

# **CO-MANAGEMENT IN SMALL-SCALE FISHERIES: CREATING EFFECTIVE LINKS AMONG STAKEHOLDERS**

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Plenary Presentation, International CBNRM Workshop  
Washington D.C., USA, 10-14 May 1998

## **ABSTRACT**

Establishing effective operational linkages among stakeholders in resource management depends on the institutional environment within which management occurs. As resource-based industries have developed and industrialized, resource management has tended to become specialized and centralized. Centralized management has been fraught with problems and has in many cases proven ineffective in the promotion of long-term sustainability. The centralized approach has often resulted in poorly designed regulations, a lack of buy-in by user groups, low levels of compliance, and ineffective controls on exploitation. As a result, interest in decentralized management approaches has increased. Co-management is the sharing of authority and responsibility among government and stakeholders. The main appeal of co-management is that it offers the prospect of relief from some of the more negative aspects of centralized decision-making. This paper discusses establishing effective linkages among stakeholders in the context of small-scale fishery co-management. The main message of the paper is that underlying the establishment of linkages among governments and communities are basic economic dynamics that influence the effectiveness of those linkages. These dynamics relate to the transactions costs of co-management and to its requirements for human capital. Examples are provided of fishery co-management, where costs and human capital have played a critical role in the degree of management effectiveness.

## **INTRODUCTION**

Theme 3 of the Workshop on Community-Based Natural Resource Management is about establishing effective operational linkages among government and community groups in the management of natural resources. An important determinant of the effectiveness of operational linkages is the institutional environment within which management occurs. Institutions establish the rules of the game for resource management, and determine, among other things, the process by which management decisions are made.

Past trends have shown that as resource-based industries have developed and industrialized, resource management has tended to become specialized and centralized. Primary stewardship authority has evolved to the government at regional, state or national levels. Although various types of decision-making processes are possible under government authority, they have tended to be top-down, with decisions and rules developed centrally by government and communicated down to user groups. The top-down style of management has been fraught with problems and in many cases has proven ineffective in the promotion of long-term sustainability. Cases abound of centralized decision-making that has resulted in poorly designed regulations, a lack of buy-in by

user groups, low levels of compliance, and ineffective controls on exploitation (McCay 1996; McCay and Acheson 1990).

And so, worldwide, the past several years have seen a rise in interest in alternative institutional forms. Attention has been placed on arrangements that shift the balance of authority away from the center to the periphery. Community-based approaches to management have been the focus of this interest.

Community-based resource management is one of many possible forms of co-management. Co-management is the sharing of authority and responsibility among government and stakeholders, a de-centralized approach to decision-making that involves user groups as consultants, advisors, or co-equal decision-makers with government (Berkes 1991; Jentoft 1989; Pinkerton 1989). Stakeholders may be members of a community or may be dispersed over a wider geographic area and form a 'community of interest' in a broader sense (Jentoft and McCay 1995). The main appeal of co-management, and the reason that it is being increasingly proposed as a process of natural resource management, is that it offers the prospect of relief from some of the more negative aspects of centralized decision-making (Berkes 1991; Pomeroy and Williams 1994).

This paper discusses co-management in small-scale fisheries, drawing some lessons about effective linkages from fishery applications worldwide. I begin with the reasons co-management is often well suited to small-scale fisheries. I next look at the functions co-management must perform, then consider how the linkages between stakeholders affect and are affected by the performance of these functions.

The main message of the paper is that basic economic dynamics underlie and influence the effectiveness of linkages among governments and communities. These dynamics relate to the costs of co-management and to its requirements for human capital. Examples are taken from fishery co-management, where costs and human capital have played a critical role in the degree of management effectiveness.

## **WHY CO-MANAGEMENT?**

Experimentation with fishery co-management is taking place on a global scale. The worldwide interest in co-management arises in part because under other management processes effective linkages between public sector, private sector and communities have often failed to develop.

Co-management carries particular appeal for small-scale fisheries because of the conditions under which such fishing takes place. First, the locality and history of small-scale fisheries often means that the pre-conditions for co-management are in place. Small-scale fisheries are usually conducted in near-shore coastal areas that have traditions of user-designed management. The behavior of participants can be internally monitored, and rules can be enforced.

Second, because of their proximity to shore, small-scale fisheries are often most in need of effective management. They absorb the spillover effects of pollution, habitat destruction and competition for space from larger scale operations. These effects are intensified by the general trend of population shifts into coastal regions, and are often highly visible in near-shore areas.

Third, the traditional tools and processes on which small-scale fishery management is based are in many cases proving inadequate to contemporary pressures brought by increases in entry,

capitalization and exploitation. Small-scale fisheries are often expected to absorb excess labor displaced from other economic sectors. Large-scale offshore fisheries cause near-shore effects including crowding, gear conflicts and localized depletion.

Fourth, small-scale fisheries may have local or regional importance disproportional to their size. In many areas fish are the basis for protein food security of low-income people who depend on the resource base for survival. With the expansion of international seafood markets, some small-scale and subsistence food fisheries have been displaced by fisheries directed toward export markets.

For these reasons, finding effective ways to link stakeholders through resource management is critical to management success. The direct involvement of resource stakeholders in the planning and control of resource use offers the potential for improving resource sustainability. The idea behind co-management as a means to link stakeholders is that people vested in planning and decision-making are more likely to pay attention to system level resource effects than those who are not.

Because co-management is often implemented as a remedy to problems created by other arrangements, the focus is often on the benefits it provides. Sometimes the focus on expected benefits means that inadequate attention is paid to the costs or requirements of implementing a new organizational process. Although at one level it may seem obvious that there will be necessary conditions for co-management effectiveness, these conditions, particularly with respect to costs and human capital, are often given scant attention to the ultimate detriment of effective performance.

## **CO-MANAGEMENT: FUNCTIONS AND ELEMENTS**

Co-management must perform the same functions as any fishery management process. It develops goals for resource conservation. It develops rules to allocate the resource between competing interests. It monitors fish population status and the impacts of regulations. It is responsible for the enforcement of rules and the resolution of conflicts. The expectation is that co-management has certain attributes that make it more effective in these functions because of the different linkages it creates.

Co-management is based on several elements of group decision-making. These elements apply to the background conditions under which fishery management takes place, the structure of decision-making, the transactions costs of decision-making, and the human capital requirements of decision-making. All affect the establishment of effective linkages.

### **Background Conditions**

- *Property Rights*: The set of entitlements to access and rules of use form people's expectations about their claims to the fishery. Property rights in some form are necessary for co-management because without them there is no definition or assurance of legitimate participation or of the conditions that link user groups to each other and to the government. As long as rights are assigned and clearly specified, and type can provide the appropriate background for co-management. Without property rights, actions taken under co-management will be undermined (Bromley 1991, 1992; Hanna et al. 1996).

- *Uncertainty*: Uncertainty is a background condition for all fisheries. Ecological systems vary, markets expand and contract, and government policies change. The type of uncertainty that exists in a fishery shapes expectations and behavior, and so also affects the links between users and government. There are ways that co-management can minimize the effects of uncertainty, by broadening the sources of monitoring information, creating coordination between user groups, maintaining consistency in rules and incentives, and clearly specifying procedures of decision-making (Hanna 1998a).

### **Co-management Structure**

- *Boundaries*: When co-management is applied within clearly defined boundaries, decision-making is brought into line with existing ecological or political systems. Boundaries serve several functions: they define and limit the number of legitimate users, they define areas of control, and they reference decision-making to an ecosystem. Costs of coordination, information gathering, monitoring and enforcement are all affected by the specification of boundaries (Ostrom 1990).
- *Scale*: Community-based management is nested within larger institutional jurisdictions, requiring that co-management process build compatible incentives at different levels. Creating consistency in incentives at different levels is not easy because both ‘scaling up’ small scale properties to large-scale systems and ‘scaling down’ large-scale properties to local scales cannot be done proportionally. The number of boundaries or scales over which co-management directly affects costs and the effectiveness of establishing links (Ostrom and Schlager 1996; Young 1996).
- *Representation*: Linking stakeholders into the management process is a critical element of co-management. Defining and identifying the full range of stakeholder interests is often a complex process even in small-scale fisheries, and involves both traditional and emerging resource users (Bromley 1992; Ostrom and Schlager 1996; Young 1992). The organizational task is to maximize representation so that decisions reflect the full array of interests and so stakeholders are as vested as possible in the process. Full representation strengthens links between stakeholders by lowering the probability of ‘free riding’ where some stakeholders receive the benefits of co-management without contributing to its costs.
- *Participation*: Various levels of user participation are possible within a co-management process, ranging from information exchange and consultation to active self-governance. The type of participation is determined by the human capital embedded in stakeholders and in the resources available for coordination (Hanna 1995a, 1995b; Jentoft and McCay 1995). Sen and Nielsen (1996) detail five types of co-management that represent different linkages between user groups and government: *instructive* (government exchanges information with user groups); *consultative* (government consults with user groups); *cooperative* (government and user groups as partners in decision-making); *advisory* (government takes user group advice); *informative* (users inform government of decisions). These alternatives have different implications for management costs and human capital requirements.

### **Transactions Costs**

- *Management Structure*: Any organizational structure embodies costs. The structure of co-management importantly influences its costs because it determines how stakeholders are organized, how information is generated and used, how decisions are made, and how

monitoring and enforcement take place. These costs are called transactions costs, and while costs are an inevitable part of resource management, their magnitude, and so their influence, can be influenced by management (Eggertsson 1990).

- *Resource Status*: The conditions of the resource base also influence costs. As resources become scarcer, the management structure must account for more trade-off between direct and indirect uses, between present and future uses, and between user groups.
- *Characteristics of Stakeholders*: Costs influence and are influenced by the linkages between stakeholders. The costs of generating local-knowledge information with the participation of stakeholders will very importantly depend on how well stake-holders are integrated across the geographic area of the resource and whether they are integrated in the design and planning of information collection efforts (Hanna 1998a). The degree of heterogeneity within user groups also influences the costs of co-management. However, some transactions costs remain fixed regardless of the way management is organized. For example, the costs of providing scientifically generated information will not be sensitive to the way stakeholders interact in co-management.

## **Human Capital**

A fishery is an example of a natural capital asset whose stock provides a flow of services over time. Several types of capital are involved. Natural capital is the ecosystem with its complex array of plant and animal life, water and minerals. Physical capital is the equipment used to exploit natural capital to extract a flow of resource benefits. Institutional capital is the stock of rights and rules within which resource management decisions are made. Human capital is the human skill and knowledge that underlie resource use and decision-making.

The important dimension of any type of capital is that it has a stock of asset value and produces a flow of capital services. The value of the stock of any type of capital stems from its ability to produce flows of services, or benefits, that accrue to either the ecosystem or the human system (Hanna 1997). Fishery stakeholders have been extremely successful in the application of physical and financial capital to the extraction of fishery resources. The greatest challenge facing fishery management has been the design of management processes that tap into human capital in ways that promote and sustain the fishery's natural capital.

Transferring responsibility for various management functions from the government to stakeholders under co-management also transfers the requirement for human capital to stakeholders. And so the development and effective use of human capital among stakeholders is essential to co-management. Co-management requires certain skills and knowledge to be available as human capital stock, so that the flow of services can be sustained. The stock of human capital is contained in the education, knowledge, and skills of stakeholders. Flows of human capital services are required for the tasks of coordination, negotiation, scientific review, design, monitoring and enforcement.

## **LINKAGES: COSTS AND CAPITAL IN PRACTICE**

Encapsulated descriptions of some small-scale fisheries co-management in practice illustrate the role of transactions costs and human capital in establishing effective co-management linkages:

*Lake Kariba, Zambia* (Sen and Nielsen 1996, based on Malasha 1996): Co-management was implemented for the Zambian artisanal gill-net fishery in 1994 as a solution for declining resources, poor enforcement and poverty. Management authority over a fishing zone was vested in fishery management committees, whose membership included user groups, government agency representatives, village authorities and NGOs. Subcommittees were established within zones at the village level, charged with monitoring compliance and recommending the allocation of development funds. Problems with establishing effective linkages between user groups arose from the forced settlement of itinerant fishers into villages with arbitrary boundaries, the incomplete representation of stakeholder interests on management committees, and a lack of human capital in organizational skills. The high levels of organizational costs and the absence of human capital in democratic traditions seriously weakened this attempt at co-management.

*San Miguel Bay, Philippines* (Pomeroy and Pido 1995): Co-management of near-shore fisheries in San Miguel Bay was implemented in 1991 to address problems of over-exploitation and user-group conflict. The San Miguel Bay Management Council was established in 1994 to cope with the problem of jurisdictional fragmentation within the Bay. The Council's responsibility is to coordinate local governments, provide policy advice, and work toward needed fishery management decisions. In this case, the government retains final authority for decisions, but consults with users. Although a relatively new process, the co-management of San Miguel Bay is layered against a background of human capital skills in democratic participation that is expected to eventually be effective in addressing the problems of resource overuse and conflict. Prior user group coordination has helped keep the transactions costs of coordination in bounds.

*Lake Chapala, Mexico* (Pomeroy 1994): Lake Chapala Mexico supports a small-scale commercial fishery that has two fundamental management difficulties: Weak property rights and poorly defined boundaries of control. Although there is some shared authority between government and user groups, background conditions and the decision-making structure prevent effective co-management. Property rights are variously defined, leaving it unclear whether fishermen's unions, cooperatives or government authorities can define the set of legitimate users. In addition, these property rights are inconsistently enforced, leaving the fishery de facto open access. Structural inconsistencies also exist in the definition of management area boundaries, which are interpreted differently at the group, local state and federal levels. The net result is extremely high transactions costs that prevent the development of effective linkages between stakeholders.

*James Bay, Canada* (Berkes 1989): The 1975 James Bay and Northern Quebec Agreement between the government of Canada and Cree (James Bay) and Inuit (northern Quebec) peoples was designed to promote greater native participation in resource management, establish exclusive harvesting rights for Native groups, and enable co-management of fish and wildlife. The agreement included cooperative research and decision-making and has been successful in strengthening Cree control over resource use, crafting broader representation in the construction of environmental assessments, strengthening Cree authority and modifying provincial authority over fishing and hunting regulations, and protection of subsistence fisheries. Homogeneity within user groups helped contain the costs of creating new links between user groups and government. Problems with the agreement included many details of implementation, funding and the transfer of authority. Especially noteworthy was the lack of consistent high-quality scientific information, a constrain on the effective use of human capital.

*Soft-shell clams, Maine* (Hanna 1998b): A community-based fishery for soft-shell clams has existed for over two hundred years, managed with varying degrees of sustainability. The co-

evolution of management of this resource within the larger economy has been made possible by the nesting of property rights in community and state levels of governance, and by the co-management activities of communities and the State of Maine. The co-management system has been well-adapted to its social, economic and ecological context, although it is vulnerable to increasing transactions costs from coordination, biological monitoring and exclusion. Changing conditions in the fishery are changing the level of transactions costs and increasing the requirements for human capital.

*Coastal Fisheries, Japan* (Asada et al. 1983): Japanese coastal fisheries are managed under a system of local property rights that reflect long-standing local traditions and customs of conflict resolution. Inshore rights are defined for territories and protected by law. A focus of the coastal fishery rights systems is the resolution of conflict between stakeholders that has required the development of human capital in negotiation skills. The system of local property rights and co-management authority, because it is so strongly based in tradition, has also been charged with raising the transactions costs of management by retarding technological progress, being short-sighted, and being vulnerable to local corruption (Matsuda and Keneda 1984; Ruddle 1984).

*Coastal Fisheries, Turkey* (Berkes 1986): The coastal fisheries of Turkey provide evidence of mixed success in local-level management. Two unsuccessful cases are managed as open access and suffer from overcapitalization. Three successful cases are closed access, with clearly defined rights to fish. External factors in offshore fisheries affect the success of local-level management but are outside its control. The successful cases demonstrate the positive effects of relatively homogeneous user groups, requirements for local residence, and smaller numbers of participants, all of which lower the costs of coordination, monitoring and enforcement. The case studies also illustrate the vulnerability of any management process to uncontrolled entry and to the effects of decisions that are made outside of its area of control.

*Lofoten Islands, Norway* (Jentoft 1993; Jentoft and Kristoffersen 1989): The Lofoten cod fishery is an example of a long lasting co-management process, functioning successfully for 100 years. Fishermen elect inspectors and regulatory committees who are charged with dividing ocean areas (districts) into bounded fields for gear groups. The committees do not explicitly limit catch; total quotas are set by government. A challenge for this co-management process over time has been the resolution of conflict between gear groups over the size of fishing areas. The long-term success of the co-management system is due in large part to the existence of both a common interest and pressing need to resolve such conflict so that fishing can take place and to the maintenance of human capital among management participants.

*Coastal Fisheries, Mexico* (McGoodwin 1994): The coastal Pacific fisheries of the South Sinaloa region of Mexico are examples ineffective co-management. The fisheries were relatively stable in early years of development, managed by a combination of government control and near-shore territories. Boundaries were mutually recognized by user groups. A combination of more efficient fishing technology, increasing coastal populations, poverty, strong export markets, inadequate pollution controls and ineffective enforcement led to the breakdown of territories and an influx of fishing effort. The rapid rate of change in the region created high costs of coordination, organization and monitoring, prevented the maintenance of effective linkages between stakeholders, and led to background uncertainty and intensified competitive use. Attempts at fishery control were eroded by new entry.

## CONCLUSION

As the case studies illustrate, transactions costs and human capital requirements pose challenges to the establishment of effective operational linkages between stakeholders in fisheries. At the same time, the way stakeholders are organized and linked affects the costs of management. Similarly, the way human capital is developed and used strongly influences co-management success. There is a circular relationship between effective linkages, transactions costs and human capital.

Designers of co-management processes have tended to not give economic concepts like costs and capital due consideration, perhaps because co-management is sometimes seen as a way to avoid economics; a way to mitigate for the harsher side-effects of managing fisheries for economic efficiency. Co-management is often put in place to mitigate some of the problems related to economics, such as competitive exclusion or a failure to address equity.

And so a certain amount of wishful thinking about avoiding economics sometimes underlies the design of co-management processes. At times there is also an element of desperation in the need to try alternatives to current management that precludes careful thinking about the costs and capital requirements of management. Wishful thinking and desperation are powerful forces. But economic forces are equally powerful, and costs and capital requirements are pervasive. They are reflected in the coordination, learning, design, implementation, monitoring and enforcement functions of management. Costs must be accounted for explicitly so they can be contained. Capital must be accounted for explicitly so it can be built or maintained at appropriate levels. A co-management process, while offering great promise for stakeholder integration and long-term commitment, also offers these economic challenges.

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