour is to arrive at a proper balance—be it in harvesting of the resource or the use of technology for fishing and related activities.

For example, one of the most crucial transitions in Asian coastal waters will be a shift from using trawls (to catch prawns) back to the more passive and environmentally benign nets for this purpose. The economic and ecological effects of "trawl-free prawn exports" have been partially demonstrated in Indonesia and can be done in other countries as well.

Achieving such transitions is an important prerequisite for a long-term, integrated community management of coastal fisheries. But such transitions cannot materialize

without the right signals to this effect from the developed world. For example, if the Japanese consumer movement can get their prawn importers to refuse prawns below a specified count/kilo from India, the salutary environmental and economic impact on coastal fisheries will be far greater than all our costly efforts to manage the extremely socially and politically charged conflict between trawler owners and small-scale fishers.

Conclusion

The success of integrated community management of coastal fisheries at the local level depends on an integration of multisectoral and transnational awareness and action. This can be achieved only in the process of the struggle to rebuild community in the coastal villages. The community focus is not necessarily in conflict with the need for multisectoral and transnational action. In fact, we should strive towards the ability to blend the two without losing the cutting edge of any of their respective concerns. Let this not be mistaken as a search for harmony and coexistence; far from it. It is only a creative effort to balance countervailing forces. In that sense, we may never reach an

Integrated community management of coastal fisheries—we will always be moving towards it. But first we must make a firm commitment in that direction.

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Planning and Management of Small-scale Coastal Fisheries

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Introduction

The experience of fisheries management in Southeast Asia has shown that fishing is a social and economic activity. As such, social and economic aspects have major impacts on management. These aspects of the fisheries system refer to human and social elements which influence fisheries objectives and economic activity. The problems and issues in planning and management of small-scale coastal fisheries are discussed in this paper. The appropriateness of co-management for small-scale coastal fisheries in the Southeast Asian region is also examined. Some implications for fisheries management in the region are taken up.

Planning and Setting Objectives

Planning and setting objectives for management requires a good understanding of small-scale coastal fisheries, the resource attributes, the traditional values of fishers, the institutional arrangements and the overall environment in which the small-scale fishers operate. Without prior knowledge of these attributes, any attempts to manage the small-scale fisheries will often be met with serious resistance and problems of noncompliance. In fisheries literature, there is apparently no consensus on, or even clear spelling out of, the exact meaning of "small-scale coastal fisheries." Smith (1979) and Panayotou (1985)

provided some detailed guidelines for classifying small-scale fisheries in Asia. The small-scale fisheries are often described as fishing units consisting of kin groups using small, occasionally powered boats or none at all. Fishing is often part-time and household income may be supplemented by other nonfishing activities of the fishers. The fishers normally use traditional gear and investment levels are low, with capital often borrowed from those who market the catch. Catch per fishing unit is low and up to half or more of the catch most often does not enter organized market but is rather consumed by the fisher and family. The fishing community is frequently isolated, geographically and socially, and their income is much lower than the stated national poverty line.

These fishers tend to operate in nearshore areas where the resources are clearly overexploited. Besides declining catch, small-scale fishers also face competition from illegal fishing activities by commercial fishing boats. Small-scale fishers often feel that institutions enforcing regulations are not effective and thus, commercial fishers, especially trawlers, are able to overfish in the coastal areas. The heterogeneous nature of fishers operating in the nearshore areas with differing objectives of resource utilization, will provide serious challenge to decisionmakers in planning and managing small-scale fisheries.

Platteau (1989) used two broad approaches for defining small-scale coastal fisheries. First, in technological terms, artisanal or small-scale coastal fishing would be composed of all beachlanding fishing units, whether of the traditional variety (e.g., canoes, rafts) or of a new type (e.g., beachlanding plywood boats). Defined thus, the small-scale sector is not technologically stagnant; not only can it comprise new types of craft (using new materials and designs), but also traditional crafts which have undergone transformations to improve

efficiency (e.g., canoes fitted with outboard motors or adjusted to handle new types of nets). This definition ensures that the small-scale fishing sector is characterized by relatively low-capital intensity, since heavy infrastructure (anchorage and harbor facilities) can be dispensed with, and medium or large vessels are excluded. Small-scale coastal fishing communities are also identified by a decentralized and scattered pattern of settlement since there is no need to cluster around a harbor point. Fishing technologies are also relatively easy to acquire by traditional fisher communities themselves due to the obvious line of continuity between the old and new techniques and crafts, and reasonable investment costs.

A second definition considers artisanal fisheries to be composed of all fishing units whose proprietors are actually involved in fishing operations, whether manual or direct supervisory or coordination tasks. This implies that management functions have not been completely specialized. In this paper, small-scale coastal fishers are those who fit the descriptions given above by Smith (1979), Panayotou (1985) and Platteau (1989).

Management objectives

Quite often there is a misunderstanding between decisionmakers and fishers regarding management of the coastal fisheries resources. The standard package approach of management as practised by many national governments may be in conflict with local conditions. When fishers do not participate in or accept the programs, it is felt that they are not acting in their own best interest. However, they may be rational in their action because the two parties have different economic strategies on resource use.

Many small-scale fishers exist at the subsistence level and have a short-run, survival strategy of taking care of themselves

and their family each day (Pomeroy 1991). These fishers have limited mobility to seek alternative employment, and will utilize whatever resources are available to harvest as much fish as possible. They prefer food now rather than a continual flow into perpetuity; in other words, these fishers have a very high discount rate concerning the resource use.

In contrast, the government is primarily concerned with the sustainable use of the resource for food, employment and resource rents. Therefore, any development program to maintain the long-term productivity of the resource will be considered by the society as the rational economic strategy. From the government's point of view, the logical economic strategy as perceived by fishers is irrational for eventually it causes total destruction to the fishery biomass. Nonetheless, these conflicting perspectives of resource management can be reconciled by incorporating both views into the fisheries management strategy. More effective development programs can be established if both the government and fishers develop new, mutually beneficial economic strategies. This approach is popularly known as co-management or community-based management.

Resource management models

In surveying the literature on managing natural resources, Ostrom (1990) found that researchers use three major models to explain why natural resources are exploited to the point of endangering their long-term economic viability. The first model, often called the tragedy of the commons, is attributed to Hardin's (1968) article. Using a pasture land open to all as an example of a natural resource, Hardin demonstrated that herders will be motivated to add more and more animals to the limited pasture because each herder is concerned only with the direct benefit

of his own animals and incurs only a share of the costs resulting from overgrazing. The result is the degradation of the pasture land and loss of benefits to all herders.

The second model is called the prisoner's dilemma game (Dawes 1973, 1975). Here, individuals utilizing a natural resource are seen to be similar to players in a non-cooperative game who possess complete information. Each player has a dominant strategy in the sense that he is always better off choosing the strategy to defect no matter what the other player selects. When all players pick their dominant strategy, a non-compare optimal equilibrium is the result. A non-compare optimal outcome occurs when there is no other outcome strictly preferred by at least one player that is at least as good for the others. The fascination of the prisoner's dilemma game lies in the paradox that individually rational strategies lead to collectively irrational outcomes.

The third model is the outcome of Olson's (1965) work on group theory. In his book, *The logic of collective action*, Olson challenged the optimism expressed in group theory that individuals with common interests would voluntarily act to try to further those interests (Bentley 1949; Truman 1958). Olson (1965) argued that "unless the number of individuals is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, rational self-interested individuals will not act to achieve their common or group interest." He used the free-rider problem as a basis for explaining why individuals have little incentive to contribute voluntarily to the provision of a good that benefits the group.

Arising from the three models mentioned above, policy prescriptions for resource management call for regulations of various kinds to protect natural resources and ensure long-term economic viability. Hellbroner (1974) felt that strong government intervention would be necessary to achieve

control over ecological problems. Ehrenfield (1972) suggested that if "private interest cannot be expected to protect the public domain then external regulation by public agencies, governments, or international authorities is needed." Carruthers and Stoner (1981) argued that without public control, "overgrazing and soil erosion of communal pastures, or less fish at higher average cost" would result. They concluded that "common property resources require public control if economic efficiency is to result from their development." An alternative recommendation has been establishing private property rights (Demsetz 1967; Johnson 1972; Smith 1981; Welch 1983), which is particularly difficult in the case of the fisheries resources.

What is evident from the policy prescriptions arising from the tragedy of the commons, the prisoner's dilemma and the logic of collective action is the call for an external agent or authority for regulating the resource or parcelling out rights of use. In many developing countries, centralized control of natural resources has been based on such prescriptions. These prescriptions have often failed to consider the experiences and capacities of local management systems and have tended to overestimate the national government's ability to manage the coastal resources. In a number of cases, a large amount of state resources is used to manage, often ineffectively, a resource that does not generate enough rents to pay for the high cost of centralized bureaucracies.

In the context of small-scale coastal fisheries, governments in most of Asia have increased their role in management. The general tendency is to reduce completely the authority of local communities through legislation and the establishment of institutions that provide a minimal participatory role for fishers in the management of the coastal resources. The general outcome has been a greater difficulty of government agencies in communicating to coastal fishing communities the need for resource

management and the benefits that may arise from it. Co-management of small-scale coastal fisheries may be an avenue for improvement, wherein the national government and the community could share authority.

Co-management of coastal fisheries

The co-management concept can be considered an advancement in property rights research because it examines further the interactions between fishing communities and regulatory regimes and does raise questions on the universal validity of the "tragedy of the commons" paradigm (Charles 1988). The existence of informal property rights, territorial use rights, and informal contracting for the management of a common property resource indicates that self-interested individuals can work out arrangements among themselves to manage a common property for their overall benefit (Ruddle and Akimichi 1984; Berkes 1986; Wade 1987; Pinkerton 1989). Privatization or state regulation may not always be essential to manage a common-property resource. Apparently, a critical requirement for the success of any common-property management scheme is the extent to which fishers will voluntarily cooperate to advance their collective interest at the expense of a short-term private interest. Essentially, the question is what motivates fishers to voluntarily adhere to regulations. Evidence shows that if fishers willingly accept the regulations as appropriate and consistent with their existing values, the regulatory agency will gain legitimacy with the fishers, thus reducing noncompliance with the regulations (Kuperan 1992). It is in securing legitimacy that co-management promises to be a better fisheries resource management arrangement.

Co-management of coastal fisheries therefore means that government agencies and fishers, through their cooperative organizations, share responsibilities for management functions. Governments formally recognize informally enforced regulations by the fishers themselves. A part of the regulatory power is transferred from the government to fishers' organizations. Therefore, they not only participate in the decisionmaking process, but also have the authority to make and implement regulatory decisions on their own.

Well-managed small-scale coastal fisheries

Universally acceptable properties of well-managed small-scale coastal fisheries can be categorized into two separate characteristics (Miller 1990). They are given here as a prerequisite for discussing how co-management can lead to this ideal.

Resource characteristics

1. The quality and quantity of resource habitats are maintained.
2. Catch is stable and is managed to change by only a moderate amount, e.g., a factor of less than 1.3, in successive years.
3. Market demand, processing capacity, resource yield and fishing capacity are well-matched.
4. Annual yield predictions are avoided, but if required, are based on recruit year-class strength and yield per recruit rather than on an assumed stock-recruitment relationship.
5. Resource waste is low: discards and bycatch are less than 30% of the yield to the fishery, and the yield per recruit is at least two-thirds of the maximum.

Management characteristics

1. The fishers/fishers' organizations participate in writing and implementing regulations.
2. Regulations in place are enforceable and enforced.
3. Reasons for regulations are understood by the fishing industry, enforcement personnel, resource managers and scientists.
4. The resource managers and fisheries scientists are visible and can be personally identified by fishers/fishers' organizations.

Can co-management ensure well-managed coastal fisheries?

One of the key arguments for the co-management approach is that it attempts to use fisheries management systems well-adapted for local conditions. In particular, effort is made to recognize customary marine tenure (CMT) systems for the management of local marine resources. The essence of CMT systems is people managing and negotiating access to valued marine resources, each individual or group acting from a firm basis within a social system. Knowledge of the environment will indicate where a fisher should fish to maximize the catch, but marine tenure regulations constrain these choices to where fishing may legitimately take place, according to rights held or permissions sought (Ruddle et al. 1992). The CMT systems thus have fisheries management as but one aspect of their role in society and history, and contain a number of opportunities for achieving ecologically, economically and socially integrated approaches in resource management. Hviding (1990) considered CMT as basically systems of social relationships that involve participants and operators, decisionmakers, insiders and outsiders. The systems are

generated, maintained and transformed in social process.

To understand these processes, an awareness of certain basic social principles underlying their dynamics is required. Ruddle (1988) identified six underlying principles for the South Pacific: (1) sea rights depend on social status; (2) resource exploitation is governed by use rights; (3) resource-use territories are defined; (4) marine resources are controlled by traditional authorities; (5) conservation is traditionally and widely practised; and (6) sanctions and punishments are meted out for infringement of regulations. These principles are to a large extent consistent with the characteristics outlined above for well-managed small-scale coastal fisheries. The question now is to what extent the principles outlined by Ruddle (1988) are discernible in the Southeast Asian setting.

Management of Small-scale Coastal Fisheries in Southeast Asia

It is now almost universally accepted that much of the coastal regions of Southeast Asia have been overfished. The governments of these countries (Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Thailand, Myanmar and Papua New Guinea) are working to attain sustainable improvements in the socioeconomic conditions of small-scale fishing communities. They see the need to maximize the net economic and social benefits from the fisheries. They are also grappling with the issue of allocating the country's limited marine fisheries between small-scale fishing communities and industrial fisheries to minimize conflict between the two. In Malaysia, Indonesia and Thailand, explicit political attention is given to income and wealth distribution issues among different ethnic groups. Most governments recognize the need for well-managed fisheries with re-

duced internal conflict as a basis for alleviating poverty among fishers and increasing society's overall returns. In most Southeast Asian countries, except Papua New Guinea, active fishers far exceed the required number under a socially optimum fisheries management. Sound management therefore entails the creation of other outlets for fishers such as employment opportunities in aquaculture, processing, mining and tourism. To handle these issues, greater central control of the fisheries is seen in most of Southeast Asia.

Traditional sea tenure systems that may have existed in the region have been largely replaced by centralized government control often originating from the colonial experiences of each country. The authority for planning and management of the fisheries resources often lies in a government department that makes decisions on effort restrictions and allocation of fishing grounds. There is often little or no role for fishers or fishers' organizations to participate in the planning and management process. Most of the fisheries plans have specific development objectives such as "to attain and maintain self-sufficiency in fish production" in the case of the Philippines, and "to make optimal use of fishery resources" in Malaysia.

The market economy is well-developed in most of Southeast Asia, wherein fishing communities are quite integrated. In the case of Malaysia, a political system based on the concept of a federation of 13 states provides centralized power to the federal government to manage the fisheries. Coupled with an almost free market system, this has almost removed any form of CMT that has any serious support from fishing communities. In his study of social relations of production in rural Malay society, Bailey (1991) concluded that in fishing communities, moral economy values have long been relegated to the cultural dustbin. Coordinating the efforts of fishers through cooperative formation or encouraging their

collective participation in rural development programs is a far more challenging proposition. He found that fishing communities do not have a pre-existing organizational capacity to build cooperatives which are often seen as an important institution for the co-management of fisheries. The cursory evidence on fishing communities in Malaysia and a well-established centralist fisheries management system point to a limited scope for co-management.

What has happened in most of Southeast Asia, except Papua New Guinea and some parts of the Philippines, is the transformation from traditional sea systems to centralist state-controlled resource management regimes. We argued earlier that co-management does satisfy the requirements of well-managed small-scale coastal fisheries. The question now is: is there a prospect for co-management in the fisheries of Southeast Asia? The answer is perhaps yes or no depending on which country we are considering. The transfer of power to local communities to manage fisheries resources may not be an attractive proposition to many governments in Southeast Asia. In Malaysia, for example, the co-management idea is unlikely to be politically feasible and the political and legal framework in the country strongly favors central control of resource management. The general feeling among politicians and resource managers in this small country with a multi-ethnic society is that common property resources can only be best managed by a centralized authority. The implementation of the co-management approach will similarly be difficult in countries like Thailand and Brunei Darussalam where the trend is for centralist control of resources.

The Philippines and Indonesia, on the other hand, may have better prospects for co-management as these countries are geographically dispersed and made up of many islands. Localized marine tenure systems that make both ecological and

cultural sense to the different fishing communities could be marshalled for improved resource management. There is greater prospect for using CMT as found in the Pacific Islands (Ruddle et al. 1992) within a co-management framework for some of the coastal fisheries in the Philippines and Indonesia. In Indonesia, however, the tendency for a strong central government may impede the prospects for co-management.

In the case of Malaysia and Thailand, the move towards a regional management of their fisheries would be in the right direction. This will enable greater flexibility in the incorporation of the specific differences in resource and socioeconomic characteristics among the regions in the fisheries management plans.

The ranking of the prospects for the co-management approach for the coastal fisheries of Southeast Asian countries (Table 1) is based on some of the factors discussed above. It is also interesting to note that except for Myanmar, those countries that have exhibited high economic growth rates and with a good record of managing the overall economy are ranked as having low prospects for co-management. This is expected as communities that have found governments falling badly are more unlikely to believe that centralized government-based approaches to managing the fisheries will be successful, as in the case of the Philippines. Its high prospect for co-management is largely due to a changed political climate which shifts more responsibilities to local governments and encourages the active participation of nongovernmental organizations in community development.

Conclusion

This article addressed the issues of planning and management of small-scale coastal fisheries in Southeast Asia. The

Table 1. Prospects for the adoption of the co-management approach for coastal fisheries in Southeast Asia.

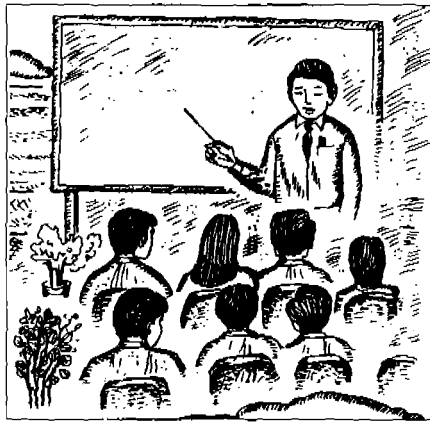
Country	Rank		
	High	Average	Low
Brunel Darussalam			x
Myanmar			x
Indonesia		x	
Malaysia			x
Papua New Guinea		x	
Philippines	x		
Singapore			x
Thailand		x	

understanding of the resource attributes and the objectives of small-scale fishers as distinct from the goals of the state or central agency is crucial to ensure effective management of the coastal fisheries resources. Community-based management is seen as an alternative and possibly improved approach for managing common-property resources such as fisheries. The increased legitimization of the regulatory agencies through community participation in the regulatory and management plans is expected to ensure better compliance and thus reduce management costs. The prospects for adoption of the co-management approach among the countries in Southeast Asia are however varied, with only the Philippines given a high rank.

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Creating Dialogue and Generating Information

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Introduction

Considerable attention has been given to tools and techniques designed to generate dialogue between development practitioners and community-based client groups. The bulk of this effort has focused on promoting communication between agriculture researchers and farm families. The general premise has been that through such interaction, researchers will gain an understanding of conditions within which most small farmers operate and be better able to develop technologies applicable to their unique conditions.

Funding proposals generally mention techniques that will be used to generate farmer input. Research reports commonly describe the rationale and/or goals of farmer/community participation. Seldom, however, are procedures for involving villagers and their impacts documented in a meaning-

ful way. Even more scarce are statements of the desired relationship between the researchers and the villagers. There are many approaches to enhancing interaction between community groups on one hand, and researchers, planners and development practitioners, on the other. The value and potential impact of a particular method or approach depend on the goals of the interaction and the nature of the relationship established with the client groups.

Rhoades and Booth (1982) noted that techniques of interaction likely to elicit farmer knowledge and views can be learned; however, there will be no incentive to do so until reward systems are altered to reflect the importance of field experience. Chambers (1989) went even further to argue not only for the recognition of the value of fieldwork, but also for the need to promote a major reversal in roles if researchers are to establish truly collaborative learning

relationships with villagers. Clearly, it is easier to state what approaches and attitudes are desirable than to implement the required changes (Farrington and Martin 1988).

The investment in and use of a particular methodology to create dialogue with community-based clients is directly related to the objectives of the community, the anticipated mode of interaction and the desired relationship with the community. Researchers can vary in their objectives in initiating interaction with community groups. Projects and research programs that have involved dialogue with community-based clients have generally focused on either technology assessment and transfer, rural resource management, or empowerment for community-based problem solving. Agriculture researchers and biophysical scientists concerned with problem identification, farm research and technology assessment have generally selected different methods from those used by social scientists and development practitioners interested more in fostering client participation and local level empowerment.

Process: Designing a Strategy for Generating Effective Dialogue

Once the objective of the dialogue has been established, researchers can select an appropriate mode of interaction. In reviewing various formats of on-farm client-oriented research (OFCOR), Biggs (1987) identified four models of researcher-farmer interaction: contract, consultative, collaborative and collegiate. In the contract mode, the relationship between researcher and farmer consists of little more than an agreement allowing the researcher to use or rent a field for the purpose of conducting on-farm trials. In the consultative mode, the most prevalent form of interaction in the implementation of farming systems research (FSR), the farmer is consulted, usually by

means of an informal interview, during the diagnostic and technology evaluation stages of the research process. The collaborative and collegiate modes have been associated with a process referred to as farmer participatory research (FPR) (Farrington and Martin 1988). Unlike the contract and consultative modes, collaboration involves continuous interaction between researcher and client and may ultimately lead to or entail a collegiate relationship focused on strengthening the capacity of the client group to develop its own problem solutions and development options.

The various methods and techniques that have been developed to assist researchers in communicating with villagers can be grouped and evaluated in terms of the underlying conceptual orientation, objective of the activity, research framework used and type of researcher-client relationship envisioned. This paper will briefly summarize a process for generating meaningful dialogue and discuss the key techniques and their potential application to coastal resources management and development.

Certain techniques and tools such as rapid rural appraisal (RRA), mapping and diagramming are common to different conceptual orientations and research frameworks (Table 1). The key factors that vary are who leads the process; what kind of interaction is generated; and who is the primary beneficiary. In the case of the transfer of technology (TOT) approach, the researcher is in control of the dialogue process which is used primarily to identify or verify the existence of certain problems usually associated with production. This diagnostic process provides a base on which research priorities are established and on-farm trials are designed by researchers.

Within the context of agroecology, some of the same tools are used to help researchers gain an understanding of complex interactions between human social systems and environmental systems. Here, the emphasis is on environmental

Table 1. Generating community dialogue.

Conceptual orientations	Objectives	Research frameworks	Tools and techniques	Relationship with client	Anticipated outcomes
Transfer of technology (TOT)	Technology assessment and transfer	Farming systems research (FSR)	Rapid rural appraisal (RRA)	Contractual, consultative	Technology/management practice to improve production
Agroecology	Rural resource research	Agroecosystem analysis (AEA), human ecology research	RRA, participant observation, rapid historical appraisal (RHA), researcher maps, researcher flow diagrams, transect analysis	Consultative	Systems analysis of agroecosystem with recommendation for improved resource management
Participatory action research (PAR)	Community development and empowerment	Farmer participatory research (FPR), farmer-first-and-last approach (FFL)	Farmer-back-to-farmer (FBTF), expert farmer approach (EF), participatory rural appraisal (PRA), participant observation, farmer flow diagrams, transect analysis, matrix ranking, farmer field schools, farmer laboratories	Collaborative, collegial	Various products with emphasis on increased capacity for indigenous learning and problem solving

management and farmer knowledge rather than agriculture and/or livestock production. In participatory research, the focus is on villagers as active participants and teachers in a process of collaborative learning and problem solving. Each of these approaches involves interacting with rural residents in the diagnostic phase of project development, but the results are very different.

The focus of the diagnosis and the resulting product can vary greatly depending on the conceptual orientation and the research framework employed. In FSR, diagnosis generally leads to some form of experimentation related to the generation and/or assessment of potential technological improvements. In agroecosystem analysis (AEA), diagnosis results in an evaluation in terms of different system properties—productivity, stability, sustainabil-

ity, diversity, equitability, solidarity, autonomy and adaptability (Conway 1984, 1985, 1987; Patanotai 1991). This can then be used as a basis for further policy analysis and recommendations. With FPR, diagnosis often leads to the identification of a particular intervention and/or cooperative development activity (Fig. 1).

Methodology

Three distinct conceptual orientations, namely, TOT, agroecology and participatory action research (PAR), have provided a base for the development of most of the methods and techniques for enhancing dialogue between researchers and rural villagers. This section will not summarize each of these orientations. Rather, it will attempt to illustrate how certain kinds of

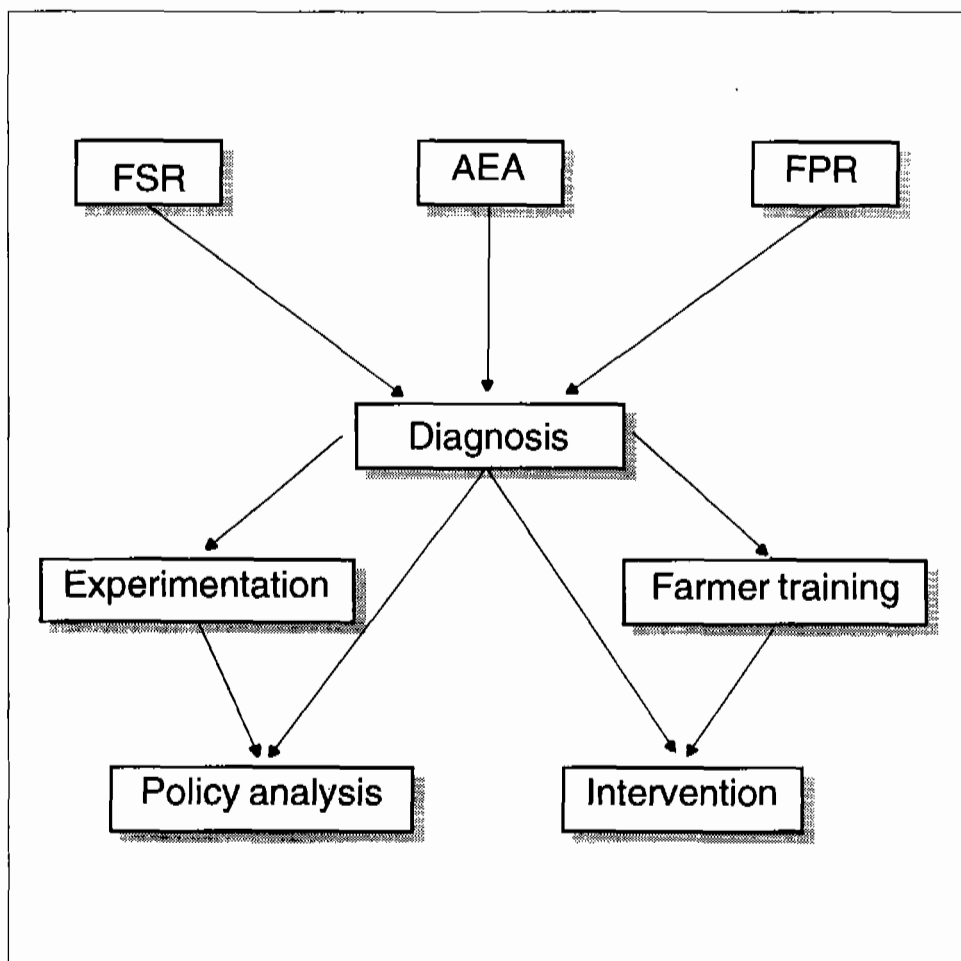


Fig. 1. The process of establishing effective dialogue begins with establishing a clear set of objectives which will influence the content and focus of the interaction and the choice of methodology and specific techniques to be used.

objectives are related to specific research frameworks that in turn influence the selection of the field methods that foster different types of client relationships (Fig. 2).

If the primary purpose of the interaction is to develop a diagnostic base which gives priority to agriculture research and technology assessment, it is likely that FSR will provide the dominant research framework. If the researcher's objectives are focused more on resource management and understanding the flow of knowledge,

energy and materials within and between human social systems and environment, AEA is the framework of choice. If the emphasis is on helping people solve their own problems, one of the participatory approaches is the most appropriate framework upon which to develop an interaction strategy.

In FSR, the crop, field and farm household are the key variables of concern. The emphasis is on how farm families can better manage the resources under their direct control to improve agricultural production.

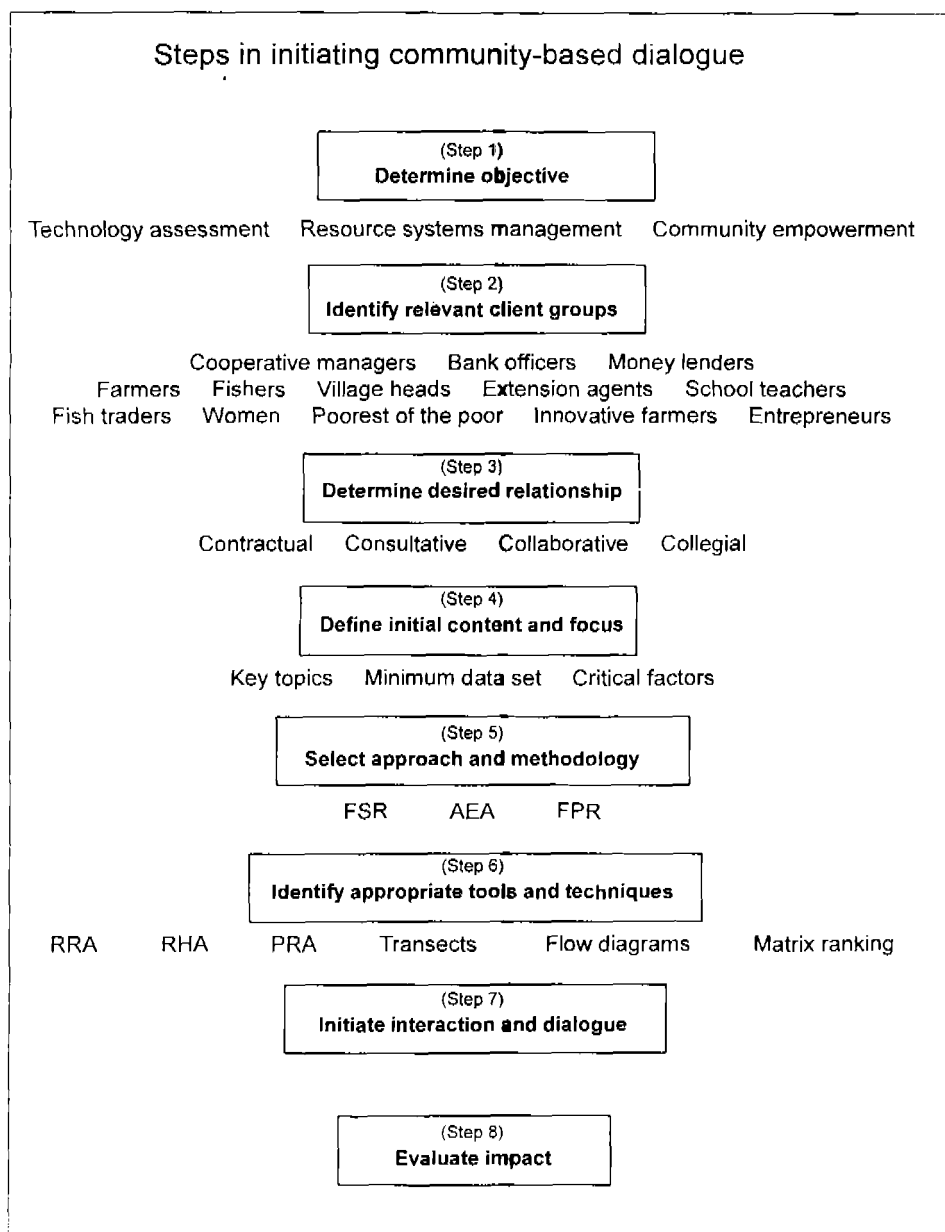


Fig. 2. Steps in Initiating community-based dialogue.

The larger physical and social environments are of interest only to the degree to which they influence farm household production strategies. With AEA, understanding human-environmental interactions is the main focus of investigation. The critical elements are

the watershed; agricultural fields, including water management systems; and human residence and resource management patterns. In FPR and other participatory approaches, farmers are the top priority. Here the emphasis is not on technology

transfer or environmental management, but rather on human resource development. In the case of FSR, technology improvement is the core concern. With AEA, the central issue is resource management. The FPR stresses learning from and building upon indigenous social and technical knowledge and/or training of farmers in scientific problem-solving methods.

Tools and Techniques

The various methods and techniques commonly utilized in communicating with villagers and community-based clients can be categorized into one of three groups depending on the degree to which they interrupt and/or influence the behavior or responses they are attempting to record or measure. In the social sciences, the various methods used in interacting with research subjects are usually classified as either intrusive or nonintrusive. Tests that require subjects to perform particular tasks and highly structured survey instruments are considered to be intrusive in that they frame the informants' behavior and limit the range of acceptable responses. Hidden cameras and unidentified observation, where the subjects have no idea that they are being observed or in any way evaluated, fall under the category of nonintrusive measures. In assessing tools and techniques associated with community-based research, three categories, intrusive, semi-intrusive and nonintrusive, can be used to indicate the

degree of researcher-imposed focus and control (Table 2). Matrix ranking is interesting in that it has both intrusive and nonintrusive characteristics. It requires informants to assign ranks or scores to a series of items significant in their environment, such as tree species and crop varieties. The selection of items to be ranked and the criteria by which they are scored are provided by the informant, not the researcher. The process had been used by Robert Chambers and others (Mascarenhas et al. 1991) to rank trees against different uses in India. Centro Internacional de Agricultura Tropical scientists have used farmer rankings of bush bean varieties to ensure that they pursue field trials on varieties acceptable to local producers and consumers (Ashby et al. 1989). Thus, this technique is intrusive because it frames behavior, but in terms established by and meaningful to the community residents.

Whether a technique is considered intrusive or nonintrusive is not necessarily related to the quality or validity of the information it is likely to generate. A person who uses nonintrusive observation techniques without proper training may end up with a biased dataset less reliable than information that a skilled interviewer can generate through informal interviews and good survey instruments. One tool is not necessarily better than another. Each has its own strengths and limitations. Tools should be selected according to the kinds of information needed; the condition in which they will be used; and the skills and

Table 2. Techniques for community-based research and data collection.

Intrusive	Semi-Intrusive	Nonintrusive
Formal surveys	Informal interviews	Undeclared observation
Journals/activity logs	Semistructured observation	Researcher sketch maps
Farm record keeping	Matrix rankings	Matrix rankings
Researcher-managed trials	Farmer flow diagrams	Researcher diagrams
	Farmer/research walks	Indigenous experimentation
	Farmer-managed trials	Transects

interests of the researchers who will use them. Productive dialogue and information generation usually involve the use of several tools which allow the researchers to compare and verify data obtained from different sources and processes. This kind of cross-checking (Fig. 3) is called "triangulation". Such planned triangulation, a basic principle of RRA (Chambers 1987, 1990; Grandstaff et al. 1987), provides a strong internal reliability check to a process that some feel lacks the objectivity and rigor of quantitative research. Observations can be used to generate topics and questions for informal interviews with villagers. The responses of informants can be compared with each other and against

ongoing observations of behavior and local practices. It is often very useful to design the interaction that makes it possible to check for consistency data collected from various sources by tools using different levels of intrusion. Such patterns of cross-checks are illustrated in Figs. 3 and 4.

Observation can provide the base for initial hypotheses that can generate topics and issues for discussion in informal interviews. The interview responses confirm and/or correct the initial observations and both can provide input to the design of formal surveys if a higher level of statistical analysis is required. In a similar fashion, farmer diagrams, often drawn on the

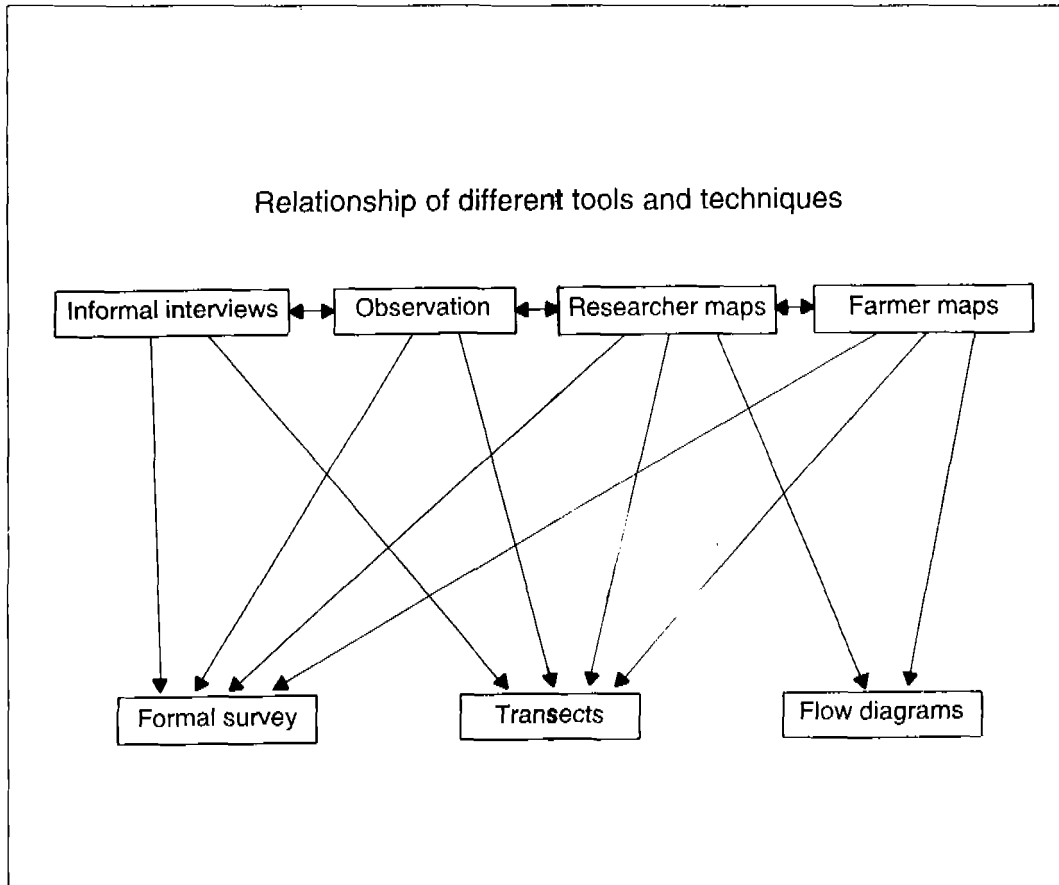


Fig. 3. Triangulation in Informal data gathering.

ground, can be used to correct researcher sketch maps. Resource-flow diagrams produced by villagers (Lightfoot et al. 1991) can reinforce and often expand information generated through informal interviews.

No single tool, no matter how powerful, is sufficient in and of itself to generate broad-spectrum dialogue and in-depth information required for research, development planning and community problem solving. Each tool or technique has its own strengths and limitations. Based on the objectives of the interaction and the desired relationship, the researcher will select a particular set of tools and techniques

tailored to his or her needs and those of the local participants.

Rapid rural appraisal

Rapid rural appraisal is one of the most widely used techniques for interacting with villagers and conducting community-level diagnostic surveys for rural research and development. The term RRA is generally used to refer to an interdisciplinary team exercise that results in timely and cost-effective information for the design of rural research and development intervention

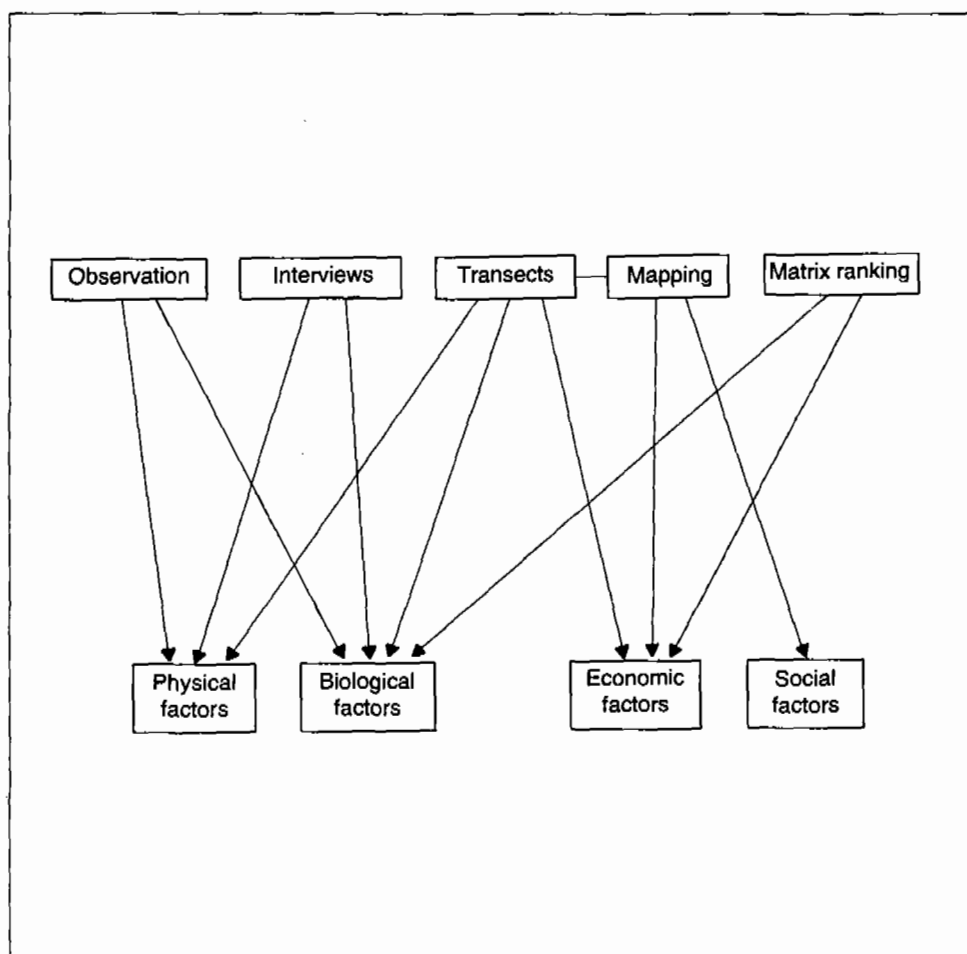


Fig. 4. Triangulation among different data sources.

efforts. It is both a process of learning about communities and a way of organizing people and resources for collecting and analyzing information. Ideally, it starts a process of continuous learning by the researcher that results in a tentative list of problems, opportunities and potential strategies.

Under the RRA rubric, a number of tools and techniques have been used (e.g., single informant interviews, group interviews, mapping of village resources and flows, transect analysis, fieldwalks, structured observation, seasonal calendars) to facilitate the interaction with and collection of information from rural villagers. The RRA process is based on a paradigm that views the world as consisting of multiple sets of interactive variables subject to rapid change and a high degree of uncertainty (Jamieson 1987). In such environments, communication and cooperation with rural villagers are considered essential for understanding rural problems and issues, monitoring trends and proposing viable solution strategies (Grandstaff et al. 1987). As a process, RRA attempts to bring together essential information gathered from secondary sources and from primary interaction with rural residents to design and plan for research and/or development action.

One of the core principles of RRA is the use of interdisciplinary teams. This approach provides strength and depth that come from focusing the minds and hands of skilled researchers from different backgrounds on a single problem. Ironically, this strength has emerged as one of the approach's main limitations. For the most part, RRA exercises have been carried out by teams of national and expatriate scientists with external donor support. The process has been more a part of external donor-driven and nongovernmental organization (NGO)-sponsored projects than an integral component of national research and extension programs which tend to be organized along commodity and disciplinary lines.

Even when implemented by well-trained teams, RRA is generally a researcher-controlled process that focuses on identifying development constraints and opportunities for change, and understanding the flow of resources, energy and information through a given system during present conditions. The process, in and of itself, does not necessarily generate a continuing relationship of mutual learning and problem solving between the researcher and community residents. It is also temporal in nature, usually providing only a single snapshot of what is happening in a community.

Rapid historical appraisal

A process which may be referred to as rapid historical appraisal (RHA) can be used to assess the degree of change that a community or subsystem (i.e., rice production) has undergone over a designated period of time. This process assumes that all social and environmental systems are undergoing change. The primary purpose of RHA is to document indicators of the nature, causes and speed of past change in a given community. Often, change in a community system is related to technological, economic, social and political transitions that have taken place on a regional, national and global level. Utilizing ethnohistory, informal interviews, village and district records and secondary sources, RHA attempts to reconstruct a comparative historical summary of key changes that have taken place in the village and the country during specific time periods, usually within two to three generations, depending on the availability of elderly informants.

Rather than a substitute for traditional historical methods, RHA is a brief look backwards that is highly dependent on informant recall of key events and situations related to particular village practices. The farther back one goes in the reconstruction,

the greater possibility of selective recall and inaccuracy of quantitative data. The only control of these weaknesses is triangulation with information from multiple informants and historical documents (census production records, old maps, accounts written by professional historians, etc.)

The following sample (Table 3), taken from the RHA portion of a follow-up RRA study conducted in a Vietnamese village (McArthur et al. 1993), illustrates how increases in rice yields are directly related to a series of physical, technological, social and political changes over a 50-year period. The historical summary allows one to identify particular sets of events that have contributed to significant growths in production and determine the likelihood that similar circumstances will occur again.

Participatory rural appraisal

Participatory rural appraisal (PRA) is a process that has emerged in response to the shortcomings of RRA with respect to involvement of villagers in the diagnostic and priority-setting process. It is based on the assumption that for lasting change to occur, community residents must participate in an active colearning process with researchers. For this to happen, a reversal in roles must take place.

For poor farmers to be served well, Chambers (1989) argued that a series of reversals must occur so that the farmer's, rather than the researcher's analysis, becomes the focus of research priorities. He called for a process in which researchers work with and learn from farmers. This theme of reversals is at the core of several PRA techniques, including the farmer first and last (FFL) process (Chambers and Ghildyal 1985) and the farmer back to farmer (FBTF) approach (Rhoades and Booth 1982). By placing the farmer and his or her interests as the primary focus of attention, these

methods attempt to increase researcher awareness and appreciation of indigenous knowledge and experience. Farmer mapping, concentrating on socioeconomic distinctions and location of and access to resources, and matrix ranking, are examples of PRA techniques which provide opportunities for villagers to share their knowledge and preferences with researchers. These techniques are more apt to result in collaborative and collegial relationships than the more researcher-dominated RRA methods.

Although an increase in mutual understanding between researchers and farmers is desirable, the concept of reversals has certain limitations. Baker (1991) suggested that farmer demands could result in an underinvestment by researchers in issues pertaining to sustainability. Given intra- and interhousehold variations in priorities, often related to differences in gender, wealth and residence location (Feldstein and Poates 1990), Baker claimed that in the end, researchers would ultimately have to decide whose concerns are most compelling and how to incorporate these into research priorities.

Given the potential conflict between researcher and villager agenda, it would appear that some kind of balance, rather than a complete reversal, in farmer and researcher roles is desirable. To this end, certain techniques have been developed which give the farmer, or fisher in the case of coastal areas, greater control over learning, research and evaluation without diminishing the scientific contribution of the researcher. Kenmore (1991) suggested that the plateau of yield increases related to improvements in water management, fertilizer technology and genetic engineering had been reached. He felt that farmers, rather than technology, would be at the center of the next wave of production increases. To this end, he argued for an additional investment in the training of farmer trainers. This "expert farmer" ap-

Table 3. Chronology of events and agricultural changes in Nguyen Xa village, Vietnam (McArthur et al. 1993).

Period/date	Vietnam	Nguyen Xa village
1935-1940	French colonial rule	Double cropping of traditional rice varieties with no use of fertilizer, second crop often lost to flooding; yields from 60-70 kg·sao ⁻¹
9/1940	Arrival of Japanese troops in Indonesia	
5/1941	Formulation of Vietminh	High degree of tenancy; most land owned by 51 families
3/1945	End of French rule: Vietnam under Japanese influence	
8/1945	Surrender of Japan; Vietminh seizes power	Strong village support of Vietminh resistance fighters;
9/1945	Ho Chi Minh's declaration of independence	French troops stationed in Dong Hung District
12/1946	Outbreak of Franco-Vietnamese war	
1948	France creates "State of Vietnam" under former Emperor Bao Dai	
1950	Major defeat of French by Vietminh along Vietnam/China border; direct US military aid to French in Vietnam	Residents fortify village and repel three attempts by French forces to move through Nguyen Xa on offensive against Vietminh; 92 villagers killed defending village from French soldiers
5/1954	French defeat at Dien-Bien-Phu; Initiation of Land Reform	
7/1954	Geneva Agreements; division of Vietnam	
1956	Rectification of land reform errors in the north	
6/1956		987 mau of land redistributed to former tenant farmers; two crops of traditional rice varieties grown with use of manure and compost, yields range from 70 to 80 kg·sao ⁻¹
1958		Formation of first hamlet level cooperative
1960	Formation of National Liberation Front of South Vietnam	Main canal constructed; yields average 100-130 kg·sao ⁻¹ with improved water management
1960-1967		Number of cooperatives varies from 1 to 16
1963		First electric pumps installed
1965	Introduction of US ground troops in South Vietnam	
6/1965	Beginning of sustained US bombing in North Vietnam	
1967		Local forces shoot down a US plane near Cau Nguyen Bridge
1968	End of sustained US bombing of the North	681 men conscripted into military service; 265 families lose a son in the war
1972		Model irrigation and water management system completed with 3 gates and 7 pumping stations; year-round water control to 90% of field areas
4/1975	Collapse of Saigon Government	Yield increases from 6,000 to 10,000 plus kg·ha ⁻¹ with
1976	Unification of Vietnam	introduction of high-yielding varieties (1966-1984)
2/1979	Chinese invasion of Vietnam	
1979	Limited introduction of household contract system in agriculture	

proach is at the core of an innovative Integrated Pest Management Program in Indonesia that uses farmer field schools to train villagers in AEA and experimental techniques. Farmer groups conduct collaborative research with university-trained personnel who live in villages and operate "village laboratories". Drawing on nonformal education as a theoretical base, this process involves the generation of local ecological knowledge through culturally appropriate group exercises. In this process, researchers contribute a framework and methods for scientific investigation, but the problems and practices to be studied are farmer-selected. Farmers adopt methodology to become better research partners and crop/field managers. Kenmore's hypothesis was supported by a series of recent studies in the Philippines (Pingali et al. 1990a, b) that suggested that farmers who have used their own knowledge and innovation in fine-tuning the management of existing technology have produced rice yields in Laguna province that surpass those of the International Rice Research Institute (IRRI).

Graphic tools and techniques

A number of graphic techniques for gathering and analyzing field data have been developed to be used in conjunction with the informal interview and other key RRA and PRA tools. The most common forms of graphic representations include researcher- and farmer-drawn maps, resource-flow diagrams, transects and matrix ranking. When researcher sketch maps are compared with those drawn by local residents, it is often possible to compare features significant to the researcher with those important to the local residents. When used as a base for further open-ended questions, graphic tools such as crude maps can provide rich sources of information concerning important social and environmental system

interactions. When transformed into a series of overlays (Fig. 5), one participatory mapping exercise can produce an amazing amount of information and suggest key relationships between the physical environment, or the resource base and the social system.

Some anthropologists have questioned whether the ability to produce graphic representations varies among different cultures and societies, particularly those that do not have a rich graphic arts tradition. Although the universality of this approach remains to be fully established, mounting evidence (Lightfoot 1990; Rhoades et al. 1990; Lightfoot and Minnick 1991; Chambers 1992; Mascarenhas 1992) suggest that villagers respond well to these techniques which can offer important insights to indigenous knowledge and resource management systems.

To achieve maximum effectiveness, it is necessary to do more than simply request that a villager draw a map. The researcher should facilitate a process of sequential discovery with such probes as: Can you point or show me where the best farmland is located? Why is this so? Who owns or uses this area? Was it always like this? Can you show or mark where the rich people live? etc. In this way, the mapping or diagramming exercise provides not only a product, but also an important contribution to the dialogue process.

Transects can be a useful tool for creating dialogue with villagers and analyzing field data. They can range from a very simple illustration of the relationship among topography, agricultural production and residential patterns to more complex displays of resource flows and human activity and residential patterns as indicated in Figs. 6 and 7. When used to its fullest extent, creating transects is an intensive process that both displays information and generates hypotheses for further exploration.

Matrix scoring is a method commonly associated with PAR that provides the

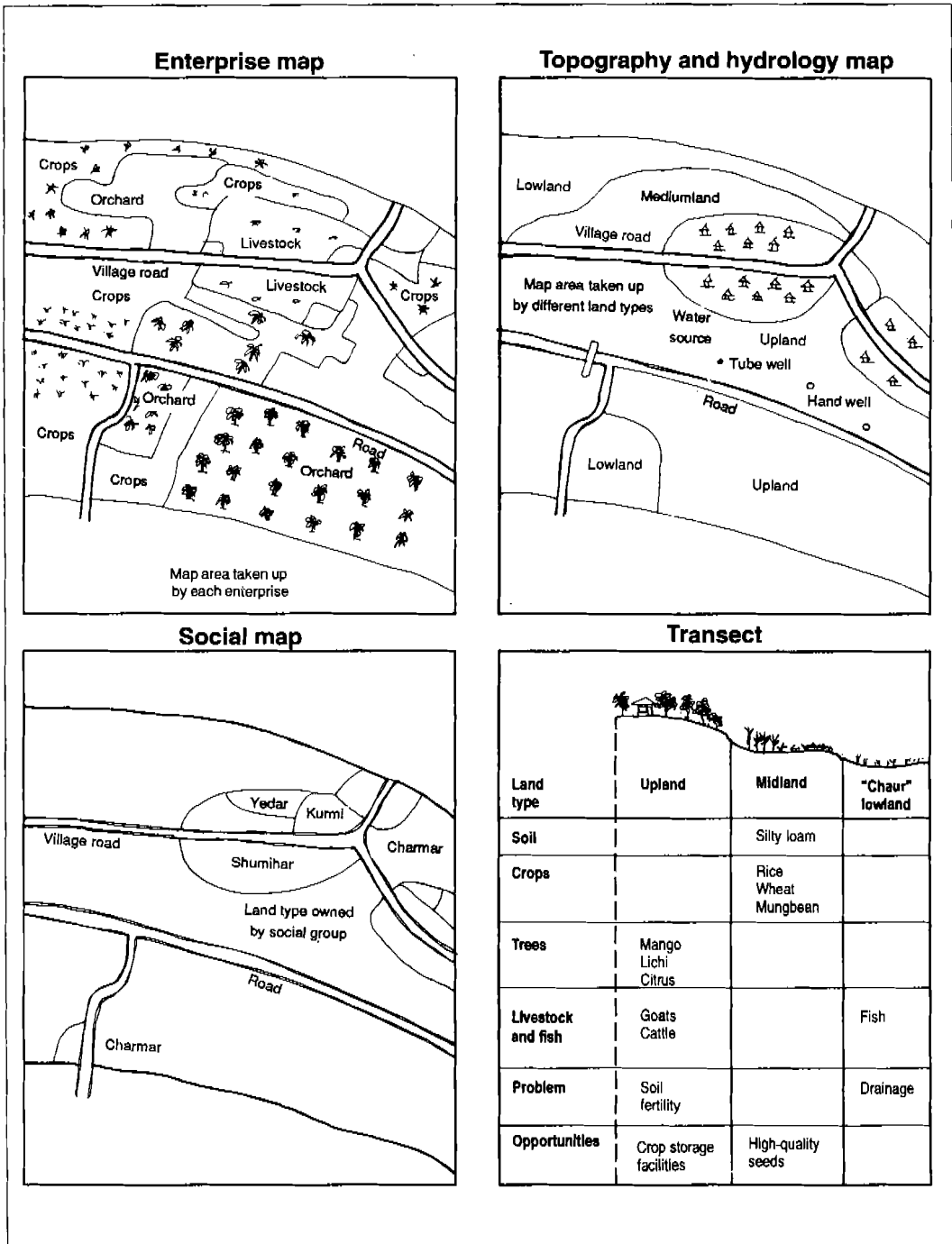


Fig. 5. Agroecosystem maps (Lightfoot et al. 1989).

villager a high degree of controlled participation in the dialogue process. While the researcher indicates the key issues he or she is interested in learning about, such as tree species or bean varieties, the villager decides what items will be ranked and the criteria that they will be measured against. As such, this process puts the villager in a true dialogue, rather than in a simple response mode in interacting with the

researcher. The end production of a session in which village women in India ranked sources of supplementary income is illustrated in Fig. 8.

Like all the other field tools associated with RRA and PRA, graphic techniques have their own strengths and limitations. Used in association with other tools, they are an important component in the growing array of methods for enhancing productive

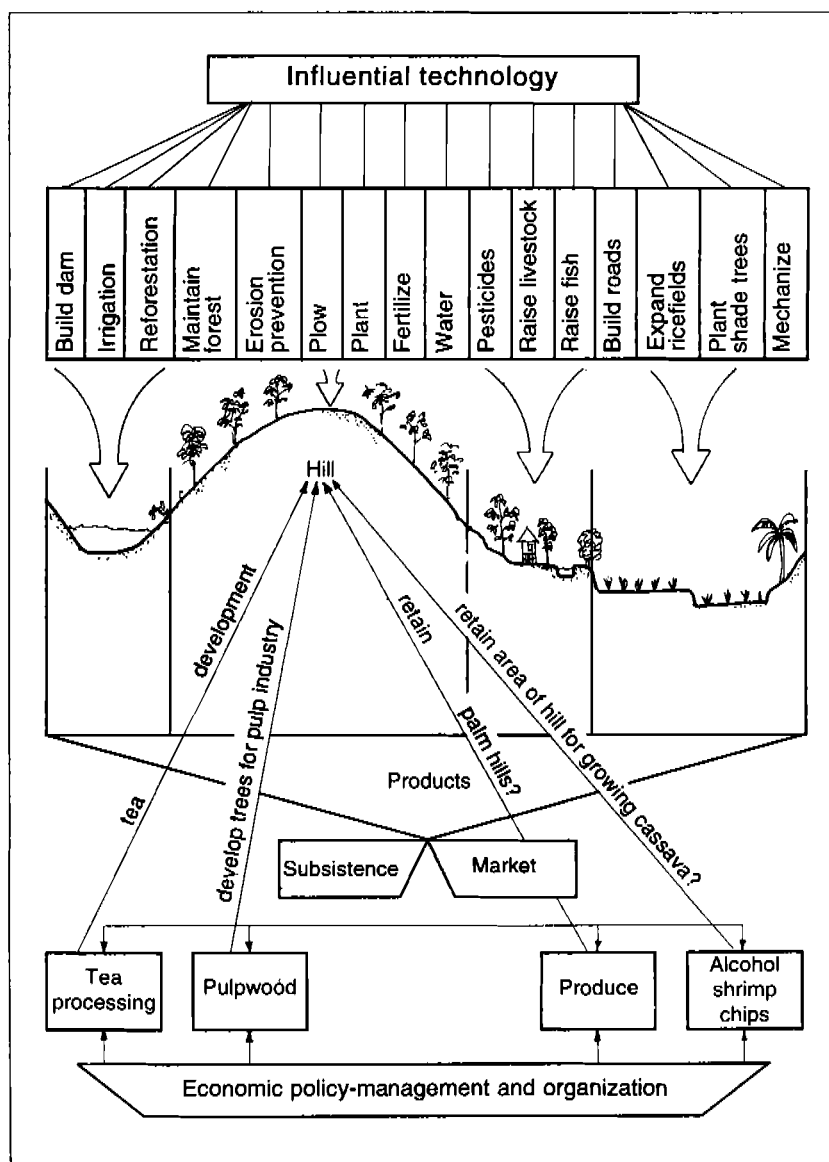


Fig. 6. Factors influencing land use in the midlands of Vietnam (Cuc et al. 1990).

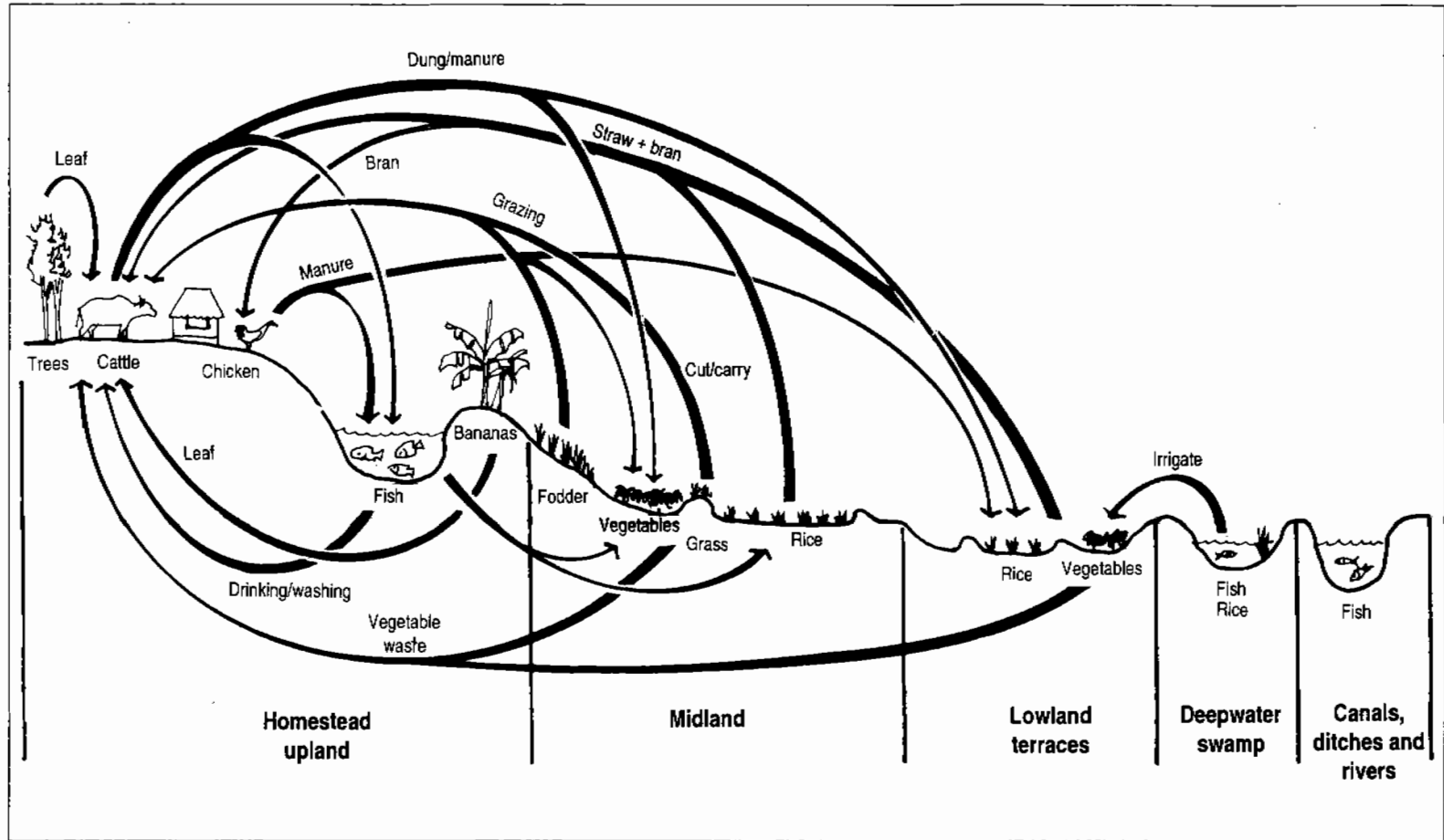


Fig. 7. Typical biomass flows between enterprises and land types in an Asian Integrated agriculture-aquaculture farming system (Lightfoot 1990).

communication among researchers, practitioners and village partners in development.

Applications to Community-based Resources Management












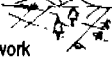
The notion of "resource" is a social structure (Rambo 1991). A particular object or material from the natural or social environment is only a resource if it is considered to have value and meaning by a particular society. When researchers move from their own culture and that of the university and the experiment station to rural villages, it is possible that they can bring with them, as part of their world view, a perception of resources that does not match with that of the local residents. Farming systems research, for example, explicitly

focuses on those resources under the farmer's direct control (Shaner et al. 1982), but does not address the possibility that the researcher and the farmer may not recognize the same set of resources.

The first step in looking for ways to improve the efficiency and/or productivity of Indigenous resource systems is to determine what elements in the system are considered resources by both the researcher and the village residents. Informal interviews and mapping exercises can assist in identifying a list of locally defined resources. In addition, a researcher also needs to recognize that people can see the same element as a resource, but relate to and manage it very differently. Some people consider trees as a resource because of their value as a source of building material, fuel and profit. Other people see trees as an important element of the ecosystem

Sample rapid historical appraisal timeline

Matrix ranking can be used for ranking items such as: crops; varieties, types and breeds of livestock; trees; fodders; supplementary income generating activities; etc. This example of nonagricultural livelihoods in Godavellagudda village was done by the village women after selecting their own criteria.

	 Cobbler	 Tamarind	 Leaf plate	 Custard apple	 Brick making	 Firewood	 Pongea
Time consumed 	●●●●	●●●●	●●●●	●●●●	●●●● ●●●●	●● ●●	●●
Profits 	●●●● ●●●●	●● ●●	●●●●	●●●● ●●●●	●● ●●	●●	●
Labor 	●	●●	●	●	●● ●●	●	●
Loan 	●●						
Hard work 	●●	●●	●●	●●●●	●● ●●	●● ●●	●●

Staff: Elias
Suresh
Padmovath

Participants: P. Lakshinarayana
Krishnappa
Gangulamana
Gangojamana

Fig. 8. Sample rapid historical appraisal timeline (Mascarenhas 1992).

that needs to be maintained because they protect the watershed, control erosion and provide a natural habitat for many species of fauna. Some people assign a special spiritual role and meaning to trees.

In many parts of Asia, certain trees are considered the home of spirits and certain groves of trees are viewed as sacred grounds. In the northern Philippines, villagers can show you the trees where various spirits and nonhuman residents live (McArthur 1977). In the highlands of Central Vietnam, many of the Montagnard tribal groups recognize water spirits and avoid building dams or wells that would capture these spirits (McArthur 1970). In Laos, the Lao Theung (midland Lao) groups manage and conserve certain trees in "sacred" groves (McArthur et al. 1992). To gather information on this level of meaning and its subsequent implication for resource management, it may be necessary to tap some of the deeper, nonvisible and nontechnical aspects of the indigenous knowledge system. In-depth ethnographic interviews and case studies are often helpful in collecting this level of information.

In a similar fashion, participant observation of different agricultural practices can also provide important clues to how people relate to their resource base. While working on a soil management research project in an Indonesian transmigrant community, Colfer (1991) discovered that one ethnic group refused to hoe, while another group were avid hoers. This observation led her and the other researchers to look deeper at the soil and at indigenous knowledge systems for an explanation. This was not a frivolous task, even for the agronomists and soil scientists, because they needed to be sure that the methods they were using to incorporate fertilizer into the soil in their field trials would not be rejected on some cultural grounds.

In addition to how a resource is defined, the issue of whether it is privately or com-

munity owned and who has use and access to it can vary. Lamug (1989) noted that in the highland areas of the Philippines, tribal groups who have traditionally practised *kaingin*, or swidden agriculture believe that custom and historical use patterns determine land-use rights and boundaries. No individual owns a single piece of land. In contrast, lowland farmers who have migrated into the upland areas feel that any forest land they have cleared and farmed is theirs. What people are willing to do with a resource, be it a forest, lake or coral reef, can depend greatly on such factors as the relationship between legal ownership, on one hand, and traditional use and historical rights, on the other. The RRA, which combines primary data from interviews and observation with secondary source material on the area, can be an important tool for understanding the critical factors that affect people's access to and use of particular resources.

Implications for Use in the Coastal Zone

Pressures from population growth, urbanization and industrialization in many areas have resulted in increasing competition among different interest groups for access to and control over a decreasing environmental resource base. Such competition is perhaps greatest in coastal areas, which traditionally have had the greatest concentration of human settlements. They also are generally closer and within easier access to major urban centers than the upland areas. They often involve the use and management of multiple and interdependent common-property resources—mangroves, beaches, coastal waters and coral reefs. Such human and physical environments provide an ideal living laboratory in which to utilize, refine and expand the existing diagnostic tool kit.

For this adaptation to occur, researchers must first ascertain their level of interest and commitment to community-level work and define their principal objectives and the kind of relationship and ultimate outcome they hope to achieve. These decisions will facilitate a logical selection of tools and techniques appropriate to the researchers' major objective and the anticipated relationships with the host community. This decision process will also expedite learning the use of different tools and techniques as the researchers will already know what they want to achieve and which techniques will probably be the most useful. Once this level of preparation has been attained, it will be possible to look for ways in which the specific techniques may need to be modified for use in coastal areas.

Individual and group interview techniques, walking tours and mapping exercises work well in defined, semi-isolated village communities where there is a relative homogeneity of resource management interests and practices. In coastal areas where inshore waters are being increasingly polluted by urban and industrial waste; where local fishers may be competing with urban-funded commercial operations; and where the same reefs that provide a habitat for fish and attraction for tourists are being destroyed at alarming rates, some new techniques may need to be developed. Collaborative and collegial relationships may be harder to forge. We may have to look to other fields such as decision sciences for conflict resolution and for ideas on how representatives of competing, and perhaps hostile, interests can be brought into effective dialogue with each other as well as with researchers and development workers. One research orientation that may be useful in dealing with multiple stakeholders is analytical hierarchy process (AHP) (Saaty and Kearns 1985). This computer-based decision tree technique could assist both researchers and coastal

residents in expressing and critically analyzing their preferences with respect to the management of a given resource. Working through this process with individuals or groups representing different stakeholders could provide a basis for productive dialogue among groups and assist in the clarification of different agenda and views of resources and how they are manifested within a historical and sociolegal context.

Feeny (this vol.) suggested four key elements that must be considered in understanding resource management on the commons: (1) the resources; (2) the preferences (desired outcomes, trade-offs) of the various users; (3) the technology used to exploit the resources; and (4) the institutions and rules that govern behavior and interaction among users. When looking at such common-property resources as coastal mangroves, bays, seagrass meadows and coral reefs, it is critical to recognize that sustainable management systems will require partnerships among a range of users and stakeholders including local fisher groups, municipal governments and various national agencies. Dr. Angel Alcala, Secretary of the Philippine Department of Environment and Natural Resources, in discussing the role of the national government in coastal resources management (this vol.), noted that 20 different agencies have a mandate that impinges one way or another on coastal resources. Pomeroy (1993) suggested that sustainable management must involve a working partnership between these government agencies and local user groups. He referred to this partnership as "co-management" where the national government and the local community share authority for fisheries management.

In developing an effective framework for such co-management, researchers and community development workers need to determine the appropriate roles and relationships that each group should have with

the various stakeholders and comanagers. For example, it may be easier and more suitable for NGOs to establish long-term collegial relationships with fisher groups and local government agencies. Researchers, on the other hand, may find it more useful and cost-effective to develop consultative links with national government agencies and collaborative relationships with NGOs and people's organizations (POs) actively involved in helping local groups work out effective co-management strategies.

Of the three conceptual orientations discussed in this paper, TOT, agroecology and PAR, the last two seem the most relevant to coastal resources management. While it is critical to understand the biological, physical and technological aspects of the resources, it is equally important to comprehend the various market attributes and external social, political and institutional forces that influence the behavior of the various stakeholders and comanagers (Oakerson 1992). The objective is to develop a research and intervention strategy that combines the aspects of agroecology and PAR into a single alternative process capable of generating the key resource system and institutional data necessary for documenting and comparing different management strategies.

While the challenge may seem formidable, the old adage—"where there's a will, there's a way" is ever true. If researchers and practitioners are willing to learn from each other and from previous experience and to try something different, ways can be found to generate and build upon effective dialogue with the multiple interest groups who all have a stake in sustained management of the coastal zone.

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The Role of Nongovernmental Organizations in Community-Based Coastal Resources Management

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Introduction

To date, some writers, agencies and sectors, including the government and multilateral institutions, have assigned a critical role to nongovernmental organizations (NGOs) in natural resource regeneration, protection and management programs, in general, and community-based coastal resources management (CBCRM) programs, in particular. Here in the Philippines, one could cite the "critical role" attributed to the NGOs by the Asian Development Bank and the government in implementing the Fishery Sector Program.

To execute the coastal resources management component of the program in 12 bays, the government contracted the services of NGOs primarily to do community organizing and carry out alternative livelihood projects. Other examples are the United Nations Development Programme-Global Environmental Facility (UNDP-GEF) Small Grants Program that commenced in 1992 and assigns the implementation of community projects to NGOs and people's organizations; and the National Integrated Protected Area System (NIPAS) program of the Department of Environment and Natural Resources to be funded by GEF

through the World Bank which also highlights the role of NGOs in the protection and management of natural resources. Notable also is the legal mandate given to NGOs by: the Local Government Code to participate in the local development council; the NIPAS Act to sit in the local Protected Area Management Board; and the Presidential Executive Order that created the Philippine Council for Sustainable Development to participate in monitoring the implementation of Agenda 21 by the Philippine government.

Such an assessment recognizes the increasing influence and expanding role NGOs play in effecting changes in Philippine society, in general, and in the grassroot communities, in particular. It is also a result of the relative effectivity and dynamism of NGOs in their conduct of development work.

But such recognition and assignment of role are not due to a unified framework. In fact, different writers, agencies and institutions define such a role from varying perspectives and motivations. Thus, though there is a general similarity in the lines of work, such as community organizing and livelihood programs, in essence the roles assigned by different sectors are not the same.

This paper attempts to define such a role from the point of view of a service NGO working with Filipino fishers, like the Tambuyog Development Center.

Framework

The framework of the role of a service NGO like Tambuyog in a CBCRM program could only be formed from: (1) the recognition of the basic "property rights" problem of an open-access resource like fishery and its resolution in the Philippine socioeconomic and political context, and (2) the precarious state of the coastal resources.

CBCRM essentially is a response to open-access regimes that surely and eventually lead to the depletion of fisheries resources. Such is brought about by the institutional vacuum or the weak articulation of property and management arrangements that characterizes an open-access situation. This in turn breeds overfishing, the use of destructive fishing gear, and the wanton dumping of wastes and pollutants into the country's fishing grounds. Such a situation occurs since everybody has virtually complete autonomy to use the resource and no one has the effective ability to keep any potential user out. The resource is subject to the rule of capture and belongs to no one until it is in one's possession or actual use; thus, no property rights exist under an open-access situation.

Since the basic problem is the unclear/nonassignment and ineffective articulation of property rights, coastal resources management must go beyond the regulation of fishing efforts; the curtailment of illegal fishing methods; and microlivelihood projects like backyard swine and poultry raising. The beginning of a meaningful and effectual response is the reverse of the problem, the clear assignment of property rights to the state, private individuals and communities. The choice of what property regime to adopt could not be made in a vacuum. One must take into account the Philippine social, political and economic context; the current dismal state of our natural resources; and the factors behind it.

Theoretically and legally, coastal resources in the Philippines are state properties. But historically and in actuality, these are virtually open-access resources due to ineffective management and differential enforcement of regulations in their use. In short, even with the new Local Autonomy Act, we are not optimistic about state property regimes. At the same time, given a weak state, held captive by rent

seekers, strengthening state property regimes will be contrary to the general public clamor for a robust and healthy civil society as expressed by the worn-out phrase "people empowerment."

The most familiar property regime is private-property rights. Any adherent of mainstream economics will tell us that the best option to remove the open-access externality and to have an efficient resource allocation is privatization. Indeed, that may be true in the dream world of perfect competition, but not in a Third World country like the Philippines wherein concentration of ownership has not only wrecked havoc on the resources but has also led to the misery and abject poverty among the people. Such circumstances ultimately add to the degradation of open-access resource bases, the forests, rivers, lakes and seas. The current conditions of Laguna de Bay attest to this.

Community property is in essence "private" property for a particular group. This means that all others are excluded from the community and decisionmaking. In this setup, individual co-owners have rights and obligations. Generally, the only viable option for the rational resource use and management in our country is a CBCRM program with a community-property regime at its core. As a system, CBCRM is broader than the set of possession and actual use of the fisheries resource. It includes use rights, exchange rights, distribution entitlements, a management scheme and an authority instrument as means of effective management. It has a built-in structure of economic and noneconomic incentives that encourage compliance with existing conventions and institutions. Such a structure emanates from the assumption that the behavior of all members is subject to accepted rules, which are transparent. Today, even with our "confused" culture, conformity with norms is still an effective sanction against antisocial behavior. Unfortunately, a lot of these norms, with

their sanctions and incentives are inoperative or being eroded, usually because of factors beyond the control of the community. Most of these are macro in nature which include government policies, the prevailing economic climate, among others.

Because of the very nature of CBCRM, advocates of privatization of open-access resources would argue that the cumbersome decisionmaking process would imply higher transaction costs compared to a private-property regime. This process is exacerbated by the fact that our colonial and current history has been biased against community-property rights and has virtually erased traditional arrangements and practices that produce and reproduce a community-property regime. But the notion of transaction cost here would be relative and culturally specific—for a long-marginalized community, such a cumbersome process will not be considered a cost but a benefit.

Agenda

With the foregoing discussion, we could say that the real agenda in the coastal communities is building the necessary social infrastructure in setting up CBCRM. This would mean enhancing the capability of the coastal communities in managing their resources. Such would entail community organizations, which refer to autonomous and self-reliant bodies; and institutions, meaning social arrangements that produce, reproduce and strengthen the community-property regime.

A community organization must be empowered to manage the coastal resources in such a way that will arrest the continuing resource degradation and increase the existing stock. This could only happen if a real management buildup program is put in place. At the same time, these organizations must be strengthened

so that the people in the countryside would be able to rediscover and exercise their inherent capacities to decide their own fate and that of their immediate environment.

Our Role

Given the framework and agenda, the role a service NGO must take could only be facilitative, in the sense that the real actors in CBCRM are the people in the coastal communities. Resource management, to stress the point, is not only building the capacity of the resource to renew itself but more so, enhancing the capabilities

of the people in the coastal communities to manage their own lives and resources. Thus, the role of an NGO could only be at best a "partner" agent if the real end goal is people empowerment. In that sense, the objects of the program become the subjects as well.

In doing its facilitative role in helping set up the necessary social infrastructure of CBCRM, the Tambuyog Development Center assists the coastal communities in the following components: (1) community organizing; (2) research (social, technical, policy); (3) training and education; (4) socioeconomic work/livelihood; (5) networking and advocacy; and (6) finance and resource mobilization.



Problems Encountered in the Implementation of a Community-based Fishery Resource Management Project

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Introduction

The destruction of the Philippines' coastal ecosystem has reached crisis proportions (Lacanilao 1989b). Coral reefs, which account for 9-25% of total fish production (Carpenter 1977; Murdy and Ferraris 1980) have been so damaged that only 6% are in excellent condition, based on the living coral cover (Gomez and Alcala 1984). Siltation; fishing methods like *muro-ami*, *kayakas* and blasting; and the use of cyanide (Carpenter and Alcala 1977) are largely responsible for the destruction of the country's coral reefs. Mangroves, a multi-use/multi-user coastal resource, have been transformed into a privately owned and single-purpose resource when they were cleared for shrimp

mariculture (Bailey 1988). Mangroves provide a significant support for fish and shrimp communities (Sasekumar et al. 1992). Of 448,310 ha of mangroves existing in 1968, only 251,574 ha remained in 1976.

Despite the existence of a "thicket of laws and regulations" (World Bank 1989), the destruction of the country's coastal resources has continued unabated over the years. The World Bank (1989) identified the following organizational problems concerning the management of the country's natural resources: inappropriate mandates; resource limitations; confusion arising from bureaucratic reorganizations; potential for corruption in line agencies charged with managing natural resources; ineffectiveness of local governments; and lack of empowerment of user groups.

Lacanilao (1989a) proposed the following strategies to arrest further destruction of Philippine coastal resources: (1) integration of economics and ecology into lawmaking and decisionmaking systems; (2) population control that goes beyond family planning programs; and (3) coastal enhancement programs that will replenish depleted resources. This set of strategies provided the context within which the Southeast Asian Fisheries Development Center's (SEAFDEC) integrated seafarming and searanching project was formulated. The project addresses the issues of degraded coastal habitats, dwindling fish stocks, failure in law enforcement, and the need for alternative livelihood opportunities.

The Philippine government through the Department of Agriculture launched the Fishery Sector Program (FSP) to address, among others, the alleviation of poverty of fishers through the development of alternative livelihood activities and rehabilitation of coastal resources. The FSP has adopted the community-based approach of coastal resources management through greater community participation. The Local Government Code of 1991 provided the policy structure of decentralizing the management of coastal resources to the local government units (LGUs). Integrated management of coastal resources will need the collaborative involvement of social scientists, biologists, development workers and fishery managers.

Community Fishery Resource Management Project of SEAFDEC/AQD

In 1991, SEAFDEC's Aquaculture Department (AQD) started implementing its Community Fishery Resource Management Project after a year of site selection. The development-oriented research on the community-based coastal resources man-

agement (CBCRM) offers a significant opportunity to improve the livelihood and quality of life of millions of poverty-stricken fishers. The dual objectives of enhancing the coastal environment through active involvement of the community and of improving the socioeconomic conditions through alternative livelihood need the support of community organizations, social scientists and development workers in applying CBCRM techniques in selected fishing communities. The objectives of the project are to:

1. develop model marine hatchery-nursery systems of selected species for culture and release of juveniles;
2. provide additional livelihood through cultivation of appropriate finfishes, seaweeds, molluscs and crustaceans;
3. regenerate fish habitats such as coral reefs, seagrass beds and mangrove swamps;
4. increase fish stock by releasing juveniles of suitable species;
5. develop the community into a strong and organized association and grant it territorial use rights to manage the project site; and
6. extend the seafarming and searanching activities to other fishing communities.

The community-based strategy entails four major interventions: (1) deployment of concrete artificial reefs (ARs) for enhancement of fish habitat; (2) granting of territorial use rights in fisheries (TURFs) to solve the problems brought about by ineffective law enforcement; (3) community organizing and institution building; and (4) alternative livelihood activities. These four interventions are integrated and complementary and should not be taken in isolation.

This is SEAFDEC's first attempt at participatory research involving biologists, social scientists and community workers. The lack of an effective system of integrating the multidisciplinary research studies and relating their objectives to community

organizing has resulted in problems in the implementation of the project.

This paper presents the two-year experience of SEAFDEC in project implementation, with emphasis on problems encountered in the process, as well as community-organizing activities.

Pilot Site

A site selection process using biophysical and socioeconomic criteria was undertaken. The biophysical criteria considered the conditions of the coastal habitats, i.e., coral reefs, seagrass beds and mangrove areas and site suitability for deploying ARs. The socioeconomic criteria used were: (1) fishing as major occupation; (2) fishing income below poverty level; (3) control of fishing practices; (4) use of fishing credit; (5) potential for alternative livelihood; (6)

membership in fishing association; and (7) presence or awareness of nongovernmental organizations (NGOs). Out of five candidate areas in the islands of Panay and Guimaras, Malalison Island was chosen as the pilot site.

A small island of 55 ha and 74 households, and lying at 1125' north latitude and 122° east longitude, Malalison is located on Panay Island, central Philippines, and belongs to the municipality of Culasi, province of Antique (Fig. 1). Only 12 ha of the total land area comprise the village, while 33 ha are classified as reforestation area. Only 3 ha are riceland; the rest of the land is covered with coconut, black myrtle and *ipil-ipil* (*Leucaena* sp.). There is also about a hectare of fishpond which is seldom used. One side of the island is exposed to *amihan* or northeast monsoon, while the other side is open to *habagat* or southwest monsoon.

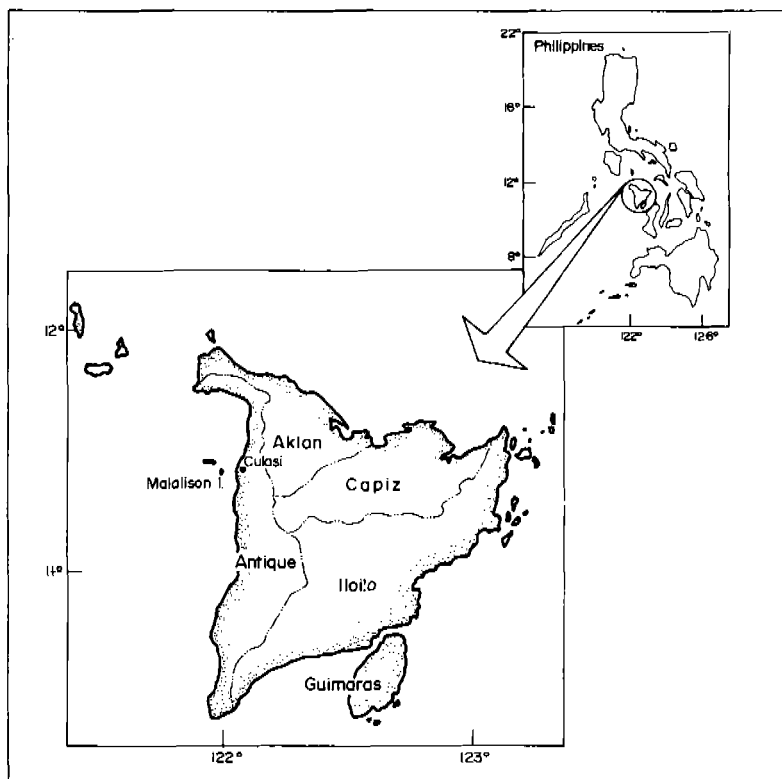


Fig. 1. Malalison Island: the pilot site of the Community Fishery Resource Management Project.

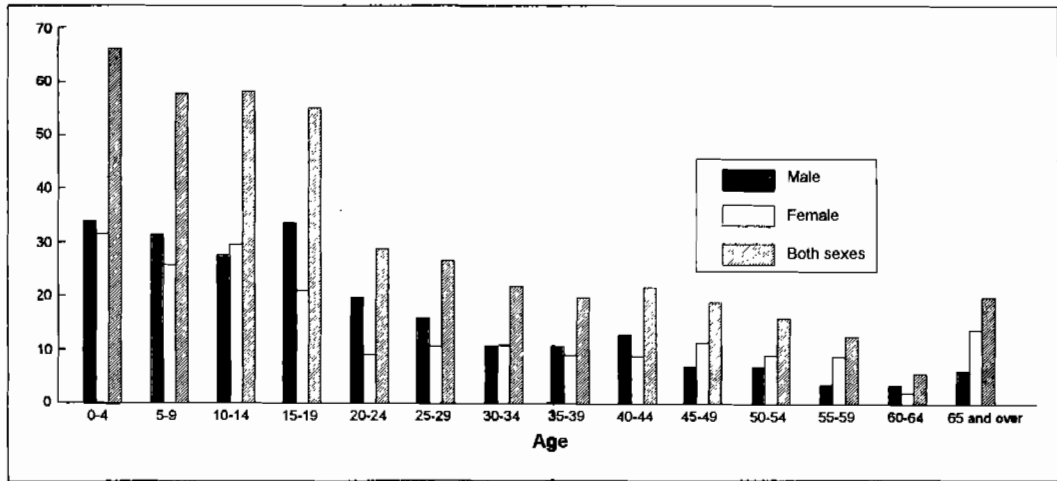


Fig. 2. Age structure of Malalison Island population (30 April 1991).

Malalison has a young population of 431 (Fig. 2). More than half are younger than 20, 29% are 9 years old and younger. There are more females than males.

Subsistence fishing is the primary means of livelihood of the islanders (Fig. 3). This occupation refers to a widespread pattern of economic activity which involves heavy dependence upon small-scale production of marine resources, largely for home consumption, and for sale or exchange in nearby households or markets, again for immediate home consumption (Szanton 1971). The heads of 55 households are fishers; some members of various households are also engaged in fishing.

Primary level (Grades 1-4) is the highest educational attainment for majority of the population (Fig. 4). The island has only a primary school with two teachers. Children have to attend the elementary school at Culasí, across the channel.

Majority of the villagers are poor. In 1990, half of the household population earned an annual income of less than P15,000 (Fig. 5).¹ Based on a 1988 pov-

erty threshold of P2,654 per month, 75.3% of households lived below the poverty level in 1990.

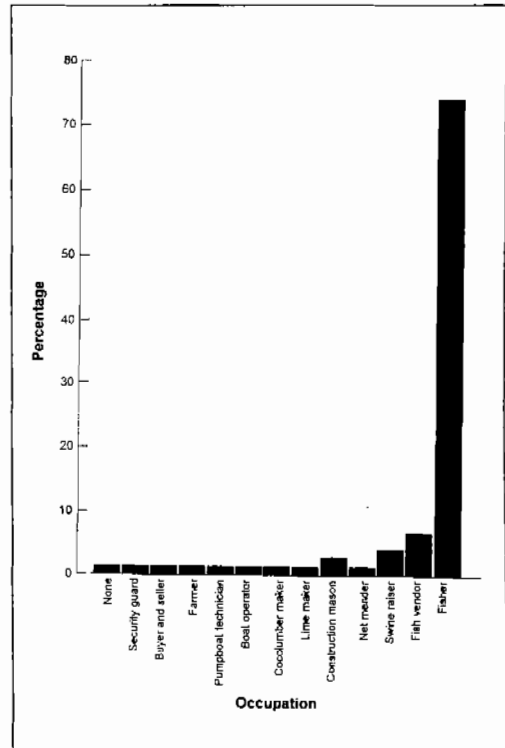


Fig. 3. Primary occupation of household heads in Malalison Island.

¹1990: US\$1 = P28.00; 1988: US\$1 = P21.34.

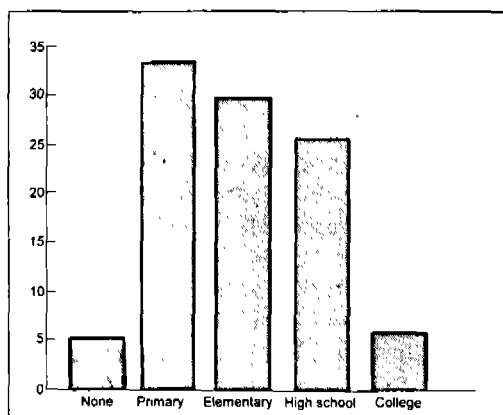


Fig. 4. Educational attainment of population aged 8 years old and over, in Malalison Island.

coastal assessment and seafarming techniques while the socioeconomic studies are on traditional fishing boundaries and TURFs, and economic utilization of resources. Community organizing and institution building are facilitated by an NGO, the Participatory Research, Organization of Communities and Education Towards Struggle for Self-Reliance (PROCESS) Foundation Inc. Seaweeds farming is the initial cooperative livelihood activity implemented by the association with technical and financial support from SEAFDEC.

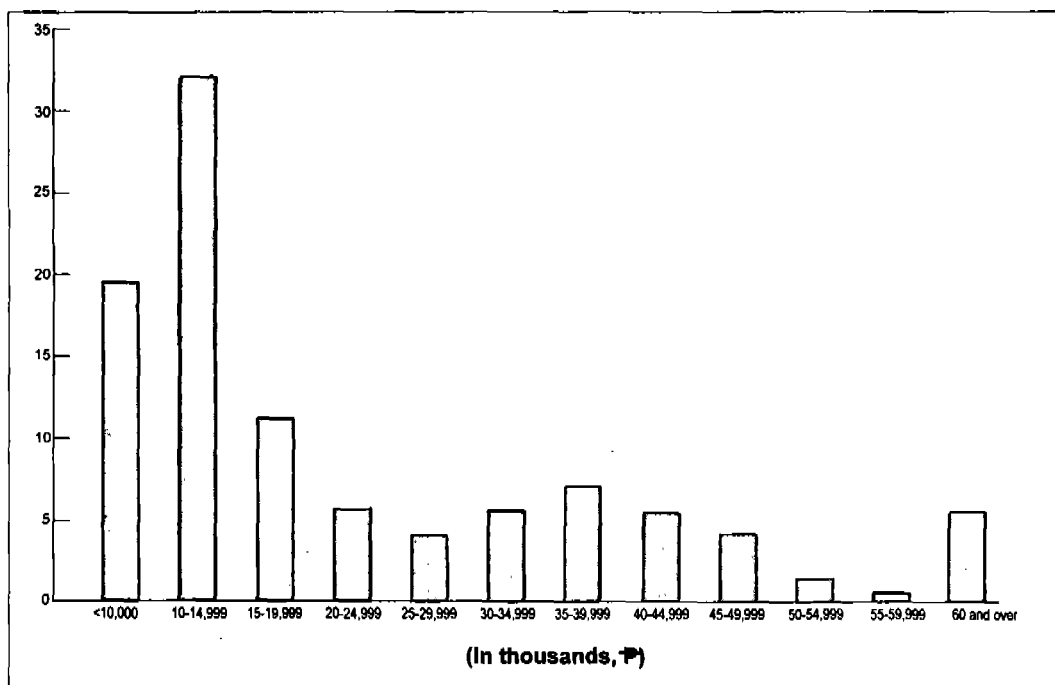


Fig. 5. Household Income distribution, 1990, in Malalison Island.

Activities

Complementary activities on research, community organizing and alternative livelihood are simultaneously being undertaken. The biological research focuses on

Research

The research team is composed of biologists, an aquaculture economist, a rural sociologist, a seaweed expert and technical assistants with background in

fisheries. A technical assistant and an aide are assigned full-time on the island.

The following research activities are being conducted:

1. Resource assessment — a detailed survey on organisms and a description of physico-chemical properties of the waters in the site. Organisms being surveyed include seagrasses, seaweeds, corals, fish and other invertebrates. The percentage of cover of hard and soft corals, algae, seagrasses; species composition, diversity and abundance of fish populations and other invertebrates associated with the reef are being assessed through underwater life-form transect techniques using SCUBA. Water quality parameters such as pH, temperature, salinity and turbidity are monitored on a quarterly basis. Samples are analyzed for dissolved oxygen, suspended solids and nutrient content. This study is on its second year and will be continued for another three years.

2. Economic utilization of resources — identifies and evaluates present and potential utilization of resources to formulate policies and projects that would lead to optimal resource use for the benefit of the community. Rapid rural appraisal techniques like semi-structured and key informant interviews, direct observation, mapping and village transect preparation are employed in preliminary data gathering. Fig. 6 shows the agrofishery transect of Malalison identifying water- and land-based resources, problems encountered by fishers and opportunities for utilization of other resources. Respondents for group interviews are usually composed of six married couples. The second phase of the study employs a structured questionnaire regarding income derived from the use of fish resources and invertebrates like sea urchin and sea cucumber.

3. Investigation of traditional marine boundaries and TURFs — documents the existence of sea tenure practices; explores the social consequences of deployment

of ARs; and determines the legal and social implications of granting exclusive use rights to the Fishermen's Association of Malalison Island (FAMI).

4. Seaweed cultivation — is composed of two substudies, namely, "Bottom-line and floating raft methods of seaweed cultivation" and "Cage culture of grouper and seaweeds". The objectives of the study are to: (1) develop a seedbank and demonstration farm for seaweed farming; (2) monitor the growth rate and condition of the test plants and production of the seaweed using three variants of the long-line technique, as well as the environmental factors which may influence these variables; (3) demonstrate the mechanics of seaweed and finfish cage culture; and (4) undertake economic assessment of seaweed farming singly or in polyculture with finfish in cages.

Community organizing and institution building

The long-term goal of conserving and regenerating coastal resources through a sustainable, community-based approach requires a strong, self-reliant people's organization. The success or failure of AR deployment and the granting of TURFs to the fishers' association depend, to a large extent, on the knowledge, capabilities and attitudes of community members regarding sustainable coastal resource use.

When Malalison was chosen as the project site, no formal people's organization existed on the island. An informal group of fishers called MICA (Malalison Island, Culasi, Antique) was engaged in a fishing activity called *duldog*, the island's version of *muroami*, a fishing method declared illegal by the Bureau of Fisheries and Aquatic Resources since 1986. In November 1990, FAMI was organized through the initiative of the municipal government of Culasi, and registered with the Securities and



Resource system	Lowland/rice/land [uma]	Upland/forest [bakid]	Midland	Lowland/fishpond	Lowland/village	Shoreline [bugas]	Seashore [baybay]	Coral reef [bakura]	Open sea [dagar]
Soil	black clay	red/white/black clay, rocky	red/white/black gravel/clay	sand [baras]	sand	sand, rocky			
Water	spring	spring	spring	ground water	pipe from spring				
Crops	rice, cassava, pineapple, passion fruit, castor bean	black myrtle tree	black myrtle tree		cassava, sweet potato, eggplant, corn, tomato, okra, bitter melon, mung bean, squash, [atugbate], [kadyos], [kastja]	seaweed	seaweed		
Trees	leucaena, guava, black myrtle tree	coconut, star apple, papaya, banana, sugar apple, leucaena, cassava, acacia [atsary], [malunggay]	coconut, papaya, jackfruit, black myrtle tree, guava, sugar apple, mango, gmelina, star apple, leucaena						
Forage, etc.	vines (for huts)	grass, ferns (ornamental), pitcher plant	guava, bamboo, pitcher plant, ferns	weeds					
Animals	carabao, chicken	chicken	chicken	turkey	chicken, turkey, pig	flat/tree oysters, brown mussel, oyster	<p>Molluscs: strawberry or kuku conch, cockle, ark shell, blood clam, small mussel, sand clam, surf or hen clam, window pane shell, chambered Nautilus, olive shell, mercenary conch, commercial top shell, turban shell, small conch, money cowrie, leopard cone, nerite, tiger cowrie</p> <p>Food fish: grouper, saig, eel, octopus, surgeonfish, parrotfish, snapper, mackerel, catfish, triggerfish, [badoj], [barangan], [gritawan], [sigisihon], [salongsang]</p> <p>Ornamental fish: blue eel, imperial angelfish</p> <p>Poisonous fish: pauperfish, seaweed, sea urchin [ayong], [burans]</p>	<p>Food fish: frigate tuna, garfish, shark, cavalla, narrow-banded spanish mackerel, squid, yellowfin tuna, stingray, [namumbok], [bangaw], [saringan], [kumbo]</p>	
Other activities	salt making (before)	Department of Environment and Natural Resources (DENR) substation	nipa hut making		social services, freshwater system, coco-lumber, nipa hut shingle making, hollow block making, gravel and sand collection, lime making, baby rice mill (nonoperational), rice drying, rice pounding, fish drying, fish vending, net making, boat making, vegetable gardening, variety store, SEAFDEC substation	driftwood collection, excavation of sand and gravel	shell gathering	shell gathering	shell gathering
Problems or threats	saltwater intrusion, typhoon	soil erosion, deforestation	soil erosion, deforestation	ownership, dikes, flooding, finances	lack of alternative water source, finances, education, health, senescence, recreational facilities, transportation, communication, chemicals, pesticides, lack of seeds for farming, low soil fertility, lack of post-harvest facilities	sand erosion due to waves and excavation of sand and gravel	fish poisoning, use of small mesh size nets, siltation	cyanide fishing, muro-ami, siltation, fish poisoning	dynamite fishing, intrusion of big farmer groups, bad weather
Opportunities	rice-fish culture, integrated farming	charcoal making		*livestock technology development and management, integrated farming, traps or milkfish culture	tourism, animal husbandry, fruit tree nursery, shellcraft, salt making, livestock cooperatives, small-scale cottage industries, dressmaking	ornamental fish, tourism	ornamental fish, fish cages and pens (grouper)	ornamental fish	

Fig. 6. Agrofishery transect of Malalison Island. (from a Joint SEAFDEC/ICLARM Rapid Rural Appraisal Training, September 1991).

Exchange Commission on 24 June 1991. The members of MICA joined FAMI.

Being a research institution with no experience in community organizing, SEAFDEC consulted with NGOs in Antique and chose PROCESS Foundation, Inc. as its partner NGO.

The foundation has a wide experience in organizing and mobilizing fry gatherers and fisher communities not only in Antique but in other provinces in Panay as well. A Memorandum of Agreement was entered into by SEAFDEC/AQD and PROCESS for the latter to undertake a training program and assign a full-time community facilitator in the island.

The long-term objectives of community-organizing activities are to:

1. empower the people in Malalison through effective and efficient participation in socioeconomic and political activities;
2. facilitate people's organization and community access to and control over resources and provide opportunities and means of production;
3. develop skills and capability for self-reliant, self-managed sustainable organization, projects and community;
4. inculcate values and promote awareness of and a proper attitude towards environmental conservation; and
5. identify, explore and implement appropriate, indigenous and innovative technologies as well as sustainable alternative livelihood projects.

The community referred to is composed of FAMI members, who are primarily household heads.

Training programs are conducted through lectures. The outputs of each training session are group reports from the participants done through workshops. Ten training programs, including a mid-year assessment workshop, were held in 1992. Of these, two were on membership orientation and one was on gender sensitivity. The other training programs were exclusively for

officers and potential young leaders. Topics discussed included basic leadership skills, organization development and management, project development and management, cooperative development, basic financial management, basic paralegal knowledge, and ecology and environment protection and conservation. The officers' training programs were usually 3- to 4-day live-in seminars held outside Malalison. Since participants are usually breadwinners, a replacement income of P50/participant/day was provided. The foundation facilitated FAMI's membership in a regionwide federation of subsistence farmers' and fishers' organizations. Moreover, representatives of FAMI also attended other capability-building workshops and meetings organized by PROCESS.

Livelihood

In 1991, experiments in a low-technology, low-financing, labor-intensive seaweed farming using *Kappaphycus alvarezii* were undertaken to showcase a livelihood activity on the island. Seaweed farming is not new to the islanders, however. It was started by a family of a young fisher in 1989, and by 1990, three families were already engaged in the activity. Seaweed farming on the island is beset by two problems: (1) planting could only be done during the northeast monsoon as the area suitable for seaweed production is exposed to the southwest monsoon, and (2) nonavailability of seedlings in nearby communities. In 1991, nobody engaged in seaweed farming because of the latter problem.

The favorable results of the SEAFDEC experiments encouraged several members of FAMI to try seaweed farming in January 1992. Although production per farmer was high, the aggregate volume was less than a ton which did not attract buyers. The harvest was sold at a breakeven

price. This experience, however, did not discourage the fishers. In December 1992, FAMI decided to venture into seaweed farming. SEAFDEC provided an interest-free seed money of P10,000 which FAMI lent to 50 participating members. The loan covered the cost of seedlings and some materials. As agreed upon during general assembly meetings, FAMI gets 5% of sales of each participating member. SEAFDEC continuously provided technical assistance before and during the farming period. At present, most of the participants have two croppings and the last harvest will be in June before the onset of the southwest monsoon. The targeted total production is about 3 t.

Other livelihood activities have been identified by FAMI. Hog raising is high on the list because of the availability of indigenous feeds like coconut meat and ipil-ipil leaves. Cage culture (nursery and growout) of selected finfish species like milkfish, grouper and siganids is being considered. Experimental runs on these commodities would be undertaken to determine their viability.

In June 1992, a consumer store was established to supply rice to members especially during the typhoon season. This venture, however, failed because of poor collection of receivables.

Problems Encountered

Several problems have been encountered during the course of project implementation.

1. **High expectations of immediate project benefits.** During the last quarter of 1990, the municipal government of Culasi was formally informed of the selection of Malalison as pilot site. Meetings with municipal and barangay (village) officials, NGO representatives, fishers' representatives and Malalison residents were held during that period to explain the objectives and

strategy of project implementation. The short- and long-term socioeconomic benefits to the community were emphasized to get the cooperation of potential beneficiaries. The high expectations of community members are an offshoot of this presentation. A case in point is the community members' desire for the immediate construction and deployment of ARs. This could provide employment and business opportunities for the community through the demand for gravel and sand, and services. However, the decision to construct ARs will be based on data regarding biological and physical properties of the coastal waters, engineering designs and socioeconomic considerations on potential use conflict. This information will come from ongoing research studies. The readiness of the association to manage the site for AR deployment is another consideration. The area for AR deployment is the same site where TURFs would be declared. The impatience of beneficiaries over the long time to construct and deploy ARs has caused irritation between FAMI members and SEAFDEC staff; has reduced attendance in FAMI general assemblies; and has reached a point where some influential community members have threatened to pass a petition to stop the project. Some members of the Board of Directors have even lost interest in FAMI activities.

2. **Lack of integration between SEAFDEC's research activities and PROCESS' community-organizing activities.** Community organizing is the primary responsibility of the community facilitator assigned by PROCESS. Her frequent absence in the site and lack of supervision have created a gap in community-organizing activities. There is some confusion within the community because some members of the SEAFDEC team are also deeply involved in community-organizing activities. Irregular coordination and communication within and between the two institutions put the project in jeopardy.

3. *Unstable leadership within FAMI.* The first president elected in November 1990 resigned without finishing his term to look for employment in Manila. The vice president who took over as president is young and energetic but has yet to gain the respect of older members of FAMI. He prefers that a reelection of officers be held to "legitimize" their positions. The leadership problem is compounded by a long-standing feud between two big families on the island. The FAMI president, who is associated with one of the feuding families, must be able to balance his actions to satisfy both sides.

4. *Practice of muro-ami by some association members affiliated with the present political leader.* The presence of SEAFDEC in the island has substantially reduced the practice of illegal fishing practices. The continuous education campaign of SEAFDEC and PROCESS has generated concern for the fishing grounds among community members. Because of low income and lack of other sources of livelihood, some members continue with muro-ami operations due to high catch. However, social pressure has built up within the community against those who persist in illegal fishing practices.

5. *Lack of understanding and appreciation of research activities by some community members.* This situation has led to resistance on the part of some fishers to provide information like catch data to researchers. Moreover, community members have also reached a saturation point because of interviews and surveys going on almost at the same time.

6. *Need for a full-time project leader.* The present project leader devotes only 50% of his time to the project and this is not enough to effectively attend to project needs like coordination with PROCESS, integration of research activities, administrative matters and report preparation. Problems arising from lack of communication and coordination could have been

avoided if project leadership was given full-time attention.

Responses to Problems

The problems which beset the project are an offshoot of the inexperience of the research team in community-based development projects. The team members are basically researchers whose orientations are laboratory- and problem-specific type of studies. This lack of experience, however, is compensated for by the multidisciplinary composition of the research team which provides a forum for discussions and exchange of ideas. Gradually, team members have been able to integrate themselves into the community and understand the attitudes, values and visions of the fishers.

It is imperative that continuous dialogue, both formal and informal, be undertaken among researchers, the community facilitator and members. Several forms of communication implemented by the project have been found effective in eliciting participation:

1. *Regular community dialogue and general assemblies.* These meetings are initiated by FAMI, SEAFDEC or PROCESS to discuss major concerns confronting members of the association and the staff. Such concerns included delay in AR construction, lack of income-generating activities, illegal fishing practices and problems associated with FAMI activities. During these meetings, project objectives, implementing strategies and timetable of activities are always discussed for the community to understand the long-term nature of the project.

2. *Personal visits to some members of FAMI.* This has created an atmosphere of familiarity and confidence in the project staff. During these visits, inevitably, even personal or family problems are discussed such as husband-and-wife quarrels, unpaid debts, illness in the family. The show

of concern about their problems erases doubts regarding the sincerity of the project staff.

3. Regular meetings of FAMI Board of Directors. This is a good venue for discussing details concerning project implementation. The community facilitator and SEAFDEC staff are usually invited to shed light on some issues arising from project implementation.

4. Presentation of research results to the community. This has been found effective in sustaining the interest of community members. Role playing by the researcher-presenter works well in projecting desirable attitudes of the fishers, such as sharing information vital to the different studies. Community members are encouraged to ask questions, react to research findings and confirm the veracity of research data. This forum has substantially reduced resistance and noncooperation on the part of community members. Appropriate visual aids are used for easier understanding of research results. Moreover, the importance of the roles of biologists, economist, sociologist, seaweed expert and technical assistants gets to be appreciated by the community.

5. Cross-visits to other people's organizations. At the end of the one-year training program facilitated by PROCESS, members of the FAMI Board of Directors and potential leaders went on cross-visits to other provinces in Panay Island. They were able to interact and share experiences, problems and frustrations with officers and members of similar associations as well as observe successful alternative livelihood projects. These interactions made FAMI officers realize not only the importance of organized efforts to improve their economic well-being, but also the problems and disappointments held in common with other associations.

6. Planning workshop participated in by community members, SEAFDEC staff and PROCESS representatives. The two-

day workshop was an opportunity for community members to discuss their achievements, frustrations, expectations and problems related to the project. SEAFDEC and PROCESS discussed their respective roles in project implementation. The following needs and gaps were identified during the workshop: (1) the community members' desire for income-generating projects and capability-building in managing small-scale enterprises; (2) strengthening of committees in terms of policy formulation and implementation, role clarification, and leadership training; (3) need for community facilitator to stay in the island; and (4) delineation of the respective roles of SEAFDEC and PROCESS to avoid confusion among community members. The workshop's outcome became the basis for project proposal preparation for the second year of community-organizing activities.

Lessons Learned

Project implementation of this nature needs well-integrated, closely coordinated and effectively managed activities. A full-time project leader is a must to ensure smooth implementation; at least 50% of his/her time must be spent in the pilot site. Moreover, he/she should have a good grasp of all project components, integrate them and relate effectively with all institutions involved.

Good project management starts with well thought-out short- and long-term plans, clear goals and objectives, a realistic budget, as well as qualified and dedicated researchers, community workers and support staff. Each team member should not only know his/her area of responsibility but also be aware of the other members' work to arrive at a harmonious relationship. Regular meetings and consultations among team members are necessary and periodic monitoring of activities

will provide up-to-date information regarding the project's status and problems encountered.

Close coordination between the research institution and the NGO through regular consultations will minimize confusion among community members. Each must know what the other is doing, with the lead institution integrating the community-organizing aspect with research activities.

The success of a community-based coastal resources management project will depend on the degree of attainment of social, economic and environmental indicators, e.g., diversified sources of livelihood; active participation of the people in community activities; and enhancement of the coastal resources through regulated fishing practices. The experiences in the project will help improve policy formulations on coastal resources management.

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The Central Visayas Regional Project: Experience in Community-based Coastal Resources Management

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Introduction

The Central Visayas Regional Project (CVRP) in the Philippines was a pilot project intended to address resources management issues, among others, in the four provinces of Central Visayas, or Region VII, and to strengthen the government's program of decentralization. Prepared in 1982, it was implemented for 8.5 years from July 1984 to December 1992. The total project cost was estimated at US\$44 million with financial assistance from the World Bank.

Using the watershed as the planning unit, three primary project components — upland agriculture, social forestry and nearshore fisheries — were supported by activities in infrastructure, institutional strengthening of regional government agencies, applied communications, research, training and technical assistance. The nearshore fisheries component, the topic

of this paper, utilized about 10% of the overall project budget.

The history of CVRP extends back to 1975 when Filipino planners and World Bank staff recognized a causal relationship between the continuing degradation of renewable natural resources and increasing poverty in rural communities. Forest cover was shrinking; topsoil eroded rapidly from upland slopes being farmed with lowland rowcrop methods; coastal waters were overfished; and highly productive fisheries habitats like coral reefs and mangrove forests were being destroyed.

Declining harvests from degraded resources combined with rapid population growth resulted in increasing poverty among forest occupants, upland farmers and artisanal fishers. Most of these resources users were aware of the problem as they watched their harvests and income dwindle year by year.

It was also recognized that to effectively address the numerous resources management issues involved, the devolution of many decisionmaking powers from the central offices to the regional level would be required.

The primary objectives of the nearshore fisheries component were:

- to assist coastal communities to improve and sustain the productivity of their coastal waters;
- to increase the income of small-scale fishers and profitability of their occupation; and
- to strengthen the government's program of decentralization.

The CVRP was implemented at 5 coastal sites in 4 provinces which included 16 municipalities and 182 villages (*barangay*) along 223 km of coastline. Organized fisher communities were greatly involved in the development project planning process, implementation and periodic monitoring. Project staff that stayed permanently in the coastal project sites served as facilitators, community organizers and trainers to the fishers.

Assumptions

During project preparation, several resource assumptions were made by project planners that shaped project design, like the following:

1. While Philippine law provided for a state property management regime, the government lacked the capability to effectively enforce its resource management regulations. The resulting situation in the government-owned forests, upland and coastal waters is best described as *de facto* open access. This lack of effective control on resources access was determined to be a root cause common to all forms of

Responsible for much of the resources degradation, they were also the only ones who could undertake rehabilitation and sustainable management over the long term.

3. The ability to provide and secure long-term tenure over portions of the resource was seen as an important means of restricting access and of encouraging sustainable management practices.

4. Nearly all the interviewed small-scale fishers related problems that were symptomatic of serious overfishing. However, scientific data were not available to confirm or deny that conclusion. In addition, the responsible national government agency was still assisting fishers to acquire better gear to reach the great untapped resources in the sea. The regulatory framework did not provide adequate mechanisms for management by local governments. Thus, project design focused on rehabilitating degraded coastal habitats and prohibiting access of those who used illegal and habitat-destructive methods, although the need for harvest management as well, was evident to project planners.

Implementation

Project objectives were to be attained using a community-based approach which included the following basic aspects:

1. The community would be the lead agency, not a government agency which was the usual practice. Sustainable resources management could only be implemented and institutionalized within the community if the members were properly organized and trained to develop the needed capability.

2. Resources management interventions were kept simple and appropriate to the needs identified by the community. Implementation was by coastal residents and

- the control of illegal fishing and other habitat-destructive activities;
- mangrove reforestation and management;
- the construction, placement and management of artificial reefs;
- the protection of all coral reefs and the establishment of marine sanctuaries including 10-15% of the total reef area within a municipality;
- limited small-scale mariculture; and
- later in the project, the use of deepwater fish-attracting devices harvested only by handlines.

3. Development activities focused on the *barangay* or village, the lowest level of government organization in the Philippines. The Barangay Development Council (BDC) was activated as the primary planning and implementing body. The BDC could be expanded and made representative of the village and would provide a direct link to the government system. Groups of village residents were also organized to implement resources management activities of mutual interest to members.

4. As more villages were organized, their activities, particularly the control of illegal fishing, were federated at the municipal and then the site level.

5. Community organizers involved the community in situation analysis, including the identification and prioritization of issues. Key issues identified by the village were addressed in as a constructive, nonconfrontational manner as possible. While coastal resources management issues were always among those with the highest priority, the community was assisted to deal with priority nonresources management issues as well.

6. Community development and technical workers lived in their respective target villages where they served to stimulate and support community action rather than as community leaders.

7. Livelihood of fishers would be improved with better resources management

in an overfished environment, not through the provision of additional fishing gear or boats.

8. Implementation would be done in two stages: (1) determine if the approach would work and if so, (2) institutionalize the successful approach in the community, local governments and government support agencies.

9. To facilitate devolution of decisionmaking power and to provide secure resources access, the following points were settled with national government agencies in a formal Memorandum of Agreement signed in June 1984:

- The then Bureau of Forest Development would issue Stewardship Agreements, a 25-year renewable lease in mangrove and other forest land areas. This was the first long-term tenure instrument offered by the government to forest occupants who had previously been considered "squatters".
- The Bureau of Fisheries and Aquatic Resources agreed to (a) allow municipal fishery ordinances, including those establishing municipal marine sanctuaries, to be approved at the regional rather than at the national level; (b) permit the licensing of artificial reef use so that access could be controlled; and (c) stop the use in Region VII of *muro-ami* and *kayakas*, two fishing practices destructive to coral reefs.

10. Project funds were released directly from the Department of Budget and Management in Manila to the Project Office based in Cebu City without passing through another national government office. Project Site Managers based at the five Site Management Units also had their own checkbooks and were authorized to disburse up to US\$3,000 per transaction, provided the item was in their approved workplan and budget. The direct fund flow

and fiscal autonomy by Site Managers reasonably facilitated implementation and was unique at that time.

Results

For 8.5 years, the coastal fishers' associations developed the knowledge and skills in the rehabilitation and management of the nearshore fisheries. Some regional resource management regulations were imposed by the national government like the ban for the operations of *muro-ami* and kayakas in coastal waters. However, several equally important resources management issues were not formally addressed, such as the user rights to artificial reefs and the official recognition of coral reefs with sanctuary that were identified, established and managed by the fishers' associations and the community. This situation prompted most municipal government authorities to pass ordinances supporting the fishers and the community's resources management activities.

Since CVRP was a pilot project, it was recognized at the outset that the motives and means to act collectively would open up better policy alternatives to the common-property problems in the coastal areas which resulted in dwindling fish catch. (Berkes et al. [1989] defined common-property resources as "a class of resources for which exclusion is difficult and joint use involves subtractability".)

The CVRP's position then was to try developing a mechanism where the coastal fishery shall be jointly managed by the organized marginal fishing communities and the government so that users' rights would be equally recognized in the management of resources classified under communal and state property. Although it was anticipated that operationally, joint resources management may create some overlapping functions, the practice of co-management can be put into place, thus initiating

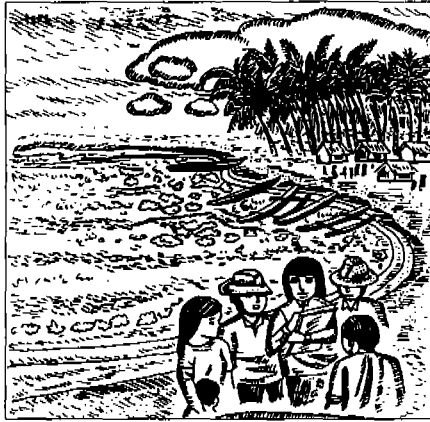
ing a better scheme of community-based management.

In summary, the intent of CVRP was to work with fishing communities to try to develop what is now termed co-management of coastal resources. Although CVRP was implemented by a specially created government entity, the methods used were those of nongovernmental organizations.

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¹Except for Berkes et al. (1989), all are project outputs.



Community-based Coastal Resources Management: the Palawan Experience

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SANDALO, R.M. Community-based coastal resources management: the Palawan experience, p. 165-181. In R.S. Pomeroy (ed.) Community management and common property of coastal fisheries in Asia and the Pacific: concepts, methods and experiences. ICLARM Conf. Proc. 45, 189 p.

Introduction

This paper hopes to share the experiences learned by the Palawan Integrated Area Development Project (PIADP) relative to community-based resources management (CBRM).

The project components of PIADP which may in one way or the other have the nature of a CBRM, as defined in this paper, are presented. When PIADP was launched more than a decade ago, CBRM as a development strategy was not yet in full use.

During the later stage of PIADP implementation, however, CBRM was recognized as a potent strategy towards sustainable development. For the Province of Palawan (Fig. 1), this came about when the strategic environmental plan (SEP) was

formulated in the late 1980s. Consequently, pilot-testing activities were undertaken by PIADP in the different areas of the province.

Specifically, this paper highlights one of the relevant pilot-test projects: the Honda Bay Resource Management Program (HBRMP), implemented from June 1989 to December 1990.

Here are some basic assumptions and/or understanding of community-based coastal resources management (CBCRM) and its related terms:

1. "Resources management" is the utilization of natural resources with due respect to and recognition of sound ecological processes.
2. A "community" in relation to CBRM is a social organization not necessarily synonymous to a village (*barangay*)

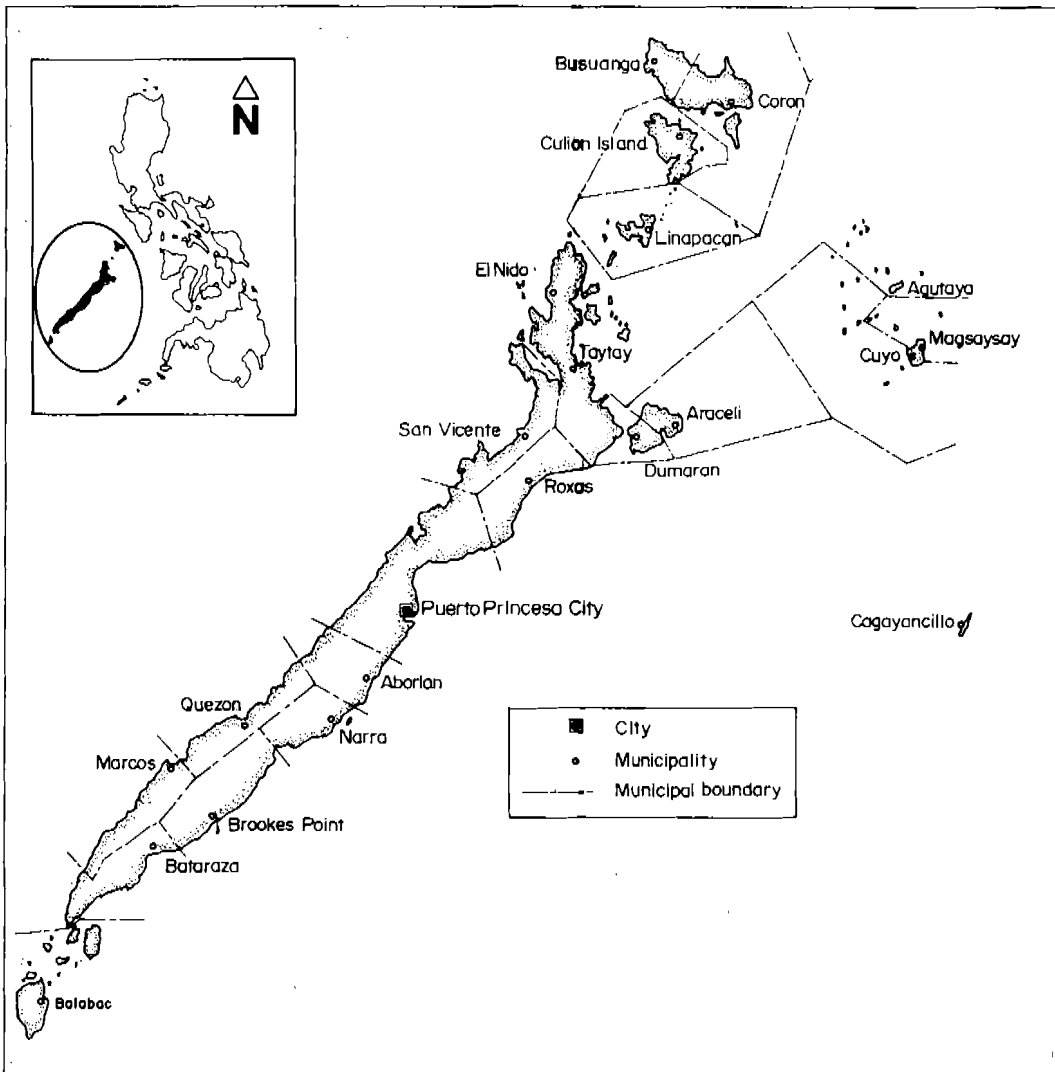


Fig. 1. The Province of Palawan is located on the western part of the Philippines. Its total land area is about 1.4 million ha but its waters cover almost one-fifth of the country's territorial boundaries.

or municipal government. Its geographical boundaries could be defined in relation to its adjacent and/or surrounding land or water resources. Thus, a community could be a group of households in an upland area, an association of fishers, an irrigators' association, lowland residents, an organization of coffee growers, etc.

3. "Community-based" denotes the participation of the organized members of a given community in activities benefitting and/or affecting the community.
4. CBRM is a strategy undertaken through the active participation of an organized community.
5. CBCRM specifically refers to the coastal resources and adjacent communities.

PIADP: a Brief Background

Officially launched in 1982, PIADP Phase I was a multisectoral seven-year project funded through a US\$47-million loan from the Asian Development Bank (ADB), a 7-million grant from the European Economic Community (EEC) and a counterpart from the Philippine Government. It has 14 components which focused on agricultural development as the key sector complemented by essential infrastructure and social and institutional services. The integrated area development strategy in Palawan was designed to: (1) develop the agriculture sector in areas with the greatest potentials; (2) improve external transport services and access to population centers and agricultural areas; (3) strengthen support services and develop farming systems and production technology appropriate to local conditions; (4) expedite the issuance of land titles; and (5) build up absorption and implementation capacities.

The project area covered the whole main island of the province (about 1.2 million ha) but concentrated on its central and southern parts where 60% of the 400,000 inhabitants live and where the potential areas for agriculture are situated. After 1988, the project was allowed to be extended for another two years within which 99% of its total targets were attained. As a multi-agency project, it was implemented by the Departments of Agriculture (DA), Environment and Natural Resources (DENR), Public Works and Highways (DPWH), and Health; Central Bank of the Philippines; National Irrigation Administration (NIA); and PIADP Office, which was then under the National Council on Integrated Area Development.

On 27 September 1990, the US\$58-million loan for Phase II or the Second Palawan IAD Project (SPIADP) was signed between ADB and the Philippine Government. Formally launched in 1991, it is scheduled to end by 1996.

The SPIADP expanded its coverage by targeting the northern mainland, the island municipalities, as well as continuing the development efforts in the southern and central mainland covered during the first phase, or effectively, the whole Province of Palawan. Aside from projects in Phase I, SPIADP now includes fisheries support services, an integrated health program and women-in-development as additional components. This paper shall focus on PIADP I's CBRM experiences.

CBRM and PIADP I

Of the 14 project components under PIADP I, only four can be classified as directly in consonance with the concept of CBRM—communal irrigation, rural drinking water supply (RDWS), upland stabilization and integrated environmental program (IEP).

Under communal irrigation, the management of water for rice production was handled by an Irrigators Service Association (ISA). The facilities of the RDWS component were managed through the Rural Waterworks and Sanitation Association (RWSA). Upland stabilization aimed to offer alternatives to the environmentally destructive shifting cultivation (locally called *kaingin*) practices by upland farmers in three specific pilot sites. Finally, IEP hoped to provide the rational framework towards sustainable development in the province by formulating a SEP that recognized the importance and relevance of CBRM.

Communal Irrigation

Implemented by NIA, this project component covered 4,500 ha broken down into several communal schemes averaging 250 ha each, scattered throughout the central and southern mainland Palawan.

For each communal irrigation system, an ISA was organized by a community organizer deployed by NIA who stayed in the area for about one-two years. The organization of ISAs was required by NIA prior to the actual design of the irrigation dam and its canals as these ISAs had to participate as early as the design stage. During construction, the ISA members provided a certain amount of equity (In cash or in kind), and the association monitored the progress (including financial) of the project. Upon completion, the ISA had to formally accept the irrigation system and manage the scheme. From the organizing up to the turnover stage, NIA conducted several trainings aimed at enhancing ISAs' organizational and technical capabilities on water management.

The performance of these Irrigation systems after turnover, however, varied (i.e., on cropping intensity, production, organizational cohesiveness, self-reliance or dependence on NIA). Several ISAs became inactive; complaints from downstream farmers in terms of nonavailability of water were noted; as well as reports of nonincrease in cropping intensities and/or productivity; and lack of credit and inadequate postharvest facilities. However, some Irrigation systems are still performing well now and have achieved their desired expectations.

In summary, the following were observations on the project in relation with the concept of CBRM:

1. The organization of ISAs was a prerequisite to the actual design and construction of the irrigation facilities.
2. It was assumed that the ISAs' organized members actively participated throughout the process.
3. As the irrigation facilities were turned over to ISAs, the latter took the responsibility in management, thus promoting self-reliance.
4. Problems encountered by ISAs were sometimes beyond their capability,

e.g., lack of credit and postharvest facilities, deforested watershed.

Rural drinking water supply

The DPWH implemented this component, completing 456 Level 1 and 2 Level II water supply systems throughout the central and southern mainland of Palawan. A Level I system is either a shallow or deep well constructed near a group of 10-15 households. On the other hand, a Level II system stores water in a reservoir and delivers it through several communal faucets located in strategic points within the community. As in the irrigation component, the establishment of RWSA was a prerequisite to the actual construction of the system. The RWSAs were trained on the actual maintenance of the wells.

In contrast to the irrigation component, however, no community organizer was assigned to each RWSA. Obviously, employing one organizer for each of the 400 or more RWSAs was unimaginable. Rather, the group of households merely presented a list of officers and members to DPWH as proof that they were already organized as an RWSA. Consequently, cases of ill-maintained wells were noticed (about 50% of the total number of wells did not produce any potable water). Moreover, despite the insistence of DPWH that RWSAs maintain the wells, several instances occurred wherein RWSAs demanded that DPWH replace the spare parts (even a simple bolt) for the well.

Throughout PIADP I, the following were observed on the drinking water supply component:

1. The organization of RWSA was a prerequisite to construction.
2. There were several reports of contractors constructing (and sometimes abandoning) the wells without notifying the village officials and/or RWSA.

3. Training on maintenance was inadequate.
4. The RWSAs' sense of ownership and responsibility for the wells was not noticeable.
5. However, some RWSAs actively maintained their wells.

Upland stabilization

Realizing the threat posed by shifting cultivation in the uplands perpetuated by tribal communities (at the time of PIADP feasibility studies, in contrast to the present where majority of *kainglineros* are Christian migrants), this project was implemented through DENR to pilot-test farming systems in three sites which would stabilize upland areas. In this regard, the Tagbanuas and the Palawans (tribal groups) were the main project beneficiaries. It was envisioned that through demonstration and persuasion, these tribal communities would no longer practise *kaingin*, stay in the same area and apply more ecologically sound farming systems, with better economic returns. Throughout the project, the staff, consisting of a forester-team leader and several community organizers-technologists, stayed on site with the farmers.

Stewardship contracts (in consonance with the Integrated Social Forestry Program) were distributed. The beneficiaries were also employed as laborers at the demonstration area, while taught on various farming systems (e.g., contour farming, hedgerows, vegetative terracing) with the objective that these farmers shall apply this knowledge on their own farms. Basic amenities and services were provided, such as drinking water, elementary education, housing materials and health services.

During the last two years of project implementation (1989-1990), the farmer beneficiaries were trained on coopera-

tives and later organized as such. Upon project phaseout, these cooperatives were envisioned to manage their own affairs, such as marketing their products, acquiring inputs, continuing the practice of improved upland farming system, etc.

Among the three pilot sites, Salogon at Brooke's Point remained the most properly maintained and operating even after project phaseout. A significant observation in relation to this is that, of the three sites, the farmers in Salogon opted to have a communal stewardship contract while the other two chose the individualized contract.

The following were also observed:

1. Organizing the beneficiaries was not a prerequisite to receive the benefits from government.
2. Majority of the beneficiaries (about 120 households for each site) remained in their areas and were no longer seen practising shifting cultivation.
3. Of the two tribal groups, the Palawans had a more closely knit social organization than the Tagbanuas who incidentally were regularly in contact with Christian lowlanders.

Integrated environmental program

Due to the sensitivity of Palawan's environment, with its rich natural resources vulnerable to threats of human activities, an environmental program was included in the PIADP I package. Through scientific studies, several consultations with various sectors and after attempts to draft a plan from 1983 to 1987, the "Strategic Environmental Plan for Palawan Towards Sustainable Development" was finally formulated in December 1987 by PIADP Office and its consultants.

A set of strategies, SEP was designed to be the framework for the sustainable development of the province, balancing the much needed development efforts and

the maintenance of its ecological integrity. One of SEP's strategies was the promotion of CBRM, as stated in one of its objectives, "to foster proper use and care of common resources by local communities".

The main goal of SEP was "to improve the living conditions of all Palawenos by developing its land and water resources in ways that are economically viable, socially equitable and environmentally sustainable". In attaining its goal, the following were adopted as philosophies:

1. Ecological viability — The physical and biological processes that maintain the productivity of natural ecosystems must always be kept intact.

2. Social acceptability — The people themselves should be fully committed to support sustainable development activities; this could be realized by fostering equity in access to resources and the benefits derived from them and through participative processes.

3. Integrated approach — This gives way to a holistic view of problems and issues prevailing in the environment as well as opportunities for cooperation and sharing that will eventually provide the resources, coordination and political will to actually implement and sustain SEP activities. To implement the mandate of the plan, the two congressmen of Palawan filed the SEP Bill in the House of Representatives in 1988. After being approved as House Bill 19576 and later concurred in by the Senate, it was finally signed into law (Republic Act 7611) by then President Corazon Aquino on 19 June 1992. While awaiting its legitimization from 1988 to 1990, PIADP Office embarked on an environmental information and education campaign, research and pilot-testing activities pursuant to SEP. Along this line, the Tamlang Catchment Rehabilitation and Protection Project, the Irawan Catchment Development Project and the Honda Bay Resource Management Program, which could be considered as

CBRM projects, were implemented. For purposes of this paper, the Honda Bay experience shall be elucidated.

Honda Bay: an Experience In Community-Based Coastal Resources Management

Located on the eastern side of mainland Palawan within Puerto Princesa City, Honda Bay is large, approximately 28,000 ha with 12 charted islands (Fig. 2). The islands are generally small, ranging from 1.25 to 45 ha, and most are surrounded by extensive shallow coral reef platforms, sand cays and mangroves. Coconuts are grown in five of these islands, namely, Fondeado, Fraser, Makesi, Meara and Ramesamey. Assessment of the bay in the early 1980s showed a relatively good quality of coral reef, seagrass bed and mangrove ecosystems. This is indicative of good feeding, breeding and spawning grounds of fish and other marine life. Thus, Honda Bay is considered a major fishing ground in the province, especially in Puerto Princesa City.

Along the coast of Honda Bay, 15 of the 19 villages are directly dependent on it for livelihood. In 1990, of the estimated 2,500 households in these villages, 85% were engaged in fishing, either as a primary or alternative source of income. Tourism establishments and facilities have started to flourish along the beaches and in some of the small islands, namely, Pulding, Meara and Ramesamey. The islands of Arrecife, Makesi, Bugias and Tadyo have become inhabited by permanent settlers.

With the increasing population pressure, fisheries resources are being depleted. Fish catch per unit effort had declined from 36.5 kg in 1985 to 8.4 kg in 1989. This was attributed to the following: (1) destructive fishing methods such as dynamite or blast fishing; (2) encroachment by transients using "more efficient" fishing

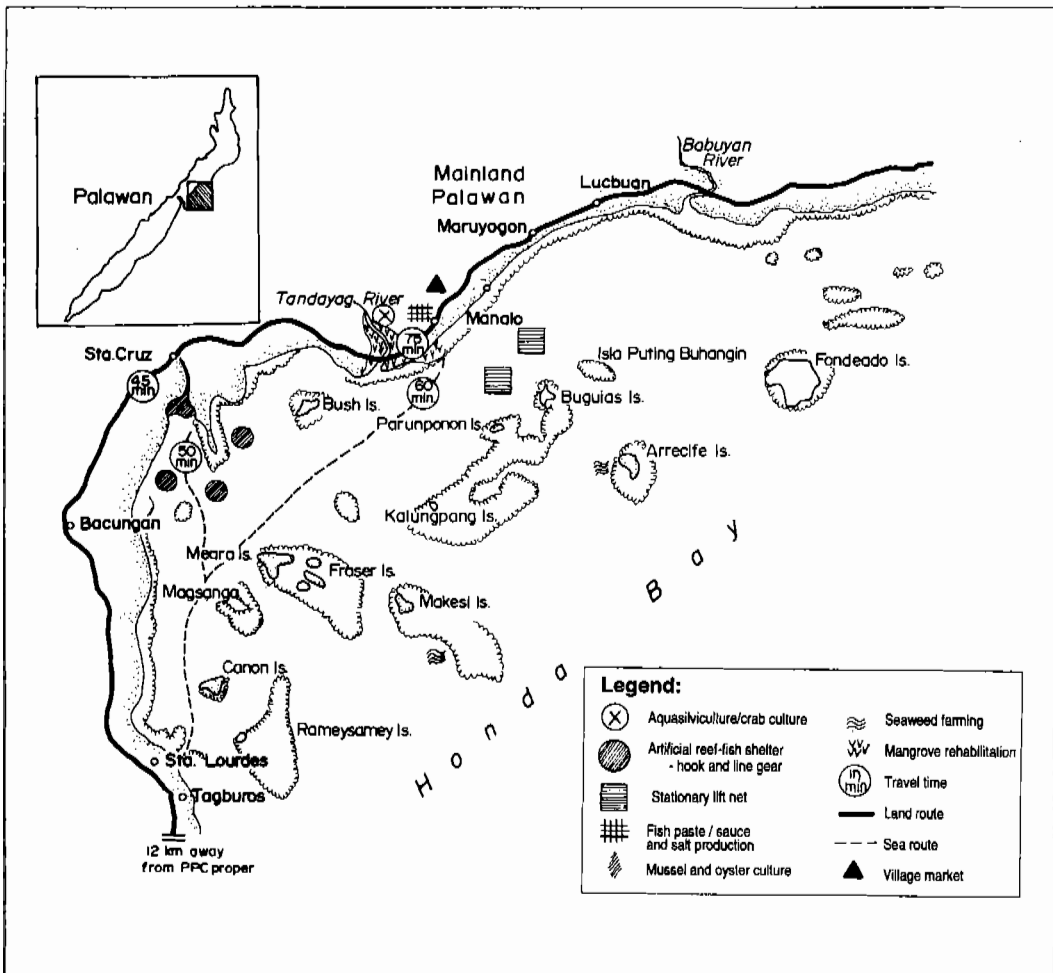


Fig. 2. Project sites for Honda Bay Resource Management Program.

methods (i.e., trawl, minipurse seine and ring nets) within the municipal or coastal waters; and (3) destructive land-based activities such as logging and shifting cultivation causing erosion and siltation, slowly smothering the very foundation of fisheries productivity — the mangroves, seagrass beds and coral reefs.

Although there are existing laws against illegal fishing practices, enforcement is another story. There may have been a good turn-in of apprehensions, but culprits are never really convicted and punished, except for payment of fees in amounts minimal compared to the value of their haul. The

situation is true not only in Honda Bay. The same problems are prevalent in other coastal and marine areas of the province. But being a major fishing ground nearest to Puerto Princesa City, Honda Bay has become the focus of interest of assessment studies.

In 1988, when PIADP Office negotiated with EEC for funding support, the latter suggested that the office should start implementing action-oriented and high-impact projects, rather than research studies. Consequently, HBRMP was conceptualized. The problem then was that the funds available (the unused portion of the EEC

grant during Phase I) could suffice for only one and a half years of implementation. The community-based approach was believed to require a minimum of three years within which target communities should be closely supervised by the project management. Nevertheless, it was an opportunity to pilot-test the CBCRM program within SEP. Meanwhile, the Planning Department of PIADP Office together with some technical staff of its other departments tasked to conceptualize the project, recognized the presence of regular programs by other agencies and the City Government that could be tapped in sustaining the operations of the project.

A Special Projects Unit under the Project Management Department of PIADP Office was set up to undertake HBRMP, the Tamlang Catchment Rehabilitation and Protection Project and the Irawan Catchment Development Project. Within this unit, a three-member technical staff was formed to work on the finer points of the HBRMP operational plan and to supervise its day-to-day activities. The team was composed of a Team Leader — a fisheries graduate (major in business management) with extensive experience in project planning and implementation coordination in both government and nongovernmental organizations (NGOs); a Project Development Officer — an agriculture graduate experienced in project planning; and a Community Organizer — a fresh graduate in political science.

The team finalized its operational plan after an ocular inspection of the area and some interaction with the target communities. These should have allowed substantial community participation in planning. But as experienced, time limitation cut short the process. The team opted to focus on communities where organizing activities had been started by other agencies. As will be discussed later, this resulted in both positive and negative impacts relative to the success of the project. Neverthe-

less, the project focused on two communities, Manalo and Sta. Cruz.

Barangay Manalo, with 279 households, of which majority are engaged in both farming and fishing, was selected because it was a recipient of an earlier project by the Regional Fisheries Training Center (RFTC) of DA. Consequently, the beneficiaries of the said project who were organized by RFTC became the participants of HBRMP. Barangay Sta. Cruz, a smaller community with 90 households, 12 km away from Barangay Manalo is likewise composed of farmer-fishers. It was chosen due to its potential for oyster and mussel culture, considered an alternative to the extractive fishing methods.

The HBRMP involved four major activities: project preparation, project implementation, training and preparation of an area management plan.

Project preparation

Project preparation included review of materials regarding the situation in the project area; evaluation of the project design against actual field conditions (in consultation with prospective beneficiaries); establishment of linkages with institutions; and the selection of specific project sites and beneficiaries. These provided the basis in the finalization of the operational plan which outlined the objectives, approach and strategies, targets, schedule of activities and budgetary requirement.

The objectives of HBRMP were as follows:

1. provide livelihood alternatives;
2. relieve the fishing grounds from extractive methods of fishing;
3. enrich the natural breeding and feeding grounds of marine life; and
4. strengthen the community values on environmental protection, cooperativism and self-reliance.

The objectives did not include direct intervention on law enforcement as the team opted to employ "positive strokes" which focused on the needs of people and the ecological habitat. The proposed project cost amounted to P494,000 (Table 1).

The program on CBCRM, as outlined by SEP and as pilot-tested by HBRMP, intended to harness the communities in the proper use and protection of the coastal resources within their locale. Basically, this allowed the communities the priority right to use the resources while assuming the primary responsibility to protect these resources. Consequently, the following were adopted as operational strategies:

1. Beneficiaries/cooperators shall be considered co-implementors and not mere recipients of inputs, and if possible must be organized into working groups or associations.
2. Technologies to be introduced must be complementary in nature and use simple methodologies.

3. Technical assistance must include the beneficiaries' secondary occupation such as farming, usually upland.
4. Aside from structured seminars/workshops, on-the-job trainings shall be facilitated by the staff by working and maximizing the beneficiaries' participation.
5. Inputs of other developmental institutions (i.e., DA, DENR, City Government) shall be harnessed and reinforced by starting where these agencies have left off or coordinating/aligning activities with their ongoing programs.

Project Implementation

Project implementation was done in three phases: (1) resource identification and mobilization, wherein the levelling of expectations between and among the prospective cooperators, the project staff and the institutions was undertaken to determine the responsibility centers and the

Table 1. The cost of the Honda Bay Resource Management Project.

Activity	Cost (P)
A. Project preparation	10,000
B. Project implementation	171,600
- oyster and mussel nursery	20,000
- artificial reefs and fish shelter	15,000
- stationary lift net	42,500
- seaweeds culture	12,500
- fish paste/fish sauce	12,000
- salt production	11,600
- mangrove rehabilitation	16,000
- village (<i>barangay</i>) market	5,000
- hook and line fishing	6,000
- gill net fishing	16,000
- crab culture/aquaculture	15,000
C. Training	20,000
D. Preparation of area management plan	8,000
E. Project administration	284,400
- personnel	243,000
- office supplies	20,000
- travel	21,400
Total	494,000
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counterpart each group was willing to share; (2) installation of structures; and (3) operation and maintenance as part of the production phase.

Throughout the process, suggestions and recommendations from project beneficiaries were encouraged relative to what type of projects they wanted to pursue, adopt or change. In cooperation with various institutions and with the assistance of PIADP Office, the project beneficiaries were able to start up and/or operationalize the following undertakings:

Barangay Sta. Cruz (with 10 households):

1. oyster and mussel nursery, and
2. artificial reefs and fish shelters

Barangay Manalo (with 57 households):

1. stationary lift nets;
2. seaweeds culture;
3. fish paste/fish sauce;
4. salt production;
5. mangrove rehabilitation (12 ha);
6. village market;
7. hook-and-line fishing;
8. gill-net fishing; and
9. crab culture/aquasilviculture

During project implementation and after training on cooperativism, the beneficiaries/participants in Barangay Manalo organized the Manalo Coastal Mangrove Development Association Inc. (MCMDAI) and registered it with the Securities and Exchange Commission (SEC).

It might be surprising that within a span of one and a half years, the above activities within Barangay Manalo could be undertaken by a group of fishers whose association grew from 10 to 57 members. However, to attain their targets, the members divided themselves into working groups, depending on their interests, except for the hook-and-line and gill-net fishing and the crab culture/aquasilviculture which were undertaken by all members. These activities

were considered a fallback in case their primary venture would fail.

It would also be interesting to consider the evolution of projects as conceived by the beneficiaries:

1. When they decided to venture into seaweeds farming (which was then encouraged by the city government), they requested training from an existing cooperative within the bay.

2. The crab culture activity was an idea raised by one of the participants, for which PIADP Office requested the Mangrove Committee of the Ecosystems Research and Development Bureau (ERDB) of DENR to train them. In this regard, the beneficiaries readily accepted the ERDB staff's suggestion to undertake aquasilviculture which would combine crab culture with mangrove and nipa enrichment/rehabilitation.

3. Gill-net fishing was initiated by the beneficiaries to maximize their time at sea while attending to the seaweeds, maintaining the mangrove plantation or drying the anchovies caught by stationary lift nets.

4. The fish paste and fish sauce projects were identified by the wives of fishers operating the stationary lift nets.

5. An offshoot of the stationary lift net project was salt production to ensure supply of salt for the fish paste/sauce production. The salt in the area was originally bought from Mindoro Province through the city market. The boiling method was adopted since the critical period was during the rainy season, instead of the usual solar method applicable only during summer months.

6. The village market was put up through the initiative of the association in cooperation with the village officials.

Initially, the project staff proposed a set of relevant projects expressed in relatively general terms to the prospective beneficiaries: mariculture development, multiple fishing gear, processing of marine-based products, mangrove rehabilitation,

training and extension services, and community organization. Notably, the specific projects that later evolved, conceptualized and implemented by the cooperators, fell under these project categories. The broad project intentions basically provided guidance and leeway for the beneficiaries to contribute their ideas in the detailed planning and operation of the specific projects. Lessons learned on project development became experiential rather than theoretical. Although not all of the projects at one time or another proved to be successful, the working groups involved had the chance to realize "what went wrong". This minimized "passing the buck" in cases of failures which usually resulted in disinterest and breakdown in other project undertakings.

Grouping of beneficiaries prior to project implementation likewise cushioned the adverse effect of disinterest in some of the members. There was always one or two members left to carry on the project and in some cases encourage new ones to join.

Consequently, in the promotion of projects, selection of the appropriate project mix was based on the varying interests, values and motivations of the beneficiaries. It was apparent that full-time fishers were more fickle-minded compared to fishers who were also part-time farmers. This was associated with the nature of their occupation. Farmers tend to exercise more patience in tilling their lands and waiting for the harvest season. Fishers can earn income overnight. Mariculture and mangrove plantation, actually farming at sea, were therefore closely tied up with multiple fishing gear which are simple and traditionally used in the area.

Another motivational mechanism employed was financial management. Each working group within MCMDAI was allowed to handle its sharing arrangements on income, recording and safekeeping. There were, however, a treasurer and an auditor to check-and-balance the statement. Each

group was required to set aside 20-40% of their net income as contribution to the general fund of the association which served as their emergency fund in cases of calamity and as a reserve for project expansion. Because every member felt a rightful claim to a portion of the fund, it also served as a pull mechanism keeping the members intact.

As a forerunner to the above financial management scheme, a 60-20-20 sharing arrangement was made of the proceeds or income derived from the stationary lift nets reinstalled for and by the beneficiaries. Sixty percent went to the fisher-cooperators; 20% to the Regional Fisheries Training Center (RFTC) within two years as repayment for the nets provided (retrieved from a stationary lift net project undertaken by RFTC and the original 10 members, prior to HBRMP); and 20% to PIADP Office to be availed of later by the fisher-cooperators as capital buildup or for calamities. Moreover, as agreed upon, the 20% share of PIADP Office was turned over to the association upon evaluation of its cohesiveness, proper operations and maintenance of the lift nets and sound financial management. This money was later used by the MCMDAI members in installing their village market and as seed capital for members engaged in buy-and-sell operations of rice and fish.

Meanwhile, in setting up the projects, specifically the structures, the beneficiaries were asked to provide labor counterpart. They were also informed of the risks and of course the possible benefits. This way, the beneficiaries became true partners of the project with a higher level of commitment and not mere recipients of inputs.

Reaching out to the beneficiaries also meant collaborating with the other government or nongovernmental institutions operating in the area. The HBRMP actually became an experience of four agencies: RFTC-DA, Environmental Management Bureau-DENR, the local

governments (city and village) and PIADP Office. Working arrangements between and among these entities were both formal and informal, through a Memorandum of Agreement or verbal understanding. In either case, synchronized movements at the top enhanced the acceptance of the project by the community. This also allowed sharing of experiences, both success and failure, that enabled improvement in style of operation.

The multi-institutional arrangement exposed the beneficiaries to linkages necessary for them to sustain operations. The regular programs of the involved agencies were avenues that had been opened, so that as HBRMP closed, the association still had several projects that could be pursued. During project phaseout, the association was negotiating with the Land Bank for financing of their proposed boat building and coconut by-product processing project; a 100-ha mangrove plantation was being discussed with DENR; and the development of the village market into a consumer store was also underway.

During the inception of HBRMP, the city government also launched a community organization scheme to hasten delivery of government services, develop self-reliant communities and provide a two-way access between the city government and other agencies on one hand and the local communities on the other. Of the 60 villages within the city, they clustered a number of contiguous villages into Area Development and Management Units (ADMUs). A Sangguniang Bayan (City Council) member was assigned together with a respected private individual in the community to organize each ADMU, provide guidance and catalyze developmental activities identified by the ADMU members. It was envisioned that these ADMUs would become private foundations or converted into NGOs to become self-reliant and a potent force to be harnessed towards community development. Consequently,

the two ADMUs organized within the Honda Bay area, SAMANMARLUC (Salvacion, Manalo, Maruyogon and Lucbuan) and BACRUZ (Bacungan and Sta. Cruz), became partners of the HBRMP staff and beneficiaries themselves. The beneficiaries at Barangay Manalo, who were organized into the MCMDAI, affiliated with the SAMANMARLUC ADMU while those at Barangay Sta. Cruz became members of the BACRUZ ADMU, and evolved later into a cooperative called BACRUZ Coop.

The 18-month term of HBRMP could not provide conclusive results on its impact on coastal resources. But indications of improvement have been observed. Trawls and ring nets which used to frequent the coastal waters are operating farther out to sea, while cyanide and blast fishers have been warned and therefore have become more careful and less potent.

Along this line, the city government's organization of ADMUs was a significant move towards greater effectivity in coastal resources protection in Honda Bay. The "open-access" nature of coastal resources renders it almost impossible for protection efforts to succeed if they are done only in isolated portions and without direct involvement by the community. In the case of Honda Bay, the SAMANMARLUC ADMU is intensifying its campaign on fishing ground protection through surveillance and actual apprehensions. It paralyzed the illegal fishers' operations. Unlike if only one village took the campaign, it would have been so easy for the illegal fishers to move to the next village and render the effort futile.

Training

Training supports the productive elements of the project by ensuring technical as well as administrative competence of beneficiaries. Training coupled with extension services provided incentives

to the beneficiaries by enhancing their capability to operationalize the projects with minimum supervision, thus encouraging self-reliance. Extension services became almost personalized with PIADP staff attending to the expressed needs of the beneficiaries in their other sources of income aside from those utilizing coastal resources. Examples are contour farming system in the uplands; sourcing of good varieties of planting materials; and the establishment of a village market. These extension services were done with negligible cost to the project.

On institutional development, the beneficiaries were assisted through trainings on cooperative principles and positive value system aside from imparting technologies on income-generating projects and environmental protection measures. The decision, however, to organize into a full-blown cooperative was left for the beneficiaries to decide whenever they were

ready for it. Meanwhile, they functioned as an association. Registration with SEC provided legal personality to the association in Barangay Manalo, enabling it to negotiate with other organizations. The cooperators in Barangay Sta. Cruz affiliated with an existing cooperative in the area, the BACRUZ Coop. Working with an existing organization allowed more effort to be devoted on capability strengthening rather than on the dragging process of registration.

Preparation of an area management plan

For the long-term prospect of Honda Bay's development and protection, a Rapid Rural Systems Appraisal (RRSA) was undertaken. This included the assessment of Honda Bay and its associated catchments and an outline of recommended strategies

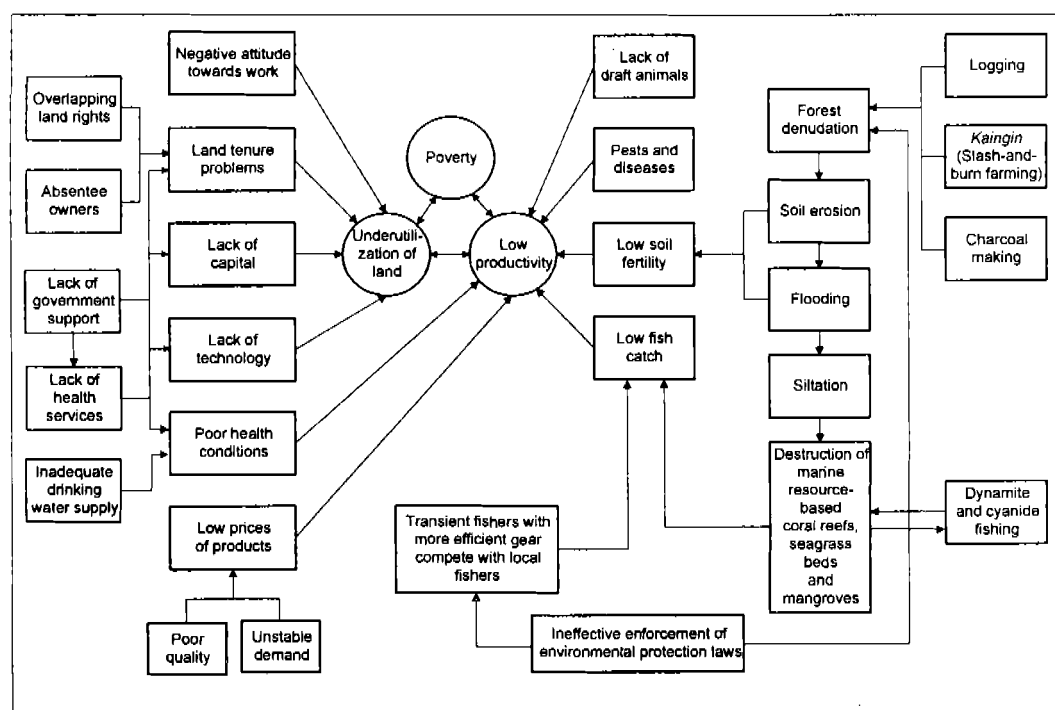


Fig. 3. Network analysis of development problems and constraints.

Table 2. Logical framework matrix.

Problem	Development potential	Strategy
Sociopolitical 1. Negative attitude towards work 2. Poor health condition 3. Land tenure 4. Inadequate drinking water supply	Sociopolitical 1. Generally young and illiterate population 2. Presence of organized groups working towards community development 3. Area development management units delineated by the city government	1. Strengthen local management units towards sustainable development and self-reliance 2. Educate the people on positive values and attitudes 3. Establish linkages with government/nongovernment support services 4. Develop and promote livelihood alternatives that are economically and environmentally sound 5. Counterbalance utilization pressure on resources with protection and habitat enrichment measures, as follows: a. promotion of positive changes in land use (e.g., tree parks in steep hills and stable upland farming system in low hills); b. enforcement of environmentally critical areas network (ECAN) with priority to restricted use zone which buffers the core zone; c. establishment of communal mangrove forest reserves; and d. establishment of a marine reserve covering the whole of Honda Bay
Economics 1. Lack of capital 2. Lack of technology 3. Lack of draft animals 4. Pests and diseases 5. Low soil fertility 6. Low fish catch 7. Low prices of products	Economics 1. Proximity to the city proper where financing institutions, implementing agencies and educational services are based 2. Available technology on appropriate farming systems and fishing methodologies 3. Accessibility to market outlets	
Environmental 1. Forest denudation, including mangroves 2. Ineffective enforcement of environmental laws	Environmental 1. Awareness of the people on environmental principles is relatively high 2. Environmental damages have not yet reached crisis level/irreversible stage	

for development to guide the local management units in their future undertakings (Table 2 and Fig. 3). The results of RRSA and its consequent network analysis coupled with the vast experience learned during the HBRMP Implementation make up a potential reservoir of knowledge, as outlined in the area management plan, that could guide future sustainable development efforts and its actors not only in Honda Bay but also in the other fishing grounds in the province.

The aftermath

After the implementation of HBRMP, a 100-ha three-year mangrove reforestation

contract worth P1.16 million was awarded to MCMDAI by DENR. Although the contract was approved by DENR in 1990, the mobilization fund amounting to P108,000 was released only in May 1992. Between the signing of the contract and the release of the mobilization fund, PIADP Office, through its original HBRMP team, provided technical as well as administrative support to MCMDAI. This was an informal arrangement without any funding from PIADP, specific to the activity. A one-year community-based project may not be adequate to successfully put in place what has been started. But DENR's regular program on community-based mangrove reforestation proved to sustain certain activities of HBRMP.

At this time, MCMDAI has fully planted the targetted 100 ha of tidal flat to mangrove species, inclusive of the 12 ha planted to mangroves in 1990-1991 that have grown to an average height of 1 m. Survival rate for the total plantation is 75-80%. Replanting in place of dead seedlings and maintenance of those that survive are being carried on by the officers and members of MCMDAI. Further, the members report a considerable improvement on their catch of marine products within the mangrove.

Some earnings from the reforestation contract are being utilized by members of MCMDAI for income-generating projects such as piggery, fishpond, gill-net fishing, mango spraying and handicrafts.

Other projects did not achieve sustainability. The BACRUZ Coop and the SAMANMARLUC ADMU were by themselves at the infantile stage at the time the projects were turned over. Meanwhile, with the change of leadership in the city government after the local elections in 1992, the ADMU Program was dissolved by the present administration. Nevertheless, the protection of Honda Bay is currently pursued by the city government through its revived Bantay Dagat Program (Operation Baywatch).

Unfortunately, the other group-oriented activities (e.g., village market, saltmaking, aquasilviculture) suffered setbacks due to their premature independence from the managing association.

Conclusion

This paper would like to put forward two primary elements in defining CBRM or specifically CBCRM as a resources management strategy: (1) The community that utilizes a given resource is organized, either formally or informally. (2) The said organized community actively participates in the proper management of the natural resources. Consequently, the capability

for resource management (i.e., technical skills and organizational cohesiveness) of the organized community has to be examined so that its activities and the inputs or assistance provided by "outsider catalysts" (meaning government agencies or NGOs) will be sustained by the said community.

Community organizing

As experienced by PIADP or at least by two of its components, the establishment of an organization is a requirement prior to the actual delivery of services. However, it is observed that the more successful projects are those where organizing is not a prerequisite; rather, the organization of communities just evolves after the people themselves recognize the need for it. However, there is yet no established operating procedure as to when and in what form the communities should be organized. On the other hand, it is noted that to attain active participation and sustainability, there is no room for a "paper organization". At stake are the dwindling natural resources. It will be court-ing disaster, if a group of individuals are merely organized on paper just to have the authority to exploit the fragile ecosystem.

Meanwhile, in community organizing, it is a must to consider the leadership pattern in the community, including the kinship structure. In Honda Bay for example, if a prospective leader does not associate well with his kin, even the nonrelatives tend to look down on him. In a small community, where almost all are somehow related, this is very significant. Moreover, among tribal groups, the Salogon USP exemplifies the utility of the socio-cultural structure, i.e., the dominance of the *panglima* (tribal leader) in achieving positive acceptance and effectiveness of the program even after phaseout.

Active participation

Aside from a very cohesive organization as an assurance towards meaningful and active participation of the community in an activity, the requirement for equity and counterpart from the community is also an effective strategy. Further, flexibility in project design to provide leeway for the beneficiaries to input their ideas, needs, perceptions and ingenuity during planning and project execution is likewise an important element to get their participation. Even financial management can be an incentive or disincentive for the beneficiaries to be involved and committed to the project.

Other factors to consider are the credibility, attitude and capability of the community organizers or the project staff. Specifically, the project staff must have the proper perspective on the role of participants in the total effort. A case in point is when these workers consider the farmers a hindrance to the speedy completion of the project. In addition, the organizers themselves should be properly or adequately trained. Quality time with farmers and fishers is also important, and should not be wasted as they also have their own priorities — to feed their families.

Active involvement is directly related to the participants' need to have a sense of ownership of and commitment to the project. If they themselves do not identify with the project, as experienced by the rural drinking water supply component of PIADP, then sustainability is not expected, thus making the exercise a waste in terms of time, money and effort.

Capability enhancement

Relevant to the active participation of the community is the level of its capability to cope with the new responsibilities of managing the resource, thus, the

need to enhance their capability through training and information education campaign in whatever form.

Again, this is dependent on the capability of the project staff to train and support the related institutions to provide training. In Honda Bay, one of the strategies adopted was tapping the assistance of the city government, RFTC and ERDB to train the beneficiaries. The contacts with other institutions enhanced the capability of the community. Later on they also provided the necessary linkages to sustain their existing and proposed projects.

However, the type of training and the messages to be delivered through an information education campaign should be properly designed to address the needs of the community. Otherwise, if these are not relevant to their interest, the participation of the beneficiaries cannot be readily expected.

Sustainability

Inherent to CBRM is the issue of sustainability. Organized communities, with the active participation and enhanced capabilities of people, logically point to the assumption that the communities sustain their resources management activities.

Policy-related Issues

Community organizing has become almost like a fad, similar to the phenomenal sprouting of NGOs. Every project proponent in an area is organizing activities. A farmer or a fisher becomes a member of two or more associations to the detriment of his productive performance and ultimately that of the group as a whole. Most of his time is spent on organizational meetings rather than on more substantive concerns — his livelihood.

Meanwhile, a community can be considered the sociopolitical unit beyond the family in a society. In a situation where development decisions come from the central government, the community becomes only the recipient with no opportunity at all to be heard in policymaking. It is therefore ironical to promote CBRM when decisions to utilize the resources are always made at the top (i.e., concessions are issued in Manila).

Moreover, in a country where politics is almost accepted as a way of life, it is expected that CBRM will also be affected by political patronage and interventions. Although politicians' involvement in community organizing is a welcome sign, vested political interests in resource use and management are inevitable. On the other hand, although an NGO may have the advantages to achieve an effective CBRM,

it is not always the safe formula. There are also NGOs with questionable origins and intentions.

Finally, while the government is vigorously pursuing environmental rehabilitation, little is done to protect the still relatively intact ecosystems. In Honda Bay for example, mangroves are being rehabilitated simultaneous with conversion of other existing ones into fishponds, in addition to the indiscriminate and unchecked cutting of the trees for housing materials and charcoal making.

Acknowledgement

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Appendix II. Workshop Program

Workshop on Community Management and Common Property of Coastal Fisheries and Upland Resources In Asia and the Pacific: Concepts, Methods and Experiences Silang, Cavite, Philippines 21-23 June 1993

Monday, 21 June

Opening Ceremonies

Dr. R.S. Pomeroy. Welcome remarks

Dr. J. Gonzalves, Dr. Y. Lambrou and Mr. S. Sverdrup-Jensen. Messages

Ms. C. Thompson. Announcements

Dr. A.C. Alcala. The role of the national government in the protection of marine life

Coffee break

Common property and community management

Dr. D. Feeny. Frameworks for understanding resource management on the commons

Lunch

Dr. E. Ostrom. Institutional analysis, design principles and threats to sustainable community governance and management of commons

Prof. F. Berkes. Property rights and coastal fisheries

Coffee break

Dr. P.E. Sajise. Sustainable land use systems in the Philippines: some lessons learned
Discussion

Ms. Y. Lambrou. Introduction for uplands workshop participants

Poster session (uplands)

Dr. L.A. von Geusau

Dr. Q.H. Pham

Dr. S. Shrestha

Ms. D.A. Dlamante and Mr. C. Basilio

Dr. C. Le Trong

Tuesday, 22 June

Fisheries workshop: concepts and methods for community management of coastal fisheries

Dr. K. Ruddle. The evolution and changing focus of coastal fisheries management in Asia and the Pacific

Dr. M. Racelis. Farmers, foresters and fisherfolk: stakeholders and activists in community resource management

Coffee break

Dr. R.B. Pollnac. Developing local organizations for people's participation in fishery management

Dr. J. Kurien. Towards an integrated community management of coastal fisheries

Lunch

Dr. N.M.R. Abdullah and Dr. K. Kuperan Viswanathan. Planning and management of coastal small-scale fisheries

Dr. H.J. McArthur. Creating dialogue and generating information for community resource management: application of client-based tools and methods

Coffee break

Mr. Y. Renard. The Caribbean Natural Resources Institute: a case study in co-management research and advocacy

Discussion

Uplands workshop

Mr. K. Phanvilay. Case study

Dr. S. Fujisaka. Pioneer shifting cultivation and social forestry revisited

Dr. E. Ostrom, Dr. C. de Raedt and Mr. T. Gimenez. Joint case studies

Discussion

Wednesday, 23 June

Fisheries workshop: case studies and guidelines

Prof. C.T. Añonuevo. The role of nongovernmental organizations in community-based coastal resources management

Mr. R.F. Agbayani and Ms. S.V. Star. Problems encountered in the Implementation of a community-based fishery resource management

Dr. R.M. Bojos, Jr. and Dr. F. Vande Vusse. The experience of community-based coastal resources management in the Philippines: Central Visayas Regional Project-I

Coffee break

Mr. R.M. Sandalo and Ms. M.P. Dygico. Community-based coastal resource management: the Palawan experience

Guidelines

Uplands workshop

Dr. G. Shivakoti. Alternative Interventions to assist farmer-managed irrigation systems in Nepal

Final discussion

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Towards an integrated management of tropical coastal resources. L.M. Chou, T.E. Chua, H.W. Khoo, P.E. Lim, J.N. Paw, G.T. Silvestre, M.J. Valencia, A.T. White and P.K. Wong, Editors. 1991. ICLARM Conf. Proc. 22, 455 p. US\$5 surface, \$20 airmail, P125.

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