



# **FISHERIES CO-MANAGEMENT POLICY BRIEF:** Findings from a Worldwide Study



K.Kuperan Viswanathan . Jesper Raakjaer Nielsen . Poul Degnbol . Mahfuzuddin Ahmed .  
Mafaniso Hara . Nik Mustapha Raja Abdullah

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Published by WorldFish Center  
PO Box 500 GPO  
10670 Penang, Malaysia

Viswanathan, K.K., J.R. Nielsen, P. Degnbol, M. Ahmed, M. Hara and N.M. Raja Abdullah. 2003.  
Fisheries Co-management Policy Brief: Findings from a Worldwide Study. WorldFish Center Policy Brief  
2, 26 p.

Perpustakaan Negara Malaysia Cataloguing-in-Publication Data

Fisheries co-management policy brief: findings from a worldwide study / K.K. Viswanathan . . . (et al.)  
ISBN 983-2346-14-2  
1. Fisheries 2. Fisheries management I. Viswanathan, K.K. 338.3727

Editor: N. Puttaraksar  
Managing Editor: Catherine Tan  
Cover design: Leelah Kumari Gobalakrishnan  
Cover photos: Poul Degnbol  
Layout artist: C-Square Sdn Bhd, Penang

ISBN 983-2346-14-2

WorldFish Center Contribution No. 1696

Printed by Jutaprint, Penang, Malaysia

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## Executive Summary

**F**isheries in developing countries are under intense pressure from increasing human populations, overexploitation of resources and conflicts over access to degraded resources. Who should take the responsibility for managing fisheries? A new governance approach is needed to address the problems facing fishing communities. One promising approach involves an arrangement where management responsibility is shared between the government, fishing communities and other stakeholders. This co-management approach will address the problems facing fishing communities which include the following: 1) the risk of exclusion from resources and markets due to globalization, 2) the intense competition for the use of the freshwater and coastal environment leading to reduced resource productivity, 3) the need to reverse the overexploitation and establishment of sustainable management of the living aquatic resources on which the fishing communities rely, and 4) reconciling the immediate needs of the fishing communities with international agreements focussing on the aquatic ecosystem. Studies of various co-management implementation cases have revealed the potentials and benefits of co-management. Potentials for reducing conflicts, enhancing cooperation between communities and government and recognising conservation needs have been documented. Scale issues, approaches for reconciling local and global needs and identifying knowledge base for co-management and ways for effective empowerment of local communities for setting management objectives are areas that require further attention.

# Introduction

**F**isheries in developing countries are under strong and increasing pressure. Increasing populations in coastal and freshwater environments create pressures leading to overexploitation of resources and conflicts concerning access to resources, space and markets. Competing uses of resources and space in coastal zones and freshwater environments such as infrastructure development, tourism, hydropower development and aquaculture bring about loss of access to and control over fisheries resources by fishing communities. Changes in the environment due to pollution, coastal erosion and deforestation also result in further losses of production and value of fisheries resources. Globalisation, which is the integration of local markets into global markets and the subsuming of political and social processes by international economic forces, often leads to exclusion rather than new opportunities for fishing communities.

Current fisheries management approaches based on centralised government intervention have proven inadequate to deal with these issues and do not meet most reasonable objectives including reversing stock depletion, resolving user-group conflicts, increasing profitability and preventing social disruption.

Existing institutions within fishing communities are not able to cope with these rapidly developing pressures either. The communities are in effect disempowered relative to emerging, stronger and, in many cases, distant stakeholders including fish consumers.

There is thus no easy solution to this problem given the strength of the forces. New institutions enabling fishing communities to deal with the present pressures are needed. Fisheries and aquatic resources management is, however, still largely government-driven although experiences worldwide show that various forms of partnership between government, industry and fishers strengthen management and produce results. Such partnerships have become known as co-management.

During the last decade the co-management concept has gained increasing acceptance among governments, development agencies and researchers as an important option for future fisheries management systems. At the same time it has, however, become increasingly evident that the co-management concept is not clearly defined and often means different things to different people. A growing number of attempts to introduce variants of co-management systems have been studied and documented and there is now a considerable body of documented experience available. It is, therefore, timely to move on to a more comprehensive understanding of co-management and to summarize the experiences with both the positive outcomes and the problems in actual implementation.

This policy brief distinguishes co-management systems according to the scope of the cooperative features of the governance system and provides evidence from a recent worldwide study on fisheries co-management that has researched cases of co-management arrangements in coastal and freshwater fisheries in Asia and southern Africa. Some of these case studies are used as examples in this brief. The project and references to publications of case studies are presented in the bibliography of this document.

# The challenge for Governance

## **Globalization and the exclusion of local fishing communities**

**T**he exploitation of fisheries resources and the markets for fisheries products are increasingly operating in the international domain. This represents opportunities for fishers and fishing communities, but exploring these opportunities requires substantial financial and organisational inputs as well as security of future access to fisheries resources. These requirements are rarely met in fishing communities in developing countries and the opportunities resulting from globalisation are, therefore, likely to turn into exclusion whereby fishing communities lose control over and access to the fisheries resources in their local environment as other users take over. Such users may be more resourceful fishing industries as can be seen in many developing countries when distant water fleets compete with coastal fisheries. An example is the case of the foreign fleets harvesting shrimp along the Mozambican coast in direct competition with local fleets.

## **Market driven agreements and conventions**

Another aspect of globalisation is the development of international agreements and conventions on standards for environmental and fisheries management, which generally focus on the aquatic ecosystems rather than on local communities. Market driven arrangements such as green labelling or certification of fisheries products also tend to focus on ecosystems rather than people. The objectives of such arrangements may be in the long-term interest of fishing communities but do not address or may even be considered counterproductive to their immediate concerns such as meeting daily requirements for food and income.

## **Competition for the use of resources**

Fisheries are under pressure from the uses of the coastal and freshwater environment for other purposes such as infrastructure and industrial development, irrigation and flooding control, hydropower development, aquaculture and environmental changes. Such uses often exclude fisheries by competing for space or by changing the environment in ways that lead to reduced productivity of fisheries resources. Examples of such developments are coastal aquaculture development in Thailand, which has resulted in loss of mangrove habitats of importance for the reproduction of fish stocks; the development of agriculture and floods control in the Mekong River Basin, which reduces the floodplain areas on which the fisheries rely (Sverdrup-Jensen 2002); and the development of tourism on Lake Kariba in Zimbabwe, which has led to fisheries being closed to local communities (Jul-Larsen et al. 2002). This exclusion has led to reduced access to resources and increased tension within communities.

The developments in coastal environments attract populations from inland areas causing more pressure on coastal space and resources. Fisheries harvest living natural resources and are thus based on a limited natural production in the aquatic ecosystem. Increased exploitation leads to overexploitation, reduced production per fisher and eventually to conflicts between fishers concerning access to resources and markets and gear conflicts.

Globalisation and competing uses of the aquatic environment leave fisheries communities in a precarious situation where they are in danger of losing access to and control over their resource base while the same resource base may be dwindling due to environmental changes and overexploitation. There is a need for an innovative way of managing fisheries that addresses these problems.

### **Who should take the responsibility to manage fisheries?**

The basic challenge to governance in fisheries management is to establish and maintain institutions - norms and rules to guide decisions including a formal framework for decision-making - which enable the communities to address this complex and fragile situation. The process for establishing, enabling and maintaining institutions for improved governance of coastal resources is often not clear and requires a process of learning and adapting to the context of the fishery concerned. This may call for a rewamp of existing institutions and the establishment of more responsive and flexible arrangements for management. The balance of responsibility that has to be shared among governments, communities and industry has to be worked out through a negotiative and iterative process.

### **Inadequacy of traditional fisheries management**

Institutions regulating access to fisheries had in many – if not most – cases been in place long before modern concepts of fisheries management were developed (Jul-Larsen et al. 2002). The problems being faced by the fishing communities are, therefore, not necessarily a result of an absence of management institutions, but rather of the inadequacy of these institutions to deal with recent developments. Examples of such systems are the “Sasi-Laut” system in the Maluku of Indonesia (Novaczek et al. 2001) and traditional fisheries management systems of the Pacific Islands (Ruddle 1998). Revitalization of such institutions will, therefore, not lead to solutions to the problems. They may have lost their significance exactly because they were set up to solve other problems and are thus inadequate to deal with the present situation.

### **Inadequacy of ‘modern’ fisheries management**

Fisheries management as it has developed within modern industrialised societies (‘modern fisheries management’) does not represent a solution either. This centralised top-down fisheries management, focussing on objectives relating to the fish resources and based exclusively on formal biological science, is increasingly questioned in the societies in which it was developed and attempts to introduce such management in other environments have generally been without much success. Such management systems are inherently unable to address the present problems of fishing communities due to the ways objectives are defined, limitations in the knowledge on which they are based and the top-down nature of implementation. The overriding and immediate objectives of modern fisheries management are related to the sustainability of the resource. While these objectives are of relevance to the fishing communities, their immediate priorities for management are generally not directly related to the resource but to other pressures on their social and resource system - which may also include the causes for excessive exploitation of the resource. The combination of a top-down approach and a narrow focus on resource issues leads to management being



based on formal biological science produced in specialised research institutions and disregarding or even being in direct contrast to the experiences of fishers (Degnbol 2002). The result is that modern fisheries management fails to address the core concerns of fishing communities, is insensitive to local conditions, lacks backing from fishing communities and is even inefficient in achieving its own objectives.

### **A new approach is needed**

The modern fisheries management approach has not prevented over-exploitation of fish resources. This is evident from the international experience that many important stocks that have been subject to this regime for decades have been severely overexploited and even collapsed. One of the main reasons for the lack of success for the modern fisheries management approach is that the top-down approach has left the fishing communities completely out of the process and builds up barriers between the fisheries administrations and the fishing communities. This has undermined the legitimacy and efficacy of the management system (Hara and Raakjaer Nielsen 2002).

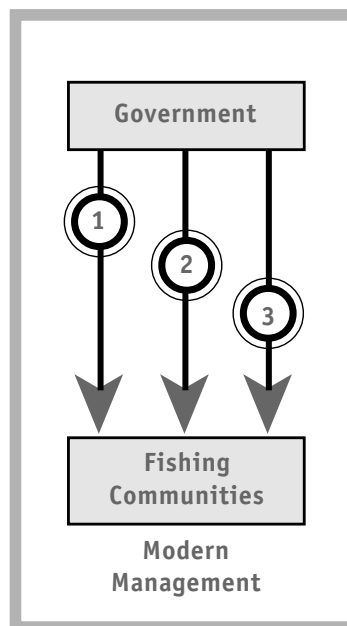
These past experiences and the present challenges for fisheries management have led to a general acceptance that institutional reforms in the governance structures for fisheries management are required.

A new governance approach needs to be developed. This approach cannot be a revitalisation of existing or former management regimes in the community, which have proven inadequate to deal with the situation, nor can it be a replication of modern centralised fisheries management.

### **Problems facing fishing communities**

The new governance approach must be able to address the problems facing the fishing communities in the present situation including:

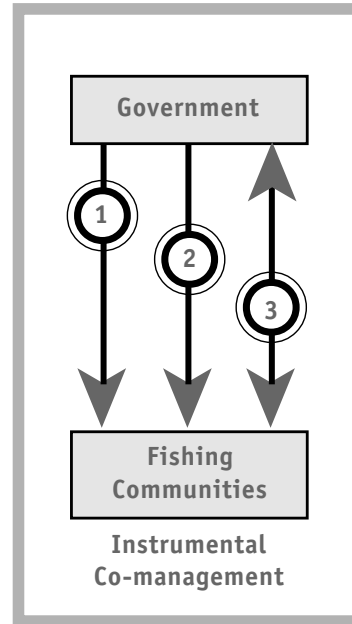
- The risk of exclusion from resources and markets due to globalisation, competing uses of the freshwater and coastal environment and other activities which may lead to reduced resource productivity.
- Provision of an institutional framework to control access and resolve questions of distribution of access between fishers.
- Reversing overexploitation and establishing sustainable exploitation of the living aquatic resources on which the fishing communities rely.
- Reconciling the immediate needs of fishing communities with international agreements focussing on the aquatic ecosystem.



# Reforming governance institutions

Governance of fisheries involves: 1) setting management *objectives*, 2) defining and providing the *knowledge base* for management and 3) ensuring *implementation* of management decisions.

In most countries around the world the fish resources are state property and thus, governments need to play an important role in governing these resources. Governments have institutionalised the fisheries management process and a global mainstream approach has evolved, which can be characterised as the 'modern fisheries management' approach because it reflects modern rationality or the scientific approach used in fisheries management. In the modern management approach decisions are taken at the central level (top-down), management objectives have primarily focussed on conservation aspects and the knowledge base has primarily been defined as resource biology. Implementation has been through policing. The involvement of fishing communities has been rather limited in all respects and the management system is top-down in relation to setting management objectives, defining the knowledge base and implementation as illustrated by the arrows in the figure.



## Fisheries co-management

Co-management has been widely recognised as a promising option for reform of fisheries governance institutions. Early cases of co-management have been documented by Jentoft (1989) and Pinkerton (1989). The co-management concept as a basis for natural resource management was introduced by Kearney (1984). Frameworks for understanding common property resources including co-management arrangements were developed by Oakerson (1992) and OECD (1996). The early conceptual development and frameworks for analysis were open for wide interpretation. An attempt to use a more specific terminology by classification of co-management arrangements along one dimension was introduced by Sen and Raakjaer Nielsen (1996). A broad institutional analysis framework was developed to study co-management cases under the Fisheries Co-management project at the WorldFish Center formerly known as ICLARM (Pomeroy et al. 1994). The concept of co-management has, however, been used to cover a large range of institutional arrangements which have very little in common and has been adapted very differently in various situations. The acceptance of co-management as an important correction to modern fisheries management has thus been associated with the concept being adopted so vaguely that it has lost substance in the process.

## **Definition of co-management**

Co-management can broadly be defined as an arrangement where management responsibility is shared between the government and fishing communities. It can be viewed as a set of institutional and organizational arrangements (rights and rules) that define the cooperation among the fisheries administration and relevant fishing communities (Raakjaer Nielsen and Vedsmann 1999; Pomeroy and Berkes 1997).

## **Rationale for co-management**

The emergence of co-management has been based on considerations of both democracy (involvement of citizens in decisions concerning their own livelihood) and efficacy (to reduce implementation costs and improve compliance). Co-management is considered to represent a more democratic governance system because it implies increased involvement of users and delegation of decisions to be taken as close to the users as possible. It has been expected to improve the efficacy of fisheries management because acceptance of management measures is assumed to be higher when users are involved in the decision-making process and the contents of management measures is assumed to be more adequate and better reflect the actual situation if users knowledge is included in their development.

Different co-management arrangements may be distinguished by their relative emphases on democracy and efficacy aspects.

## **Instrumental co-management**

Co-management can be an innovative change to the modern fisheries management approach as it implies a power sharing arrangement between government and fishing communities to undertake fisheries management. However, the practical adaptation of the co-management approach by governments has most often been limited to involving fishing communities in the implementation process – an ‘instrumental co-management’ approach. Governments have generally not perceived co-management as a means to introduce more democratic principles into fisheries management, but have recognized co-management as an instrument to reach its management objectives more efficiently by involving fishing communities in the implementation process. Governments have not been prepared to expand user-participation to setting management objectives (this has only been observed in a few cases of limited consultation) and determining what knowledge to include in the management process (there are no documented cases where fishermen’s knowledge have been used as a basis for management decisions on equal terms with research based biological knowledge).

Examples of attempts at instrumental co-management approaches from Southern Africa and Southeast Asia are the Administrative Management Design for Game Management Areas (ADMAGE) in Zambia, the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in Zimbabwe, the development of marine parks in Malaysia and the co-management arrangement in San Miguel Bay, the Philippines. The practical adaptation of the co-management concept in the two regions and elsewhere in the world, has almost entirely been focussing on the implementation process, thus taking an instrumental approach.

On the ground experiences from the two regions strongly indicate that the present problems of making the co-management arrangements successful can be related to the instrumental approach to co-management taken. One of the best-documented examples is perhaps the co-management arrangement introduced at Lake Malombe, Malawi. When the project was initiated the expectations in the local fishing communities were that empowerment was going hand in hand with the introduction of co-management, but it turned out differently. The Beach Villages Committees, which were established to represent communities in this co-management process, felt that they entirely became an implementation body for the Fisheries Department. In addition, the Beach Village Committees felt that the support from the Fisheries Department was insufficient in the implementation process.

The lack of support from governments to local co-management initiatives is a general observation from the case studies. One reason for this might be the lack of adaptation in the organisational structures of government departments to cope with new management concepts. The extent of the change in scope required to move from top-down management to co-management even in the most rudimentary instrumental form has generally not been realised by governments. The situation is further complicated by the fact that most fisheries departments have been staffed nearly exclusively with biologists and have mainly been driven by resource conservation concerns.

In reality the instrumental co-management approach does not differ significantly from the modern management approach and the efficacy has in most cases not been much better. The current trend might actually lead to a situation where it will do worse because the frustration among fishing communities will increase due to the lack of empowerment and this will consequently undermine the legitimacy of the management system. When co-management was initiated, it created huge expectations for a genuine participation and empowerment, but the practical adaptation of the co-management turned out to be business as usual and not an institutional reform.

### **Empowering fisheries co-management: an institutional innovation**

The limited success of instrumental co-management may be due to its lack of involvement of users where it really matters - in defining management objectives and in identifying the knowledge to be considered a valid basis for management decisions. It is a radical institutional change to involve fishing communities in setting management objectives on equal terms with government. It should be anticipated, as a consequence hereof, that management objectives will be modified and, in some situations, in contrast to the previous biological/resource oriented focus. Socio-economic considerations are likely to play a more prominent role within an empowering co-management arrangement.

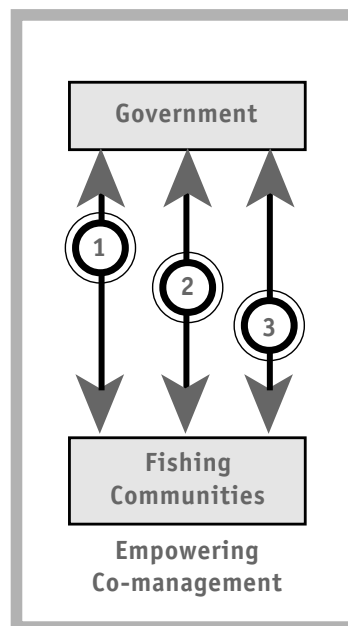
Empowerment of fishing communities is a mechanism to give the people within the fishing communities a chance to influence their own future in order to cope with the impact from globalisation, competing use of freshwater and coastal environments, and other fisheries related issues. An empowering co-management approach will apparently – to a higher degree than previous or present management approaches – fulfil the overall management objectives, although these objectives are likely to differ from management objectives set by governments in the past.

The empowering co-management approach is a demanding concept, as it requires:

- A rethink of the logic for management and subsequently a change in the knowledge base for management.
- A major restructuring of the institutional and organisational arrangements supporting management.
- A substantial change in attitudes from both governments and fishing communities towards their role in such arrangements.
- Aspiration from fishing communities and government to proceed along this avenue.
- Capacity-building at several levels both within governments and fishing communities.

The empowering co-management concept is a learning process for all involved parties. It takes an adaptive approach to management. In order to deal with the very complex issues the process will be a “muddling through”. The participants might from time to time perceive it as chaotic. Finally, it is important to emphasise that it will be a troublesome exercise without any guarantee for success, but it promises to improve the efficacy of fisheries management in small scale fisheries in developing countries or for that matter in fisheries management in general.

An empowering co-management arrangement will to some extent challenge the objectives set by main stream international conventions within fisheries management e.g. the Code of Conduct for Responsible Fishing and the precautionary approach for fisheries management, which is an attempt to ensure that all uncertainties in respect to stock estimation and fisheries management implementation are included to protect the fish stocks. This may be at the short-term expense of fishing communities as their ability to generate income and food is correspondingly diminished. The approach taken in the international conventions is quite similar to the modern fisheries management approach. In this sense, the international decision-making community may have underestimated the limitations of this approach. A balance between conservation and socio-economic concerns need to be found. In this respect empowering co-management can actually facilitate the process by exposing governments to the impacts felt by fishing communities of the international conventions and assist national governments in making arguments to balance the various objectives in international decision-making fora.



# Meeting the challenges in implementation

It is at the implementation stage that co-management requires careful planning, effort and cooperation of many parties for it to succeed. Co-management in essence is an institutional response that has emerged largely through a bargaining process in which groups with varying power seek to control how institutions allocate rights over resources and provide for their representation for determining those rights. Co-management will not take place in an institutional vacuum and existing institutions or power bases will influence the formation of new ones. Co-management will thus not go without being contested by the many interested parties involved in securing benefits from the resource in question.

## **Empowering communities to help define management objectives**

An important question is how co-management authority can be vested in or assigned to local communities. The experience in Southeast Asia and South Asia shows that co-management is largely seen in terms of functional communities where rights and responsibilities will have to be assigned to representatives of fishing industry organisations or otherwise-defined groups of harvesters. These groups are usually defined in functional terms, e.g. harvesters using particular gears such as trawls and purse seines; fishers harvesting certain species such as shrimps, bivalves, pelagics or demersals; or defined by area of operation or fishing grounds such as inshore and offshore fisheries. Co-management requires a clear commitment on the part of governments to the sharing of power and authority with local governments and groups of people such as local fisher and community organisations.

As a first step, governments must establish conditions for co-management systems to originate and prosper. Governments should allow fishers to hold meetings to discuss problems and solutions and to develop organisations and institutional arrangements for management. A second step for governments to nurture co-management is to give fishers access to governments and government officials to express their concerns and ideas. Fishers should then be given the right to develop their own organisations and to form networks and coalitions for cooperation and coordination. Fishers should be encouraged to develop organisations on their own initiative that meet their needs. Thus, the role of government in establishing conditions for co-management is the creation of legitimacy and accountability for the local organisation and institutional arrangements. It is crucial to note that the government has a pivotal role in co-management especially in providing the legal basis for the functioning of community organisations and community enforcement of user rights and resource extraction rights. As an example, see Case study 1 on page 21 for the case of Bangladesh. Governments are required to defend user rights and security of tenure delineated by community groups. The often-quoted cases of long standing marine fishery co-management arrangements that work in Norway and in Japan have a legal basis (Jentoft and Kristoffersen 1987; Ruddle 1989). This suggests that beyond the simple call for more

community involvement and fisher participation, governments must establish commensurate legal rights and authorities and devolve some of their powers. See for example Case study 3 for the Philippines on page 24.

The process of establishing co-management requires changes in the government organisation involved as a partner. It is necessary to accept that the empowerment process of co-management bodies is associated with a symmetric disempowerment of government agencies, which formerly had full control. There may be a need to supplement department staffing with other types of professional skills than required in former management organisations. There may also be a need to develop capacity to deal with co-management processes in several communities simultaneously. Such changes may require reorientation in mindsets both in government organisations and in the communities towards openness for this type of cooperation.

### **Integrating the scientific knowledge base for co-management decision-making**

One of the noteworthy problems in fisheries management has been a gap in the understanding of condition of the resource as seen by fishing communities, scientists and government managers. Centralised government-based management systems have relied heavily on research based on biological and ecological science as developed in research institutes and universities. The knowledge of fishers and the recognition of the special values, culture, practices of fishers have not been given systematic attention. The integration of fishers' knowledge and practices into contemporary management systems is one of the main benefits of the co-management approach. This is particularly important in ecosystems where both great uncertainty and irreversible natural processes require qualitative judgements.

Many different types of collaborative processes for examining the condition of fisheries resources have been effectively used. Fisheries scientists have a great deal of experience in research collaboration in which fishermen assist scientists in research that the scientists direct. While such programs are well established mainly in developed countries, many examples of successful collaboration exist in both Africa and Asia. Programs, in which fishers gather data about fish abundance, have been rigorously tested against parallel, scientifically designed sampling programs in India, Guinea, the Philippines, Laos and Zambia and found to produce usable reliable data. Many effective methodologies have been developed in four decades of research on understanding folk biology and on gathering local ecological knowledge at first mainly in terrestrial farming systems, but since the 1970s in aquatic environments as well. Truly collaborative approaches, in which fishers and scientists work together on all aspects of research from hypothesis formulation through the interpretation of results, have begun to appear in developed countries. These programs have almost all been the result of grassroots action by citizens of fairly well educated communities, particularly in Canada, Alaska and Northern Europe, which had suffered devastating stock collapses (Wilson 1999). Many have also been part of a broader fisheries co-management program that has linked their results directly to management decisions. There is an increasing willingness on the part of fisheries management agencies in developing countries to make use of the local ecological knowledge found in their fishing

communities, and to take what they consider as appropriate to their situation from these models of even richer scientific collaboration. However, it is a difficult task and a serious challenge to integrate local ecological knowledge and research-based scientific knowledge into a common basis for management decisions.

### **Co-management and conflicts over fisheries resources**

The first lesson learned by any fisheries manager is that all conservation decisions are also allocation decisions, i.e. it is almost impossible to find a measure for conserving fish stocks that does not benefit some resource users more than others. It has actually been found that co-management arrangements may largely be driven by desires to establish mechanisms for allocation of resource access. Very often management measures are selected for their political feasibility, e.g. technical measures that affect many fishers equally or similarly are much easier to implement than quotas and area closures that affect some fishers much more than others. This reality has, of course, played an important role in the development of fisheries co-management programs. Advocates of co-management have often pointed to co-managements' important role in conflict resolution, both directly through facilitating negotiations and by identifying the most appropriate measures as shown in Case study 2 on page 22. Studies of existing co-management efforts have turned up another critical dynamic: conflict can be an important motivation for fishing communities to become involved in co-management. Co-management efforts often increase the influence of government authority in the fishing community. Communities can use this increased authority, for example, to exclude outsiders that they do not want in their fishing area.

### **Gear conflicts**

Many fisheries conflicts are between users of different types of gear. One particularly serious form such conflicts take is between large-scale, mechanized, industrial fishers and small-scale, artisanal fishers usually fishing further inshore. These conflicts exist throughout the world. In Cote D'Ivoire, ensuring that industrial fishers stay their legally mandated distance from shore is the basis of artisanal fishers cooperation in rule enforcement. Artisanal fishers' need for protection against industrial fishers is a primary motivation for co-management in Mozambique and the Philippines as well. Other conflicts that have motivated co-management participation include competition between different artisanal gears, conflicts between gill nets and seines common in Africa, and conflicts on different understandings of property rights as seen in Case study 4 on page 25. In Benin, a conflict between a local management system that was based on the assignment of rights to fish in particular areas, and fishers who wished to use fish aggregation devices almost led to violence and increased government involvement in management. We have found the desire to use government authority to exclude outsiders from fishing grounds playing an important role in co-management programs in Cote D'Ivoire, Laos, Malawi, Nigeria, Thailand and Zambia (see cases in Norman et al. 1998 and Viswanathan et al. In press). A co-management program in Laos has found an innovative way to channel the motivation to exclude gears used by outsiders into both conflict resolution and effective resource management: it operates on the principle that any community can ban any gear within their zone as long as everyone, insiders and outsiders, are equally effected. Another issue that is arising in several African



cases is that local co-management committees are asking for greater policing powers, almost to the point where they would become an arm of the government rather than its partner.

### **Excluding others**

Some partners in a co-management arrangement may see the arrangement as a mechanism to exclude other groups from access to the resource. An example of this was seen in Lake Chiuta in Malawi. Weaker groups including migrant fishers who have been regular resource users and may have legitimate historical rights to access may find themselves excluded because the co-management organisation is dominated by other users who use the organisation to acquire exclusive access rights.

### **Traditional authorities**

Both conflict and cooperation arise where multiple sources of authority are involved in fisheries co-management. Traditional claims to fishing rights play a strong role in co-management programs and, in both Africa and Asia, this has led to the increasing involvement of pre-colonial authorities in co-management programs. Research in both Indonesia and Malawi has found that the involvement of traditional authorities in co-management can lead to quicker conflict resolution. Other experience in Malawi and Zambia suggests that involving traditional authorities in co-management can be a delicate matter. The relationship between these authorities and the government can be an uneven one. Traditional authorities do not always operate in ways that fit well with the transparency and participatory decision-making that co-management is based on, and, most importantly, traditional authorities often have their own unique interests in the fish resource. In Mali, a co-management program based on local authorities was used by powerful interests to serve themselves rather than the fishers. The involvement of non-governmental organisations (NGOs) in co-management can also be delicate. NGOs play a critical role world wide in helping to initiate and build co-management programs. Failures in coordination between NGOs and local governments, however, have led to redundancies and even conflicts. Villages have found themselves with several different local resource management committees; one village in Malawi was found to have five at one time. It is always necessary to verify that new institutions are justified before they are established in terms of their expected roles not already fulfilled through existing mechanisms.

### **Managing scale issues**

An important issue with co-management is the issue of scale. The problem of scale refers to the transferability of both empirical generalisations and casual inferences from one level to another in the dimensions of space and time. At issue is whether and to what extent the causal mechanisms through which institutions affect behaviour at one level of social organisation, such as small-scale or micro level societies, also play key roles at other levels of social organisation, including national (meso-level) societies and international (macro-level) society and vice versa.

One example of scale issues in fisheries is the division of authority between community fisheries regimes versus national fisheries regimes and international regimes for highly migratory species of fish. Most studies of co-management arrangements have been

concerned with management at the local scale, involving one or a few communities. However, lessons learned from such situations may not or will almost certainly not be directly applicable to larger scale situations. The questions are therefore: Can co-management handle large-scale fisheries systems? If it can, what institutional arrangements are required to handle large-scale fisheries? Can the standard design principles for long enduring common pool resource institutions (clearly defined boundaries; congruence between appropriation and provision rules and local conditions; collective-choice arrangements; monitoring; graduated sanctions; conflict-resolution mechanisms and; minimal recognition of rights to organise) be scaled up to apply to higher levels of social organisation? What are the costs involved in scaling up and community participation? (Mustapha 1998).

Evidence from some efforts in the Philippines indicates that bay-wide or large-scale resource systems can be handled by co-managed institutions. However, these are still at the early stage of experimentation and new institutional developments are taking place such as bay-wide joint councils that aim to provide representation for the different communities of the larger group of fishers in the bay area.

In Bangladesh, the case of Beel fisheries is a good example of co-management success on a large scale where thousands of beels or enclosed water bodies are being managed jointly by NGOs representing fishing households. New institutional arrangements between Government and NGOs have emerged. Resources users set management objectives and participate in management with support from the Department of Fisheries (DOF).

# Conclusions and implications

**S**tudies of various co-management implementations have revealed not only potentials and benefits of co-management but also many unresolved issues and problems to be addressed. There is still a long way to go before a general understanding of various co-management systems and examples of solutions to all the major problems are available. A range of issues and problems need to be addressed:

## **Scale**

Developing co-management institutions on a larger scale than the local community: Many of the problems and issues facing fisheries can only be solved on a provincial, national or even international level. The resource systems on which fisheries rely are in most cases too large to be entirely within control of a few communities and fisheries management institutions must, therefore, be able to address problems of resource access and sharing on that level. The solution to this scale problem may be representation within nested systems, but this raises a new set of problems relating to mechanisms to ensure genuine representativity and to avoid a new process of alienation between communities and management.

## **Local and global**

Reconciling local and global agendas: International agreements on fisheries and environmental management are a special case of incongruence between scales. Means must be developed by which the governments can serve the double obligation of attending to international agreements while sharing power in setting objectives for fisheries management with the communities.

## **Knowledge base**

Identifying a knowledge base for management that is considered valid by stakeholders: The knowledge base for fisheries management should relate to the objectives of management and be considered valid by the stakeholders. A co-management system must develop mechanisms to reconcile formal scientific knowledge and fishers' knowledge about their resource system in a way that maintains scientific validity and wide acceptance. There are no easy solutions to this problem. One approach may be to identify indicators of the status of the resource system that are both supported by science and reflect fishers' observations (Ahmed 2000).

## **Conflict resolution**

Developing approaches to manage conflicts between resource users who have acquired exclusion rights to a resource through the co-management process and those who are excluded: There is a need to understand the mechanisms and actual reasons behind the alienation process of the different user groups to manage these conflicts.

## **Empowerment**

Developing appropriate approaches for empowering local communities to participate in the setting of management objectives through institutional reform: This may require substantial change in the way management authorities function to provide fisheries management services and changes in perceptions of stakeholders on the roles of fisheries management agencies.

## **Learning from experience**

These issues must be addressed by way of practical experiments with co-management. It is, however, important that such experiments are documented and the experiences communicated to others who may be in the process of establishing or developing co-management arrangements. It is, therefore, necessary that attempts to implement co-management are associated with independent research to document and disseminate the experiences.

## **Fisheries Co-management Research at the WorldFish Center**

In 1994 the WorldFish Center formally known as the International Center for Living Aquatic Resources Management (ICLARM), Malaysia; the Institute for Fisheries Management and Community Development (IFM), Hirtshals, Denmark; and National Aquatic Research Institutions in Asia and Africa started a five-year research project on fisheries co-management. The Danish International Development Agency (Danida) funded the project. The collaborative research project was based on mutual interest to gain practical experience in research on fisheries co-management, to demonstrate its applicability as a sustainable, equitable and efficient management strategy and to develop models for use and adoption by governments, fisheries communities, NGOs and others. The immediate objective of the project was to have a set of globally or regionally applicable fisheries co-management models developed and applied to selected aquatic resource systems in several countries and pilot sites in Asia, Africa and the Pacific. The overall purpose of the project was to determine the prospects for successful implementation of fisheries co-management strategies by systematically and comparatively documenting and assessing models and processes of fisheries co-management implemented at national government and community/fisher organisation levels as well as their results and impacts. Phase one of the project ended in 1998 and the second phase is for a further five years up to 2003. The findings from the project are used as examples in this policy brief.

## **List of Collaborating Institutions**

- Program for Land and Agrarian Studies, University of Western Cape, South Africa.
- Environmental Evaluation Unit, University of Cape Town, South Africa.
- Instituto de Desenvolvimento da Pesca de Pequena Escala, Mozambique.
- Center for Applied Social Sciences, University of Zimbabwe, Zimbabwe.
- Lake Kariba Fisheries Research Institute, Zimbabwe.
- Fisheries Department, Malawi.
- Department of Fisheries, Zambia.

- Institute for Fisheries Economics and Planning, Ministry of Fisheries, Vietnam.
- National Center for Social Sciences, Can Tho University, Vietnam.
- Department of Fisheries, Thailand.
- Department of Agricultural Economics, Kasetsart University, Thailand.
- Coastal Resources Institute, Prince of Songkla University, Thailand.
- Andaman Sea Fisheries Development Center, Thailand.
- Department of Fisheries, Cambodia.
- Living Aquatic Resources Research Center, Laos.
- Research Institute for Marine Fisheries, Indonesia.
- Indonesian Fisheries Socioeconomic Research Network, Indonesia.
- Department of Economics, Diponegoro University, Indonesia.
- Faculty of Economics and Management, University Putra Malaysia, Malaysia.
- Department of Fisheries, Malaysia.
- Southeast Asian Fisheries Development Center, Philippines.
- College of Arts and Sciences, University of the Philippines in the Visayas, Philippines.
- Southeast Asian Regional Center for Graduate Study and Research in Agriculture, Philippines.
- Tambuyog Development Center, Philippines.
- Department of Environment and Natural Resources, Philippines.
- Department of Fisheries, Bangladesh.
- Chittagong University, Bangladesh.

## LITERATURE: A READING GUIDE

The case studies referred to in this policy brief are documented in two conference volumes presenting the case studies of the Co-management project:

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## **CASE STUDY 1. Co-Management in Bangladesh – issues of equity**

### **KEY PROBLEMS AND ISSUES**

Inland fisheries are a major sector of the Bangladesh economy: 80 per cent of the rural households (about 70 million people) catch fish for food or income and 60 per cent of the national animal protein comes from fish. However, these inland fisheries are in decline from drainage, embankments, silting up of channels and over-fishing. Past projects focused on cultivating carps and not on small fish caught and eaten by poor people. The fisheries are subdivided for administration and have been leased out as a source of government revenue ignoring sustainability. Organizational support and incentives for cooperation among fisher communities to improve management were lacking.

### **CO-MANAGEMENT PROCESS**

Building on pilot studies going back to 1989, the WorldFish Center and partners have been undertaking action research on community-based fisheries management in Bangladesh. More intensive work started from 1996 under the Community Based Fisheries Management Project. Working in 19 inland waterbodies in Bangladesh. This partnership involves government, non-government organizations (NGOs), the WorldFish Center and donor support from DFID. The Department of Fisheries of Bangladesh has secured transfer of beels from the land administration and then provides access to fishing communities. Five NGOs, Bangladesh Rural Advancement Committee, Caritas, Proshika, Banichte Sheka and Centre of Rural and Environment Development have organised about 5 000 fishing households into groups that are represented in waterbody management committees, and also provided training and credit support. WorldFish Center with the other partners has monitored and assessed

institutional arrangements, household welfare and resource use.

Currently the waterbody or resource management committees for beels continue to function and take management decisions, but they are still dependent on NGO support for technical issues and particularly to resolve internal conflicts. A second phase will withdraw NGO support and assess the sustainability (resilience) of fishing community organisations and institutions. Evidence and media coverage generated from the project have influenced recommendations made for fisheries policy and particularly changes in the strategy for inland fisheries, which is now moving to gradual transfer of fisheries from the Ministry of Land to the Department of Fisheries for Community Based Fisheries Management approaches.

### **OUTCOMES**

Case studies undertaken by the project show that:

- Community based organizations of fishers, who are one of the poorest groups in rural society, can be developed.
- Fishers can improve transparency and representation within resource management by electing management committees.
- Locally decided rules (which restrict fishing) are perceived to be fair, and compliance by fishers and others in local communities is generally high.
- Participants in beels report significant increases in their influence and in ease of decision-making.
- These fishing communities are more effective in lobbying the government for fishing rights.
- However, these conclusions do not apply to rivers which the government made open access in 1995 and where there has



*continued from Case Study 1*

been no legitimacy for management committees to take decisions to limit fishing.

Large welfare impacts during a four-year period are not expected, but the evidence shows:

- A reduction in the share of benefits going to richer local landowners and moneylenders due to limits on fish

aggregating devices and access to cheaper credit through NGOs.

- Incomes have been variable but evidence indicates that participants have invested in improved homes.
- Catches in open beels have increased but vary between years.
- Where communities stock beels, production is higher and incomes are shared more equally.

## **CASE STUDY 2. Co-Management of Lake Malombe, Malawi – adaptability and exclusivity**

### **PROBLEMS AND ISSUES**

At the height of its productivity in the late 1980s, the estimated catch from Lake Malombe averaged over 10 000 tonnes annually. By the mid-1990s, this had declined to around 2 000 tonnes. While other factors could have also contributed to this dramatic decline, the most likely reasons were due to human factors - excess capacity, illegal activities such as use of undermeshed fishing gears, fishing during closed seasons and the introduction of new fishing techniques (e.g. the nkacha net) that were not covered by the existing regulations. The increasing resistance by fishermen to regulations and the inability of the Fisheries Department (the sectoral line agency) to enforce the existing regulations due to resource constraints and also failure to quickly detect and regulate new technological innovations meant that government was failing to bring order to an increasingly worrying situation. Following extensive consultations with stakeholders and external advisers, it was strongly felt that there was need for a shift to a regime that involved some amount of self-regulation by the fishers. This resulted

in the conception of the Lake Malombe/ Upper Shire River Participatory Fisheries Management Programme (PFMP) in 1993.

### **THE CO-MANAGEMENT PROCESS**

Since user participation was deemed to be a completely new experience for all stakeholders in the fishery, it was decided that this should be done on a pilot basis. This would provide room for learning and experimentation. The organisational set-up is that the (Mangochi) Fisheries District Office is the government side at the forefront while the fishing communities are represented by elected Beach Village Committees, with Village Headmen as ex-officio members of Beach Village Committees (BVCs). The government has revised the Act (duly passed in 1997) to cater for the new regime. Four particular changes were essential for the facilitation of the user participation: the introduction of flexibility to allow for regular review of policy and regulations; transfer of property rights over specified fish resources to communities; permission to allow plough back of some money from gear licence fees to BVCs to cater for their administrative costs and

incentives; and to provision for the transfer of management responsibility to local institutions when appropriate. It was stated that in the early stages, the Fisheries Department would retain decision-making powers but would consult fishers when making any decisions.

#### **OUTCOMES**

So far, co-management has had little impact in terms of facilitating recovery of the fishery. Several factors can be attributed to this, namely problems related to donor driven projects; poor compliance to new regulations; power struggles and incentive structures; facilitation of BVC elections by government; poor representivity of the BVCs; and external factors.

Being a multi-donor funded programme, this project had problems in differing (in some instances donor-driven) objectives and timeframes for implementation. The funding from the various projects was for a maximum of three to five years. The renege on the agreement to buy-out fishers using illegal gears and compensate those who wished to leave the fishery by one of the main donors knocked out a lot of the trust between the department and the fishers. It also meant

that fishers continued to use illegal gears and to stay in the fishery long after most of the inappropriate gears would have been retired from the fishery. Fishers continued to ignore the new regulations because they still had the gears that should have been bought from them and enforcement was still in the hands of the Fisheries Department in the initial stages. Fishers also gave economic hardship as a reason for the continued illegal activities. Since the Department facilitated the election of BVCs, fishers felt that it had a lot of influence as to who could be elected to the committees. The power struggles within and between committees and Village Headmen and misunderstanding about incentives for committee membership have contributed to problems of the functioning of BVCs. In most BVCs, the primary stakeholders (gears owners and crew-members) were poorly represented (less than 30 per cent), resulting in lack of ownership of the BVCs and resistance to their authority. Finally, the fishery is an employment of last resort due to lack of alternative economic opportunities in the area, which militates against the implementation of limited access and/or reducing capacity.

### **CASE STUDY 3. Fisheries Management in San Salvador Island, Philippines – organizing communities**

#### **KEY PROBLEMS AND ISSUES**

San Salvador Island is a 380 hectare island that forms part of the Masinloc municipality in the province of Zambales, Philippines. It is located on the western coast of Luzon, about 250 km from Metro Manila. The island had a population of about 1 620 persons consisting of 284 households in 1996. Fisheries depletion and unabated destruction of coral reefs began to be felt in the 1980s with rampant illegal fishing activities. The highly centralised national government of the Philippines at that time was too distant to control the situation while the San Salvador fishers themselves were too fragmented to embark on any collective action to avert resource degradation.

#### **THE CO-MANAGEMENT PROCESS**

Through the initiative of a Peace Corps volunteer, cooperation of the resource users and stakeholders, and the participation of a local NGO, a marine sanctuary and reserve was conceived in 1988. This joint effort, called the Marine Conservation Project of San Salvador (MCPSS) sought to enhance institutional capabilities, develop and implement a marine resource management plan, and establish a coral reef fish sanctuary and a marine reserve. Central to the achievement of the project's goal was the community organising process. This involved mobilizing the residents to take collective action on resource management problems. It involved intensive information campaigns to help residents realize the consequences of unsustainable resource uses and heighten their concern for nurturing their natural environment for their continued survival and livelihood. A core group of members drawn from committed residents participated in the project

activities and shared a concern for resource rehabilitation. The group spearheaded a campaign to support the 127-hectare marine sanctuary reserve of San Salvador. A local ordinance that banned fishing within the sanctuary and allowed only non-destructive fishing methods in the marine reserve was drafted by the core group in consultation with the fishers and the community at large. The Masinloc Municipal Council passed the ordinance in July 1989 thus providing government recognition for the regulation. The ordinance banned the *kunay*, a traditional fishing gear that uses a long scareline of coconut fronds for herding fish from the reef flat into a fine mesh net. Led by the Masinloc municipal government, law enforcement is now a collective responsibility of the government-deployed *Bantay Dagat* (coast guards), the fishers' organization, and the village police. In 1991, policy and legal support from the national government came through the passage of the Local Government Code, which gave the municipal government jurisdiction over municipal waters. The national government declared Masinloc Bay a protected seascape in 1993 under Presidential Proclamation No. 231. In July 1996, the San Salvador sanctuary won a prestigious national award for its achievement in coastal resource management and local governance, providing a source of pride to all partners and reinforcing the incentive to protect the sanctuary. The strength of this success laid in part in the involvement of resource stakeholders in project planning and implementation, well-defined objectives, supportive leadership, strong linkages with the municipal government and sources of technical expertise and funds, and generation of tangible project benefits.

*continued from Case Study 3*

Decision-making was participatory, marked by a series of consultations, dialogues, and public hearings to thresh out issues and conflicting interests, as well as interaction among partners.

#### **OUTCOMES**

Resource assessment surveys conducted at San Salvador in 1998, a ten-year period after the establishment of the marine sanctuary showed overall condition of living coral cover to have improved from an average of 23 per cent for the whole island in 1988 to 57 per cent in 1998. Fish species richness improved from 126 species

belonging to 19 families in 1988 to 138 species belonging to 28 families in 1998. These changes appear to have resulted from the control of destructive fishing practices and vigilant law enforcement by the community with the support of the municipal government. From the social side, the fishers perceived gains in equity. They perceived gains in the fair allocation of access rights, in household well-being, and household income over time. These outcomes are very encouraging given the context of a degraded resource base in the late 1980.

### **CASE STUDY 4. Co-Management in Mozambique – managing conflicts**

#### **The scale problem and interaction between artisanal and industrial fisheries in Moma/Angoche - Mozambique.**

##### **KEY PROBLEMS AND ISSUES**

Mozambique has a very long coastline. Small-scale artisanal fishers from coastal communities undertake the fisheries in near shore areas while semi industrial vessels (<20 m) are mainly involved in shallow water shrimp fisheries and industrial vessels fishing for shrimp and resources in deeper waters. The shallow water shrimp fishery (primarily at Sofala Bank) is in commercial terms by far the most important with an export of 8 000 tonnes worth US\$ 70 million in 1999.

There is a high concentration of beach seines along the coast of the Angoche and Moma districts (around 1 000 beach seines for 150 km of coastline). This area is the northern tip of the Sofala Bank, and several larger trawlers are fishing in that area part of the year.

This has created conflicts between artisanal and semi-industrial/industrial fisheries. Conflicts are caused by the operation of semi-industrial and industrial shrimp trawlers very close to the shore, resulting in beach seine destruction and a probable negative impact on fish stocks and nursery areas. Fishers are allowed to claim reimbursement for the destroyed gear, but the process is complicated, time consuming and slow.

Furthermore, semi-industrial/industrial fishers are claiming that artisanal fishers due to the use of small mesh sizes (using mosquito nets) are catching a high percentage of larvae and juvenile fish including small shrimps. This is claimed to have a negative impact on the shrimp resources. At the same time there is a very high by-catch of fish in the shrimp fishery leading to a waste of resources. In their traditional canoes artisanal fishers go to the trawlers and collect the fish by-catch from shrimp trawlers. This by-catch is often the

major source of income for artisanal fishermen, and provides proteins for the poorest people. The two types of fisheries operate at very different scales. A single vessel in the industrial fleet can be fishing over the entire Sofala Bank, whereas the artisanal fishers primarily fish in near shore areas adjacent to the residential community, although migration along the coast is frequent among artisanal fishers.

The Fisheries Master Plan approved by the Mozambican government in October 1994 sets the priorities and strategies for development to be pursued in subsequent years. With regard to the management of small-scale fisheries the Master Plan lays emphasis on the involvement of fishermen in setting and enforcing the management regimes.

#### **THE CO-MANAGEMENT PROCESS**

In the Master Plan co-management was introduced as a management tool to regulate artisanal fisheries. Co-management has been implemented at the national level (consultative body). In January 1997 a fisheries management committee, *Comissão de Administração Pesqueira* (CAP), was established including fishers' representatives from the artisanal as well as the semi-industrial and industrial sectors. Co-management has also been initiated at district and local levels. The co-management

arrangement in Moma-Angoche is the best known local example. CAP is an advisory body for the Minister that meets four times a year to make recommendations on the management measures they feel are necessary in order to manage the national fisheries.

#### **OUTCOMES**

The process of establishing consultative committees in the Moma and Angoche districts with representatives from both the fishing communities and from the various government agencies involved in small-scale fisheries management has been an important step towards the implementation of a co-management arrangement. This arrangement has established some sense of responsibility among fishers. Most fishers are aware that the use of mosquito nets leads towards resource degradation and gradually fishers are increasing the mesh size.

The higher degree of representation by artisanal fishermen in CAP, together with the fact that this has led to banning semi-industrial and industrial trawlers three miles from the coast, has been a major achievement for the local committees, based on a co-management approach. The co-management arrangements have thus served as a means to mediate conflicts between fisheries operating at very different spatial and organisational scales.