

An Assessment of Co-management Arrangements Developed by the Community Based Fisheries Management Project in Bangladesh

**PAUL M. THOMPSON, PARVIN SULTANA,
MD. NURUL ISLAM and MD. MANJUR KABIR**

International Center for Living Aquatic Resources Management, House 75 Road 7, Banani, Dhaka

MD. MOKAMMEL HOSSAIN and MD. SHAMSUL KABIR
Department of Fisheries, Matshya Bhaban, Ramna, Dhaka

THOMPSON, P.M., P. SULTANA, M.N. ISLAM, M.M. KABIR, M.M. HOSSAIN and M.S. KABIR. 1999. An assessment of co-management arrangements developed by the Community Based Fisheries Management Project in Bangladesh. Paper presented at the international workshop on fisheries co-management, 23-28 August 1999, Penang, Malaysia.

Introduction

This paper is based on an action research project undertaken by seven organizations: International Center for Living Aquatic Resources Management (ICLARM), Bangladesh Department of Fisheries (DOF) and five development NGOs. Community management arrangements were developed in 19 state owned waterbodies in Bangladesh over about 3 years. The paper reviews the progress of the project based on a series of case studies compiled for each waterbody, and tries to identify the factors resulting in differences in institutional arrangements and that appear to determine the extent to which community-based management of these fisheries may be considered successful. The issue of conflicts and of cooperation through community-based management are highlighted.

Context

The four million ha of openwaters in Bangladesh are among the world's richest and most complex fisheries. The rivers, *beels* (permanent and seasonal lakes and wetlands), *baors* (oxbow lakes), *haors* (large deeply flooded depressions), and floodplains support some 260 fish species (Rahman 1989). About 80% of rural households catch fish for food or to sell (this study), and fish contribute about 60% of animal protein consumed (BBS 1997). However, the many "miscellaneous" small fish caught from the floodplains by poor people have been neglected in official statistics and policies, yet they are the accessible and preferred food of poor people. Some also provide relatively more micro-nutrients than do the fish favored by fish culture (Flood Action Plan 16 1995; Thilsted et al. 1997).

Fish habitat destruction due to roads, embankments, drainage and flood control, and natural siltation, along with overfishing, have been commonly cited as major causes of the deterioration of the country's fishery resources (Hughes et al. 1994; Ali 1997). The National Water Policy (Ministry of Water Resources 1999) has recently emphasized reserving wetlands for fish in a reversal of past trends. However, past fisheries policies have discouraged local institutions for fisheries protection and sustainable management.

There are over 12,000 *jalmohals* (state fisheries generating government revenue) in Bangladesh. They have been leased to the highest bidder with a preference for fisher cooperatives but very often, either directly or by bidding through a cooperative, control came into the hands of rich and influential lessees. It has been widely believed that fishers suffer not only from declining catches but also from exploitation

under this leasing system. Lessees usually sub-lease to agents on condition of receiving a profit (a share of the resource rent) or allow fishing by as many fishers as are willing to pay user fees set to ensure a profit beyond the lease cost and their operating costs (Ullah 1985; Naqi 1989; McGregor 1995). Toufique (in press) has argued that fishers have failed to gain fishing rights under the leasing system mainly because they have high transaction costs and are less able to enforce property rights than are socially powerful lessees who can prevent unauthorized fishing by threat and by social pressure.

In 1986 in response to these problems and lobbying by the national fishers association, the Government of Bangladesh initiated a New Fisheries Management Policy (NFMP) and responsibility for nearly 300 waterbodies was transferred by Ministry of Land (MOL) to the DOF. Under this arrangement DOF was to operate a licensing system for individual "genuine fishers" (those whose livelihood depended on catching and selling fish). This policy aimed to save fishers from exploitation by influential middlemen, and to ensure proper conservation of fishery resources whereby DOF would limit the number of fishers to ensure maximum sustainable catches (Ahmed et al. 1997).

In practice NFMP brought some recognition of fisher rights at least through licenses but there were a number of limitations. Fishers were unable to exclude outsiders including past lessees and middlemen and in many cases continued to depend on them to help fund license payments. DOF also found it easier to deal with a few fisher leaders in arranging collection of revenue, rather than with many individual fishers and fishing teams in each waterbody. DOF also found it difficult to enforce fishing only by a fixed number of license holders. Unlike the lessees, who could hire an army of enforcers if needed, DOF staff cannot easily mobilize magistrates to catch or fine unauthorized fishers. Moreover, the yearly licenses with the possibility, but no guarantee, of indefinite renewal did not give poor fishers the secure use rights that the NFMP hoped to provide. Licensing retained the revenue orientation of fishery management because a condition of the policy was that the total revenue would rise by 10% per year from the earlier level, so no assessment of appropriate levels of taxation was made.

Fishery administration has become more complex since 1995. In September 1995 open waters were declared free of revenue collection and open access. Consequently revenue collection from flowing rivers ceased and they are no longer leased out. Leasing in other waterbodies has continued. However, leasing of closed waterbodies of up to 20 acres (8 ha) were handed over to the Local Government Division from 1996 and then transferred to the Ministry of Youth and Sports in October 1997.

There are still waterbodies handed over to DOF for projects where DOF collects revenue with fixed increments of 10% each year. In these cases revenue is usually collected through licensing under the NFMP framework. The Community Based Fisheries Management (CBFM) Project is one such project but it has greater flexibility for local arrangements to be made for revenue payment by fishers with advice and supervision from NGOs and DOF so long as the required total amount is collected.

Community Based Fisheries Management Project

The CBFM Project started field activities in different locations from late 1995 to mid 1997. The project is a partnership of government (DOF), five NGOs - Caritas, Proshika, BRAC, Banchte Shekha and CRED, and ICLARM. The project was designed as an action research project to test and assess alternative local fishery management arrangements that might achieve greater efficiency, equity and sustainability. Specific objectives were to:

- * develop a framework for community based fisheries management, by testing alternative models of GO-NGO-fisher collaboration;
- * ensure more sustainable exploitation of openwater fish resources, including protecting natural recruitment of indigenous species to the fisheries for future generations;
- * promote an equitable distribution of benefits from fisheries to community people;
- * provide alternative employment and income generating projects to fishers to compensate for reducing exploitation to more sustainable levels and to improve incomes during the lean season;
- * reduce illiteracy among fishers by providing adult literacy courses;

- * develop an integrated systems view of human community - fisheries resources relationships;
- * understand the role of local institutions, traditional practices and ecological knowledge in regulating access to, and patterns of exploitation of, the fisheries; and
- * generate and disseminate policy-relevant information to foster informed debate and advocate necessary policy change.

Hand over of waterbodies from the MOL to DOF forms the basis for co-management under the project, but delays meant that in some sites the partner NGOs were active for over one year without clear rights for the communities they work with to take management responsibilities (Hossain et al. 1998). Out of 28 proposed waterbodies the project has been working in 19 comprising: flowing rivers, open floodplain beels, and semi-closed beels and baors. Throughout the project there has been no government recognition of community or DOF rights for co-management of eight of the rivers. Key features of project waterbodies are summarized in Table 1, and locations are shown in Fig. 1.

Table 1. Waterbodies under the Community Based Fisheries Management Project.

No.	Waterbody	District	Area (ha)	NGO	Start	Status and progress
1	Kali Nodi	Kishorganj	800-1200	Proshika	Jul 1992	Open access, RMC formed 1998, not set any fishing limits so far
2	Titas River (ka)	Bbaria	395	Proshika	Jul 1992	Open access, RMC formed 1998, reduced conflict
3	Titas River (Gokon-Goshaipur)	Bbaria	208	Proshika	Jul 1992	Open access, RMC formed, conflicts with neighboring areas, fishing rota established
4	Boyral River	Netrakona		Proshika	Jul 1995	Open access, silting up, katas increasing
5	Moisherkandi Bornpur River	Kishorganj	127	Proshika	Jul 1995	Under NFMP, fishers limiting access
6	Dhaleswari River	Bbaria	550	Proshika	Jul 1995	Open access, RMC formed, also NFMP on north bank of same river
7	Jari Jamuna-Bachamora River	Manikganj	1620	Proshika	Jul 1995	No effective activities, river course changes, part leased out by MOL as a Pangas sanctuary
8	Tetulia River	Bhola	na	Proshika	Jul 1995	Large open-access estuary, only part covered
9	Ashurar Beel	Dinajpur	200-400	Caritas	Jan 1996	Local fish sanctuary from 1997, also closed season, BMC elected
10	Hamil Beel	Tangail	16	Caritas	1995	Stocked and managed by fishers, BMC elected
11	Ubdakhali River	Netrakona	55	Caritas	Jan 1996	Under NFMP, DOF confused in link with CBFM
12	Rajdhola Beel	Netrakona	53	Caritas	Jan 1996	BMC elected, stocked by fishers
13	Dikshi Beel	Pabna	14-250	Caritas	Jan 1996	Past conflicts among fishers and with outsiders, BMC excavated 0.3 ha reserve in 1999
14	Goakhola-Hatiara Beel	Narail	2-250	Banchte Sheka	Nov 1996	BMC of all stakeholders protected kuas in 1998 and 1999
15	Arial Kha River	Narsinghdi	40	CRED	Nov 1996	RMC established sanctuary and pen culture
16	Dum Nadi Beel	Rangpur	58	BRAC	Jul 1997	Stocked and managed by fishers, BMC elected, transparency in accounting still to develop
17	Ruhia Baisa Beel	Rangpur	29	BRAC	Jul 1997	Stocked by fishers, local government helped when outsiders tried to take over
18	Shemulia Baor	Jessore		BRAC	Jul 1997	Outsiders dominate and control fishery
19	Krishnochandrapur Baor	Jessore		BRAC	Jul 1997	Stocked and managed by fishers, BMC elected, fishers divided by lease auction in 1999

Notes: BMC = Beel Management Committee; RMC = River Management Committee

Action design

The DOF ensures the availability of inland open waterbodies and involvement of its staff in the project, including for surveys and monitoring. Administrative responsibility for waterbodies under the project was to be handed over from the MOL to the Ministry of Fisheries and Livestock (MOFL) and on to the DOF. DOF represents the government in co-management arrangements that involve increased community participation in fishery management. This means ensuring that revenue is collected by the fisher communities with NGO support, facilitating local administrative support to define and protect the fishers' use rights, and providing technical advice for sustainable and sound fishery management.

The NGO partners have formed groups of fishers meeting their own poverty criteria; supported these groups with education, training and credit; raised awareness of fishery management problems; and helped the fishers develop institutions and techniques for managing the fisheries. Direct impacts of NGO activities should include access to credit (at lower interest rates than informal sources) and improved livelihoods. All of the NGOs target poor people the common criteria is that their participants should not own over 0.5 acres (0.202 ha) of land. However, each NGO follows its own approach and one objective of the project was to assess the merits of different NGO approaches to CBFM. To understand this aspect the characteristics of each NGO's activities are reviewed here. The combination of waterbodies and NGOs means that only partial comparisons are possible.

In the case of **Caritas**, groups of fishers have been purpose-formed for the project, with a Caritas field worker posted at each waterbody specifically for CBFM activities. Generally all of the fishers recognized as regularly fishing for an income in the waterbody have been included in these groups, but in some cases fishers not meeting the group membership criteria have been left out or were left out due to local disputes. Most subsistence fishers from the same villages and using the same waterbodies are not organized in groups. The organized groups are represented in a management committee for the waterbody. The overall framework adopted is known as DEEDS (Development Extension Education Services) by Caritas, and involves a phased plan of establishing a local people's organization or federation of the groups in a thana (sub-district), which then manages its members' activities and own credit and savings programs (Shelly et al. in press). Caritas aims to incorporate fishery management within this framework in four phases:

1. 3 years to establish groups and CBFM;
2. 3 years to consolidate CBFM (all 6 years with donor funding);
3. 3 years of phased withdrawal of NGO support as the community takes over management of the waterbody and the people's organization strengthens to become self reliant; and
4. a final indefinite phase when all responsibility for the fishery rests with the fishing community supported by the local people's organization, with minimal advice from Caritas.

The approach adopted by **BRAC** in the CBFM Project is similar to the one it adopted in previous projects: Oxbow Lakes Project II (Middendorp et al. 1995) and BRAC's own baor program which arose from experience on the former project (Hossain in press). Groups of poor people (mainly but not exclusively people who fish for an income) and who may or may not have as a nucleus an existing fisher cooperative society, have been formed to take exclusive control over semi-closed waterbodies suitable for artificial stocking. The aim is for the organized fishing community to manage the fishery itself where all members have equal rights and share costs and income, with credit provided by BRAC. In some cases BRAC is effectively attempting to reform existing fisher cooperative societies that already held rights over a beel/baor through leasing. This involves gradually excluding richer people who are not directly involved in fishing and making management more transparent and accountable to the general members. BRAC also undertakes general development work to help the wider community living around these waterbodies, including education, health and sanitation.

Proshika has focused on flowing rivers, which unfortunately became open access at the same time as the project started. In the resultant policy confusion and local power struggles, Proshika's main strategy has been limited to organizing traditional fishers in groups and providing training and credit for both fishery related investments and alternative income sources (Huq et al. in press). One focus has been credit for women and men to process (mostly drying) fish when they are abundant and to market them later when prices are higher. Awareness is raised of the problems resulting from widescale capture of brood fish and fry and from overfishing and use of illegal gears, including *katas* (brushpiles used by rich non-fishers to establish rights over part of the fishery and to aggregate fish. But the open nature of these fisheries and lack of coordination among separate fishing groups has given little incentive for fishers to cooperate to limit gear or seasonal fishing that might otherwise increase overall catches.

Banchte Shekha only works with women, and under the project works in one seasonal floodplain where it has formed groups among women who fish mainly for subsistence. These participants take a lead role, but for fishery management other stakeholders - male fishers, farmers, and local leaders have been included in a management committee.

CRED is a local NGO founded by influential leaders in its working area, where it has worked with the fishing community around a secondary river that is currently free access. Besides organizing groups of fishers, their main activity has been to work with elected local council members and influential people from the area to help them promote more sustainable fishing practices.

Research design

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

Fish catches and fish markets were monitored in each month of 1997 and 1998 in each site. Fish consumption by samples of households was monitored in detail in four sites for a special study. Other special studies supported included studies of the biology of indigenous fishes, a study of lease values and pilot work on indigenous knowledge of fishes. Case studies were compiled for each waterbody covering the fishery in general, project activities, impacts, and institutional and management changes. These case studies form the basis for this paper.

Fishery characteristics

The 19 waterbodies or fisheries covered by the project have been categorized into "closed beels/baors", "open beels" and rivers. While these distinctions help draw out the main differences in fishery management and are important in understanding co-management institutions, they are not absolute distinctions. All of the "closed beels/baors" have some opening, and one is in part a seasonal floodplain within which there is an enclosed waterbody. The open beels differ in the extent of permanent water. Some rivers have little or no flow for part of the dry season, all connect to open floodplain areas including seasonal beels and smaller channels in the monsoon.

All of the "closed beels" are permanent lakes, their areas fluctuate with the seasons. The relatively few openings are easily blocked naturally or by fences and nets. This has enabled them to be stocked

artificially with carp (both native and exotic) which do not breed in the lakes and so must be stocked each year. All have been leased out either to fisher cooperatives or individuals, and stocked either by the lessees or by government in the past. Once they may have been visited by natural carp populations but there has been a general decline in native carp stocks. Such lakes still contain significant natural fisheries. A study supported by the CBFM Project (Haque et al. 1999) estimated catches of indigenous non-stocked fish of over 500 kg/ha/year involving just under 60 species in two moderately stocked lakes, catches of these fish were about 50% of this level in two heavily stocked lakes.

Open beels are shallow depressions, much land has been converted to agriculture and permanent water is limited to deeper areas and *kuas* (ponds and ditches dug to catch fish in the dry season). Most fishing is seasonal and many farmers and landless people catch fish for food. When it is inundated the private land becomes a common property fishery for people of the villages concerned, although the landowner has a priority for setting fixed gears (trap-fence systems). In two largely seasonal beels under CBFM Project at least 25% of estimated catch was from *kuas*, and landowners retain most of this income. Generally there are more openings in these beels, and they are largely capture fisheries of indigenous species. Many have been stocked with some carp in the past through government projects but this has been short lived.

The rivers range from secondary ones of some 50 m width to branches of the main rivers and estuarine areas several kilometers wide. In Bangladesh traditional "full-time" fishers are largely Hindu and form a clearly defined community where cooperative fishing in teams using seine nets is widespread. They are concentrated along the rivers. *Kata* have long been used to aggregate fish in rivers. The open access policy since September 1995 has encouraged poor Muslims to start fishing in rivers and encouraged landowners to invest in *katas*. The *katas* exclude traditional fishers from part of the fishery, although they are usually hired by the *kata* owners on a wage or share basis to harvest the *katas*.

Co-management arrangements and institutions developed

For fishery management the approach that evolved was to help the fisher groups to organize or be represented in local management bodies for each of the project waterbodies in the expectation that they would then be better able to cooperate, take collective decisions and develop local rules to regulate fishing. Indicators of this include the establishment of management committees, the level of participation of fishers in decision making regarding these fisheries, and the rules and decisions taken. Ultimately it is expected that fishery management will be improved in terms of sustainable fish catches (hopefully at higher levels than in the recent past) and in terms of a more equitable distribution of returns, with less going to fisher leaders, middlemen, moneylenders and leaseholders.

To achieve CBFM requires more than normal NGO programs or government enforcement of existing fishery laws. Local institutions are needed that promote sustainable fishing by defining who can fish where and at what times. Community investments in enhancing fish stocks may also be made. A key step in achieving this is for communities to have some forum or body that can take decisions and coordinate fishery management, since all of the waterbodies concerned are exploited by people from several villages. Representation of different stakeholders is an issue. People who fish for an income, who fish for food, who process or market fish, who invest in fish aggregating devices, floodplain landowners, boat operators, and local government are all stakeholders in the fisheries.

Because each fishery is unique in its social, economic and environmental characteristics, and because NGOs differ in their approaches, it was not expected that the same arrangements would evolve in each fishery. In the following sections the arrangements that have evolved in each type of waterbody are characterized. Table 2 gives details of the local committees formed, the stakeholders represented, and the management actions they have adopted.

Semi-closed beels

Five of the closed beels and baors have a functioning beel management committee (BMC), in each case it comprises only fishers representing each of the NGO organized groups of fishers. Under the umbrella of DOF support (fishing rights have been handed over to DOF for the duration of the project) groups of fishers have established exclusive rights. In three cases this built on an existing fisher cooperative (largely part-time Muslim fishers) and in two sites the groups cover the whole of a traditional Hindu fishing community. In one baor the project was unable to break the control over the fishers held by local influentials and mastans (musclemen) who paid for stocking.

Table 2. Institutional and fishery management arrangements in the CBFM Project in mid-1999 by waterbody type.

Attribute	Closed beel/baor (6)	Open beel (3)	River (10)
Maximum size (ha)	36.5 (16-58)	300 (250-400)	482 (40-1,620+)
Number of villages	4.8 (2-7)	8.7 (3-14)	11.8 (5-17)
Total households*	1,267 (250-3,560)	1,142 (355-2,100)	1,322 (530-2,220)
NGO participants	96 (60-135)	325 (215-509)	324 (37-1,155)
Property rights	Public jalmohals, in each the NGO participant fishers pay revenue for exclusive fishing rights.	Two are public jalmohals where NGO participants pay revenue for fishing rights. One is private land - a seasonal common fishery in the monsoon.	All public jalmohals: 2 under NFMP - licensed fishers have exclusive access; 1 leased by a fisher cooperative as a "fish sanctuary"; 7 open access.
Management committees (BMC or RMC)	4 BMCs, BMC never established in one site, one BMC lost lease and broke up in 1999.	3 BMCs.	9 RMCs on paper but only 4 have made any rules for fishing.
membership	Only leader(s) of each NGO group.	Only leader(s) of each NGO group (2). Group leaders (female), male fishers, landowners, NGO staff and local council member (1).	NGO group leaders, other fishers, local elites, FAD owners, DOF and local administration, NGO staff and local council members.
executive posts	Elected by general members	Elected in one, decided by NGO in 2.	Decided by DOF and NGO, but non-functional in all but one.
Fishery management decisions and rules by MC	In 5 fingerling purchase, closed season, guarding, rotational harvesting, sharing of income, taking loan to meet collective costs.	Sanctuary delineation and protection (2), habitat re-excavation (1), closed season (2), gear restrictions (2).	Sanctuary (1), fish culture in pen (1), limit fishing grounds and try to rotate fishing (3), several have committed to not use "harmful" gear but not enforced.

Note: * approximate figure from household census, note that some additional villages make use of some waterbodies.

In four sites the executive members of the BMC have been elected by the participants. The fishers collectively have taken credit from the respective partner NGO and their executive manages its use, freeing them of ties to traditional leaders, middlemen and traders who before controlled lease and fingerling payments.

Open floodplain beels

Only three open floodplain beels are covered by the project. BMCs have also been established, but the experience is more mixed reflecting the extensive use of these fisheries for subsistence fishing, a wide range of stakeholders, and their capture fishery and common property nature.

In two beels Caritas has only involved fishers organized in its own groups in the BMCs - where each group organized by the NGO is represented. The communities were diverse and at least the fishers have through the project now found ways to cooperate to protect fish in parts of the beels. They also have the focus of paying revenue and so can exercise some rights to enforce their rules and can call on the local government to back up their rights.

In the private floodplain of Goakhola-Hatiara Beel, Banchte Shekha works with women as its direct participants. In this Hindu community 97% of women fish seasonally, more than in any of the other

project areas. Although this NGO has the most focused target group orientation, it has helped establish a BMC that also includes male fisher representatives, landowners and local leaders. This BMC has protected some kuas as fish sanctuaries, and set a voluntary closed season to permit wild fish to breed. In 1998 the catch was 33% higher than in 1997, but water levels were also higher in 1998.

In all of these beels the NGO-organized fishing community has accepted fishing for food by other members of the wider local community (which was also previous practice). However, in each case there is a tendency for the NGO participants and the NGOs to look for production enhancements, and this may in future result in more barriers to fish movement and to fishing access.

Rivers

Free access and no revenue collection mean that in eight rivers there is now no formal basis for establishing territorial use rights. In Arial Kha River CRED established in 1997 a RMC incorporating both local leaders and fishers. Despite the lack of any official government support, in early 1998 the RMC agreed to set up a local fish sanctuary to protect broodstock of wild fish. The fishers in this river have less direct control of decision making and management than in the beels, but so far seem happy with the improvements achieved by local leaders. Support from local elites has made something possible when government has in other rivers largely abandoned any attempt to make exploitation sustainable.

In the other nine rivers NGO partners were reluctant to work with other members of the community who are not participants in their groups. DOF was reluctant to take a lead in developing local management committees as it had no clear instruction from central government and could not expect support from local administration. Furthermore, in all of these rivers there are strong divisions and conflicts among stakeholders. The target of the NGOs has been to mobilize traditional (largely Hindu) fishing communities, but their position in the fisheries has been eroded by:

- * richer landowners investing in katas;
- * increasing numbers of part-time and subsistence fishers using low cost gears; and
- * attempts by other influential groups to gain control of the whole river, for example associations of "Freedom Fighters" have argued that rivers are closed waters and so should be leased to them.

In 1998 DOF and Proshika agreed to facilitate the establishment of RMCs involving all the stakeholders. The aims of these RMCs were to be reducing conflicts, encouraging compliance with national restrictions on harmful gear, and possibly introducing local fish conservation measures. However, this has had limited success as the RMCs have no clear mandate or authority. In some rivers the RMCs have been able to reduce conflicts among the fishers. But the RMCs have had no effect where stronger outside influences had taken control of the fishery, or where local partner staff were uncoordinated or lacked interest, consequently some of the RMCs are no more than lists of names.

Conflicts and cooperation

The complexity of inland fisheries in Bangladesh and the often strong competition for control over these resources and the benefits (income and resource rent) that flow from them, mean that conflicts of various types are common. It was expected that CBFM and the local management committees that were developed by the project would help to improve cooperation among fishers and the wider community and that conflicts could be mediated. Interactions between fishers, between fishers and other resource users, specific interactions between fishers and others over control of the fishery through leasing, interactions between local administration and fishers, and three-way interactions between fishers, NGO partner and government (DOF) were documented for each waterbody. The interactions documented indicate the extent that CBFM Project activities and related factors have provided incentives to cooperate (Table 3).

In the rivers there are more examples of conflict than of cooperation. There are many examples of competition heightened by the lifting of leases and consequent open access, this has resulted in

encroachment of katas made by landowners in open river areas (Box 1), local influentials have also attempted to take control of rivers by having them declared closed waters (and thus leasable).

Table 3. Numbers of waterbodies over which different types of cooperation and conflict have occurred during the CBFM Project (numbers of waterbodies and main issues).

Interaction	Closed beel/baor (6)	Open beel (3)	River (10)
Fisher-fisher			
cooperation	5 ^a stocking, guarding, harvesting	3 sanctuaries, fishing limits	6 limiting access by outsiders
conflict	5 old v new leaders, exclusion	2 minor with influential fishers	9 over fishing grounds (usually between villages)
Fisher-other user			
cooperation	4 permit poor to fish for food	3 subsistence fishing	8 mostly that kata owners hire local poor fishers
conflict	4 encroachment, poaching, pollution	3 farmers over irrigation	9 kata construction by landowners, water abstraction
Fisher-other over lease			
cooperation	5 fishers pay lease	2 fishers pay lease	2 pay revenue, prevent outsiders leasing (rivers under NFMP)
conflict	5 ex-leaders, musclemen (1)	none	4 access, tolls on fishers
Fisher-administration			
cooperation	4 support for exclusive rights	3 support for BMC and enforcing its rules	7 preventing lease as closed water, boundaries
conflict	5 attempts to lease to others	1 over participation in BMC	8 tolls, not restricting katas
Fisher-NGO-DOF/GOB			
cooperation	6 to get and retain access for NGO-supported fishers	3 over fishery management plans	10 RMCs, against tolls and exploitation
conflict	4 generally government-fisher leaders v NGO and participants	2 minor - DOF alliances with part of community	8 govt. with fisher leaders ignore other fishers' interests

Notes: ^a in one baor this cooperation only lasted for one year.

There are also a number of cases of conflicts between fishing villages over fishing grounds, often this arises at the previous boundaries of jalmohals. However, there are a few good examples of cooperation from local leaders that has helped to resolve such problems: in mediating over fishing ground disputes (Box 2), in resisting the threat of loss of free access when outsiders have tried to gain control of rivers, and to establish a sanctuary in one river. Generally this has occurred because the fishers and local elites found a common interest in protecting a local fishery.

Box 1.

Conflicts in Open Rivers and the Kata issue

The underlying conflicts involving traditional fishers in most of the rivers are over kata (brushpiles that act as fish aggregating devices) and control of river fisheries through katas. Katas encroach on the open fishing area and accelerate siltation. Katas shelter a wide range of fishes, notably larger species including carp, large catfish and prawns that are now rare in the rivers. When owners harvest their katas they do not leave any fish as they enclose the kata with nets and harvest all fish. This has a severe impact on the fish population in the open rivers. General fish catches fluctuate between years but are now mostly small fish. Because of katas, fishers are unable to fish throughout the rivers and they are not even allowed to fish near the katas. Most kata owners hire local fishers to harvest their kata twice in the dry season when other fishing activity is low, most of the income goes to the kata owners, but the fishers are unable to make any direct conflict over katas as they depend on this work in the lean season.

It was found that the same people build katas in the same area as long as they can keep control of the area. They usually build kata in the river adjacent to their homestead. Kata size varies with the socio-economic condition of the people in the area and the status of the people investing in them. In Kali Nadi most of the katas are less than 15 decimals whereas in Titas G-G they average 74 decimals. In some rivers the number of katas is rapidly increasing (e.g. Boyrala and Dhaleshwari Rivers, Table 1). The River Management Committees (RMCs) have no control over the number of katas in those rivers.

In the rivers under CBFM Project, 74% of NGO-organized fishers (who comprise most of the traditional fishing communities) own less than 50 decimals of land. Yet landless people (owning up to 50 decimals of land) own very few katas (Table 2). Most of the katas are owned by richer landlords who are not from fishing communities. Moisherkandi River is one exception, the river is under New Fisheries Management Policy and, supported by the Thana Fisheries Officer, the NGO-organized fishers control the fishery and have made a few katas for their own benefit, this is coordinated by the RMC. Also in Arial Khan River the RMC is active and has persuaded people to reduced the number of katas (Table1).

Table 1. Number of katas in CBFM Project rivers.

River	1997	1998	% change
Moisherkandi	4	5	+25%
Arial Khan	31	25	-19%
Boyrala	22	51	+132%
Dhaleshwari	90	113	+26%
Kali Nadi	82	86	+5%
Titas Ka	115	120	+4%
Titas G-G	50	50	0%

Table 2. Percentage of katas owned by landless (less than 50 decimals).

River	1997	1998
Moisherkandi	100	100
Arial Khan	39	20
Boyrala	32	10
Dhaleshwari	14	11
Kali Nadi	38	36
Titas Ka	43	43
Titas G-G	2	2

Box 2.

Conflict Resolution in Titas Ka and Arial Kha River

There was a conflict for about 20 years between two fishing villages over rights to fish in the fishing ground on the border of the "Ka" section of Titas River, which also forms the border between two Thanas or sub-districts. The fishers from Shahbazpur and Rajamarakandi filed a legal case against each other in the district court in Brahman Baria. The fishers spent a lot of money trying to get control of this area but to no avail. The problem continued after the CBFM Project started. Meetings were held in the different fishing villages involving fishers, other local people, and local and headquarters officials. The problem was discussed in the meetings.

It was decided, at the suggestion of the project partners (DOF, ICLARM and Proshika - a national NGO), to form a River Management Committee (RMC) that could be a forum for the fishers and other stakeholders to discuss and hopefully resolve problems. The chairman of Shahbazpur Union Parishad (local council) helped to organize the RMC. He called a meeting in his office where the District Fisheries Officer, Thana Nirbahi Officer (chief administrative officer in a sub-district), both Thana Fisheries Officers, a representative of Proshika and fishers from both villages attended. After discussion in the meeting the fishers agreed:

- ◆ to withdraw their cases against each other from the district court immediately;
- ◆ since there was no clear demarcation of a section boundary in the river, the fishers from both villages agreed to fish in the areas they understood to be appropriate and to avoid competing to fish there;
- ◆ all fishers would comply with the decisions made in the meeting; and
- ◆ the local administration would take legal action against anyone breaking the decision.

It was agreed that if any problem arose the Union Parishad (UP) Chairman would take necessary steps to resolve it.

Similarly Arial Kha River has been an open access fishery since before the CBFM Project started. However, a RMC comprising UP chairman and member, fishers and local influential persons was formed. It has successfully motivated fishers and the general community to establish and observe a fish sanctuary in the river, to permit some fishers to cultivate fish in a pen in the river provided it did not hamper movement of boats, and to reduce the number of brushpiles (*kata*) made by non-fishers in the river.

In both cases the involvement of local elected leaders (UP chairmen) was critical as they are respected and powerful locally and so are well placed to mediate in disputes and to lead opinion. Their incentive to cooperate with the fishers was their involvement in the RMCs and their identification of the potential for non-controversial benefits for their political and social status.

In general there at least as many examples of cooperation as of conflict in each type of interaction in closed beels (where defined sets of fishers have exclusive control) and in the open beels (where management by a defined set of NGO-supported fishers and by a wider community-based body are both being tried). In all but one of these beels there has been strong cooperation within the fishing community. The exception is a baor where local musclemen had a strong financial hold on the fishers and by their local power and threats prevented the fishers from taking support from the partner NGO. However, cooperation within the fishing community is not enough when they must convince the land administration to give them preferential control over a fishery (Box 3). Elections have resulted in divisions among the fishers, but further elections give a chance for others to try their hand and the benefits of accountability and equality appear to outweigh the disputes in these valuable fisheries.

Assessment of CBFM

Criteria and indicators

Three broad criteria have been applied to judge the performance of co-management arrangements: efficiency, sustainability and equity (ICLARM 1996; Hanna 1996). The means of achieving these ends in a

community-based approach is based on empowerment of fishing communities through gains in economic power and livelihood security, and increased social status and roles in decision making. Table 4 lists indicators considered at the outset of the project.

Box 3.

Cooperation in Rajdhola Beel

Rajdhola Beel is a closed beel of some 53 ha that had been managed by a cooperative society and by individual lessees. Immediately before the CBFM Project started one outsider who owns a fish hatchery business had leased the beel for 3 years for an exceptionally high cost of 46% more than the previous lease to manage it by stocking fingerlings. He hired fishers from outside rather than from the traditional fishing community around the beel. The lessee faced regular quarrels with local fishers over fishing access and fishing for subsistence.

Caritas is a national NGO and one of the CBFM Project partners, at the start of 1996 it organized all the traditional fishers and motivated and trained them. In mid 1996 there was a conflict between the lessee and organized fishers over restrictions the lessee imposed on fishing. The local fishers resisted fishing by outsiders and they held a procession against the lessee and forced him to surrender his lease back to the district administration one year prior to complete of his tenure. The district administration then offered the beel in open bidding for a new lease, even though it was earmarked for management by local fishing communities from 1995 under an arrangement that the Department of Fisheries (DOF) would be given responsibility for ensuring that the fishers paid government revenue.

The DOF requested the Ministry of Land to abandon tendering. However, the Ministry of Land asked for an evaluation report from the Deputy Commissioner of the district. The fishers had shown their interest and that they could cooperate with each other in ousting the previous lessee. However, it required further pressure from DOF and the NGO through its personal contacts before the Ministry of Land agreed not to lease out Rajdhola Beel openly but rather to hand it over via the Ministry of Fisheries and Livestock to DOF for the fisher groups to control and manage it. The fishers received a legal document awarding them rights over the fishery on 26 August 1997 after Caritas helped them pay the lease costs through an interest-free loan.

Cooperation among the fishing community was necessary but not sufficient for them to gain rights for this fishery. Ultimately it depended on a combination of DOF, NGO and fishers to convince the land administration of government that it did not need to invite bids for the fishery but should favor the fishing community. Unfortunately the Ministry of Land's condition is that the poor fishing community must pay 25% more revenue as taxes for the right to the fishery than the previous lessee paid.

Table 4. Performance criteria considered for CBFM Project initiated co-management.

Criteria	Indicators
Economic	Improved standard of living for fishers/participants. Standard of living at least no worse for other poorer households.
Empowerment	Greater participation in fishery management. Greater influence by stakeholders over decisions.
Efficiency	Optimal rate of use of fishery. Benefits of institutions exceed costs (i.e. lower transaction costs, more efficient decision making).
Equity	Representation of range of interests (stakeholders). Process clarity - transparent management process. Homogeneous expectations among participants regarding management. Distributional equity: benefits in proportion to costs, or seen as fair by community members.
Sustainability	Stewardship - maintain productivity and ecological characteristics. Resilience of management system to cope with changes and shocks.

Qualitative assessment

In this section we review the performance of fisher-led management arrangements and related institutions developed under the CBFM Project along with the impacts of support provided by the NGO

partners as this was an integral part of the project design. However, within the 3 years of the project it is unrealistic to expect major achievements against all these indicators.

Over 80% of households in the project communities fish at least occasionally. The partner NGOs organized poorer households that fish for an income and, on average, have covered about 20% of households who ever fish in the project waterbodies. Most non-NGO households around beels only fish for household consumption, whereas 52% of non-NGO households along rivers also earn an income from fishing. The NGO-organized professional fishers on average were poorer than other households in the same communities. In beel areas in particular more non-NGO households are farmers and they own significantly more land than the NGO participants (Table 5).

Table 5. Household distribution by landholding in 1996.

Landholding size (100 dec = 1 acre = 0.4 ha)	Beel		River	
	NGO	non-NGO	NGO	Non-NGO
No. households	288	292	544	592
Average landholding (ha)	0.28	0.59	0.16	0.36
landless < 50 dec	61	43	74	62
marginal 50-100 dec	14	13	11	13
small-large 101+ dec	25	44	15	25
All	100	100	100	100

There have been some improvements in credit access and in living standards (economic indicators), although the differences between NGO participants and others are not large. These are illustrated in Boxes 4 and 5.

Box 4.

The aim was to reduce fishers' dependence on money lenders (for example for gear, paying jalmahal revenue and for stocking), to compensate for loss of income during any closed seasons established by the fishing communities, and to enhance household incomes. Data from the same households for 3 years indicates that the total amounts received have grown. In the rivers relative dependence on moneylenders has fallen to some extent and the, but the NGO participants now access substantial amounts of NGO credit while their neighbors are more dependent on sale and mortgage of land. In some beels fishers could not earlier afford to take credit for lease fees and stocking in beels, they now through NGO credit can pay for the right to control the fisheries rather than working for a lessee but have more debt. NGO credit has not relieved the need to sell assets, especially not in 1998 which was a flood year.

Box 5.**Changes in living standards in CBFM Project sites**

Comparing the same sample of households in all project waterbodies, in the rivers fishers have not gained much because of open access and the incidence of improvements in house structure was similar to that of non-participants. In beels, where fishers gained from stocking and sanctuaries, the participant households caught up to some extent in terms of house quality with their non-NGO participant neighbors who on average were richer than the NGO participants. NGOs raised awareness of how to improve sanitation for better health but there was no difference in the improvements in sanitation (latrines) between their participants and the general communities.

Percentage of households with wall or roof of tin/concrete/tiles/brick, reporting food deficit, and with improvement in latrine facility (1996-1998).

Year	Beel - Caritas/BS (5)		Beel - BRAC (4)		River (10)	
	NGO	non-NGO	NGO	non-NGO	NGO	non-NGO
Wall						
1996	2	15	na	na	13	20
1998	4	23	7	18	25	30
Roof						
1996	43	65	na	na	76	72
1998	66	77	67	74	82	78
Food deficit						
1996	36	28	na	na	38	42
1998	24	22	12	10	12	16
Latrine	40	32	20	23	33	33

Box 6.

The first task in empowering fishers has been to increase their participation in decision making. In the first two full years of CBFM in five beels over 80% of NGO members participated in fishery management meetings (on average 2.2 meetings in the first year and 4 meetings in the second). Participation in meetings in the rivers was less reflecting less coordinated NGO activities and fewer meetings as it took longer to initiate RMCs. Some 20% of all non-NGO participant households also attended at least one meeting a year, so the wider communities have also been involved. BRAC only started its activities in the second half of 1997 when a much greater level of participation in decision making was developed compared with 1996 when traditional cooperatives operated, but involvement of non-NGO participants in these four beels has been very low (all of these beels are stocked).

General participation in meetings related to fishery management is high compared with before the project (Box 6), so that NGO group members, and to some extent the wider community, have the opportunity to discuss issues and influence decisions.

It is not possible to say if fishing effort and catches are at any optimal level, given the complexity of the multi-species, multi-gear fisheries involved. But in some of the CBFM waterbodies compliance with new rules introduced by the communities has been good compared with the general situation where the Conservation and Protection of Fish Act, 1950, is largely ignored and unenforced. In the closed beels and baors the fishers are able to exclude others from fishing, but this was also the practice of the previous cooperatives and lessees. However, in Ashurar Beel (Box 7) there was previously little observation of any rules - when it was stocked by DOF just before the CBFM Project most of the fingerlings were reportedly caught soon after.

Box 7

Compliance with fishing rules: A case study of Ashurer Beel

Ashurer beel is a floodplain depression comprising a network of khals (channels) and deeper depressions that form a lake in the monsoon and through which water flows on its way to and from the connecting river. The professional fishers living around the beel were organized by Caritas – a national NGO – into 20 groups. From the fishers a 24-member Beel Management Committee (BMC) was first formed in 1997, the four executive officers were subsequently elected by the group members. A workshop was held in 1998 to discuss and agree on the fishing rules and guidelines that the BMC would follow in future. Through the workshop and BMC meetings the following decisions and rules have been adopted and later have been followed by the fishing communities:

- ◆ Any decision regarding the beel fishery will be taken on a participatory basis. Before sitting for the BMC meeting the group leaders who represent each group and sit in the BMC will discuss openly with the group members the agenda and take their opinions which they must then put forward during the BMC meeting.
- ◆ From 1997 making kata (brushpile) were completely banned. They were owned by fishers who agreed to move the branches into a new sanctuary established to preserve brood fish from fishing. Fishing within the sanctuary area is completely banned. The sanctuary area is clearly marked and signed and all people follow the rule. Since the sanctuary is a large brushpile it is not possible to poach there.
- ◆ Each fisher group has contributed equally branches and bamboo for the sanctuary in 1997 and again in 1999 as the original materials were rotting.
- ◆ To conserve fish stocks, fishing will remain closed from March to July each year. From March to May there is little fishing anyway because the water level is low, but fish breed in these months.
- ◆ Fishers agreed not to use harmful gears such as current jal.
- ◆ Fishers decided to place gill nets parallel with the flow through the beel and not cross-wise so that fish migrating through the beel would not be trapped excessively.
- ◆ The BMC will punish anyone not following the BMC's rules.

Sample surveys revealed that from 1997 all participants and non-participants knew of the sanctuary and in 1998 all participants and 65% of non-participants knew of the closed season. About half of the participants and over a third of non-participants knew of breaches in the rules. In 1997 there were no penalties, but after the workshop decisions the BMC has enforced the rules. In 1998, 82% of participants and 50% of non-participants knew of cases where people were caught and had their gear confiscated or were fined. However, it is reported that none of the members disobeyed any rule so far. Catch monitoring showed that only 8% of the total annual catch was caught in March-July in 1998. In 1998 total fish catch was estimated at 50 t compared with 32 t in 1997.

The earlier discussion of management committees highlighted the different arrangements with respect to equity. In the narrowly defined BMCs only NGO participants are represented, but among them there is a transparent process characterized by regular open meetings and elections of officers (compared with previous cooperatives dominated by one or two leaders) and equal sharing of costs and benefits (Box 8).

Box 8.

Equity and sustainability in Hamil Beel

In the closed beels there are few years on which to compare production under CBFM with earlier production (which was also based on stocking). In Hamil Beel, at 16 ha the smallest fishery in the project, a homogeneous set of people who already had fishing rights over the beel are the participants. In the first year of the project they achieved a 4-fold increase in production over earlier years. Equity improved notably: the participants share equally in investment costs, guarding the stocked fish, and in both harvesting effort and income. This has been at the expense of reduced access for subsistence fishing for non-members. However, in 1997 and 1998 production was between the 1996 and pre-project levels due to internal conflicts among the community between new leaders who have emerged through two elections and traditional leaders.

Thus based on case studies the qualitative assessment indicates that there have been benefits from CBFM in all the open beels (with both types of BMC), and in those closed beels where the fishers were not dominated by outsiders and could retain use rights (Table 6). In the rivers there have been some material benefits for fishers and in two the fishery appears to be better managed, but in other rivers open access and conflicts have been dominant.

Table 6. Outcomes of CBFM in mid-1999 by waterbody type.

Attribute	Closed beel/baor (6)	Open beel (3)	River (10)
Fisher incomes, assets and equity	Some increased with improved stocking, but also costs of lease and stocking high. Major improvement in equity - equal sharing of costs and benefits.	Some improvements through increased catches and additional income sources supported by NGO credit. Effort and catch depend on gear and individual interest.	Mixed, some improvements, but in some rivers probably falling due to increasing competition for fish.
Empowerment and decision making (representation)	All fishers with fishing rights represented, but subsistence fishers and landowners around waterbodies not represented.	All fishers with fishing rights represented, but subsistence fishers and landowners around only one waterbody represented.	All fishers and fishery stakeholders, but no clear mechanism for choice of representatives.
Empowerment and decision making (transparency)	Regular meetings, record keeping and accounts not yet well maintained by BMCs, but members awareness increasing.	Regular meetings, one local workshop to decide on main rules.	Limited, meetings held but decisions not enforceable and no clear representational arrangement to provide feedback channels.
Fish catches (sustainability)	Stocking-based component not yet financially viable in most, capture component open to fluctuations.	Fish catches increased in 2 beels in 1998 compared with 1997 following conservation measures.	No clear trend, but increasing numbers of <i>katas</i> in some rivers due to open access.
Efficiency: compliance and enforcement	Closed seasons enforced by fishers, some poaching when conflicts arise.	Rules, sanctuaries observed, some outsiders fish, fishers accept some subsistence fishing by poor.	Katas increasing though illegal, weak enforcement by DOF, fishers and RMC achieve some compliance in 2 rivers (one strong RMC, one under NFMP).

Quantitative assessment

To quantify how CBFM Project activities have affected people, respondents from each waterbody (both NGO participants organized for CBFM and non-participants) were asked to assess themselves changes in key indicators using a self-anchored 10-point scale adapted from a method used in Philippines to

assess similar coastal projects (Pomeroy et al. 1996). In general significant changes in indicators of empowerment (participation and influence) and institutional efficiency (ease of decision making) were reported in the beels (both closed and open), but the pattern of changes was less clear in the rivers as was to be expected (Table 7). Sustainability (wellbeing) was perceived to have improved mainly in the stocked closed beels probably due to stocking, any effects of conservation measures in other waterbodies were not seen until later in 1998. There was very little sign of any perceived greater improvement in economic condition among NGO participants compared with non-participants.

Table 7. Respondent assessments of changes in key indicators of CBFM performance assessed through comparison of mean scores comparing 1995 with late 1997.

Waterbody	General partic.		Fishery partic.		Fishery influence		Fishery decision ease		Fishery wellbeing		Household wellbeing		Household income	
	NGO	Oth.	NGO	Oth.	NGO	Oth.	NGO	Oth.	NGO	Oth.	NGO	Oth.	NGO	Oth.
Closed Beels														
Hamil Beel	S	S	S**	NS	S**	NS	S**	NS	NS	S	S	S	S	S
Rajdhola Beel	-S*	NS	S**	S	S	S	S	S	S	S	S	S	NS	NS
Dum Nadi Beel	S	S	S**	NS	S	S	S**	NS	NS	NS	NS	S	NS	NS
Ruhia Baisa Beel	S*	NS	S	NS	S	NS	S**	NS	S**	S	NS	NS	NS	NS
Shemulia Baor	NS	S	S*	NS	NS	NS	NS	NS	S	S	S	NS	NS	NS
Krishnochandrapur Baor	S	S	S**	NS	NS	NS	S	NS	S	S	S	S	NS	NS
Open Beels														
Ashurar Beel	NS	S	S	S	S	S	S	S	S	NS	S*	S	S	S
Dikshi Beel	S*	S	S**	NS	NS	NS	NS	NS	NS	NS	S*	S	S	S
Goakhola-Hatiara Beel	S	S	S**	S	S	S	S*	S	NS	NS	S*	S	S	S
Rivers														
Kali Nodi	S**	NS	S**	S	S**	S	S**	NS	S**	-S	S**	S	S**	S
Titas River (ka)	S**	NS	S**	NS	NS	NS	-S	NS	-S	-S	S	S	S	NS
Titas River (Gokon-Goshaipur)	S**	NS	S**	NS	S	S	S*	NS	NS	NS	S**	S	S**	NS
Tetulia River	S	NS	S**	S	S**	S	S**	NS	NS	NS	S**	S	S	S
Moisherkandi Bornpur River	S	S	S	S	S	NS	NS	NS	NS	NS	S	S	S	S
Boyral River	NS	S	NS	NS	NS	NS	NS	NS	S	S	NS	NS	S	S
Dhaleswari River	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	-S*	-S	-S	-S
Jari Jamuna-Bachamora River	NS	NS	S**	NS	NS	NS	NS	NS	NS	NS	NS	-S*	NS	NS
Ubdakhali River	NS	-S*	S*	NS	NS	-S	-S*	NS	NS	-S	-S	-S	-S**	-S
Arial Kha River	S	NS	S*	S	NS	-S	NS	-S*	-S	-S	NS	-S	NS	NS

Notes: indicators were scored by the respondents on a scale of 1-10 with 1 and 10 defined respectively as the worst and best conditions that the household could imagine for that indicator.

NS = not significant i.e. $p > 0.05$ and S = significant i.e. $p < 0.05$ in t-test comparing mean scores for 1995 and 1997.

* = significant $p < 0.05$ and ** = significant $p < 0.01$ in t-test comparing mean differences in score between these two years for NGO and other households, the symbol indicates the category of household that reported the greater change.

"-" indicates that the score in 1997 was lower than that in 1995 i.e. a worsening of the indicator.

Sources: 1997 impact monitoring survey.

Among the closed beels distinctions can be drawn between those where Caritas works (Hamil and Rajdhala Beels) where significant increases in most scores were recorded and the beels and baors where

BRAC works, of these the two beels recorded immediate improvements in decision making within 1997, whereas there was little impact in the two baors (and the general fishers do not now control them). The communities using the first four rivers generally reported some significant improvements, especially the NGO participants, although they were not able to take up any clear management plans. Similarly in Moisherkandi there were improvements in empowerment and efficiency, and here the fishers have remained licensed. No clear changes, even negative changes were reported in the other rivers, indicating the failure prior to RMC formation of NGO activities. Two rivers are complex. In Ubdakhali River there were previous disputes between fishing villages and conflicts over leasing and continued licensing that the partner NGO was unable to address adequately through a RMC of its members only (one faction of fishers). Arial Kha River has the most successful RMC in qualitative terms, but it is led by local influential persons and at the end of 1997 there was no clear improvement in management (after the survey a sanctuary was established). Thus the surveys form a base for comparison in later impact assessment.

Conclusions: lessons learned and future plans

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

Table 8. Opinions on appropriate balance between fishers and government for fisheries co-management in CBFM Project sites in late 1997 (% of respondents).

Attribute	Closed beels (6)		Open beels (3)		Rivers (10)	
	NGO	Non-NGO	NGO	Non-NGO	NGO	Non-NGO
No households	350	360	180	180	492	539
Government only	2	25	0	0	0	2
Government mostly	4	10	0	0	11	16
Govt. and fishers equally	52	36	48	45	68	62
Fishers mostly	38	25	15	13	10	12
Fishers only	3	1	35	36	11	8
Neither	1	3	3	6	0	1

A second phase of the CBFM Project is in an advanced stage of design. It seeks to maintain the focus of the earlier project that stresses the diversity of fisheries, flexibility of approach and need to learn by doing through substantial monitoring and research activities.

The second phase seeks to build on the experience of project partners and to expand into new locations. It aims to test co-management institutional arrangements to link local community management where wetlands and fisheries are large or are systems of smaller linked units. The new phase also seeks to incorporate expertise in fish habitat restoration, advocacy and awareness raising developed through other related projects supported by the Ford Foundation. It plans to advocate appropriate measures to support on a wide scale those community-based approaches that are found to be effective through sharing of experience with other projects, with the general public and with policy makers.

Based on surveys of fishing households, both those organized by NGOs and others, and on the initial experience of local management committees, some lessons can be drawn and the second phase aims to address them.

1. Establishing CBFM takes time where the fishers lack earlier fishery organizations or institutions. Major benefits should not be expected within 3 years. The second phase seeks to maintain support for

community management of waterbodies started under the first phase because local institutions created by the project are expected to be self-sustaining within five more years.

2. Community management has developed faster where there is a well-defined community and waterbody and where there were few conflicts or factions within the community. CBFM-2 will continue to work in all types of waterbody, but will focus action research on consensus building mechanisms and conflict resolution processes.
3. A clear intervention, which may be a visible conservation measure such as a sanctuary or an improved production technology, forms a focus for fishers to work together in the expectation of a tangible benefit. CBFM-2 aims to enhance the resources for communities to undertake habitat restoration and conservation measures.
4. Progress was better where the partner organizations locally had staff dedicated to the project and with sufficient autonomy to develop local initiatives. CBFM-2 would provide more NGO staff specific for the project and would support government staff to actively participate.
5. NGOs focused on poor people who fish for their livelihood. Compared with government the NGOs have considerable advantages in working with fishers. But in open beels and rivers an NGO cannot expect that its participants will have exclusive rights. They need to be more flexible to also assist communities to develop their own organizations and institutions for fishery management and to recognize that the community includes stakeholders other than their group members, otherwise negotiation with those stakeholders is not possible. In CBFM-2 more emphasis will be placed on multi-stakeholder management bodies in larger more complex fishery systems.
6. NGO training and credit for participants to take up productive enterprises has helped, even if incomes are not substantially higher. It gives poor fishers an option to reduce their ties to middlemen and moneylenders. It also helps fishers gain extra sources of income and this has encouraged some to take up and comply with local fishing restrictions (seasonal bans or sanctuaries). Credit will remain a substantial component of NGO support to fishing communities in CBFM-2.
7. Ad hoc government policies and lack of coordination, and a reluctance to support local communities establishing rights over openwater fisheries, are serious limits. Some parts of the government machinery appeared not to recognize that government had agreed to establish genuine local co-management arrangements between itself and fishing communities, for which the communities needed support and rights. CBFM-2 plans to include MOL and local administrations as explicit partners in the project and to test new models of management that would directly link them with fishing communities and management issues other than revenue collection.
8. The fishers often lack incentives and past experience of cooperating. Some form of revenue payment is needed for a specific spatially defined fishery if property rights are to exist in fisheries in Bangladesh. Without this there is no precedent for any territorial use right. International experience strongly indicates that community management is unlikely to take off unless communities have rights over defined fisheries. Arrangements developed by the CBFM Project in closed and open beels appear generally successful. However, changes are needed in the rivers. Common property rights and CBFM could be enabled in rivers while maintaining the policy of minimizing taxes on fishers in rivers. CBFM-2 aims to test this on a pilot basis, for example, leases may be awarded at nominal rates, rivers could be entrusted to local government (Union Parishad or Thana) for use by the people of that area, or local management agreements including allocation of fishing rights could be jointly supervised by land administration and DOF.

Already a number of projects in Bangladesh are adopting a community-based approach, and the CBFM Project is one reason for this trend. However, "community-based management" should not be seen as a panacea. Approaches adopted so far have not worked in all locations. Also it is all too easy to involve NGOs on a short-term basis to help fishing communities, without making a commitment to devolve fishing rights and responsibilities to local communities. The evidence is sufficient to warrant expanded piloting of different institutional arrangements for fisher-led management and co-management. Government should

enable these arrangements on a flexible but clear basis. Assessment of the results will then be used to advocate appropriate changes and strategies for fisheries in general.

Acknowledgements

The CBFM Project is a team effort, we thank the staff of DOF, Caritas, Proshika, BRAC, Banchte Shekha, CRED and ICLARM for their substantial assistance. We thank the management committees, participants and communities from all the waterbodies for their cooperation and hope that their efforts to improve fishery management will be recognized by government. Lastly we thank the Ford Foundation for supporting all the project partners, and Dr Doris Capistrano for initiating the project.

References

- Ahmed, M., A.D. Capistrano and M. Hossain. 1997. Co-management of Bangladesh fisheries. *Fisheries Management and Ecology* 4(3): 233-248.
- Ali, M.Y. 1997. *Fish, water and people*. University Press Ltd., Dhaka.
- BBS. 1997. *Statistical yearbook of Bangladesh*. Bangladesh Bureau of Statistics, Dhaka.
- Flood Action Plan 16. 1995. Potential impacts of flood control on the biological diversity and nutritional value of subsistence fisheries in Bangladesh. Flood Plan Coordination Organization, Ministry of Water Resources (unpublished report prepared by Irrigation Support Project for Asia and the Neareast).
- Haque, A.K.M.A., M.A. Islam, M.F.A. Mollah, and M.R. Hasan. 1999. Impact of carp stocking on non-stocked indigenous fish in the oxbow lakes of southwest Bangladesh. *In* Papers presented at a national workshop on community based fisheries management and future strategies in inland fisheries management in Bangladesh, 10-11 August 1999, Dhaka, Bangladesh.
- Hanna, S.A. 1996. User participation and fishery management performance within the Pacific Fishery Management Council. *Ocean and Coastal Management*, 26.
- Hossain, M.M., S.A. Rahman and P.M. Thompson. 1998. Building government-non-government organization-fisher partnerships for fisheries management in Bangladesh. Paper presented at the 7th conference of the International Association for the Study of Common Property, 10-14 June 1998, University of British Columbia, Vancouver, Canada.
- Hossain, M.M. in press. NGO as custodian for fisher groups in culture based semi-closed waterbodies: BRAC's experience. *In* H.A.J. Middendorp, P.M. Thompson and R.S. Pomeroy (eds.) *Sustainable inland fisheries management in Bangladesh*. ICLARM Conf. Proc. 58, ICLARM, Manila.
- Hughes, R., S. Adnan and B. Dalal-Clayton. 1994. *Floodplains or flood plans?* International Institute for Environment and Development, and Research and Advisory Services, London.
- Huq, M.F., M.A. Hossain and P.C. Dey. in press. Community based fisheries management experience with fishing communities along rivers: Proshika's approach and constraints. *In* H.A.J. Middendorp, P.M. Thompson and R.S. Pomeroy (eds.) *Sustainable inland fisheries management in Bangladesh*. ICLARM Conf. Proc. 58, ICLARM, Manila.
- ICLARM. 1996. *Analysis of fisheries co-management arrangements: a research framework*. ICLARM and North Sea Center, Manila.
- Middendorp, A.J., M.R. Hasan and N.A. Apu. 1996. Community fisheries management of freshwater lakes in Bangladesh. *Naga*, the ICLARM Q. 19(2): 4-8.
- McGregor, J.A. 1995. *The assessment of policy and management options in inland capture fisheries: summary guidelines*. Centre for Development Studies, University of Bath, Bath.
- Ministry of Water Resources. 1999. *National water policy*. Ministry of Water Resources, Dhaka.
- Naqi, S.A., 1989. Licensing versus leasing system for fishing access. pp. 83-92. *In* M. Agüero, S. Huq, A.K.M. Rahman and M. Ahmed (eds). *Inland fisheries management in Bangladesh*. Department of Fisheries, Dhaka, Bangladesh; Bangladesh Centre for Advanced Studies, Dhaka, Bangladesh; and International Center for Living Aquatic Resources Management, Manila, Philippines.
- Pomeroy, R.S., R. Pollnac, C. Predo and B. Katon. 1996. Impact evaluation of community-based coastal resource management projects in the Philippines. Research Report no. 3, Co-Management Research Project, ICLARM, Manila.
- Rahman, A.K.A. 1989. *Freshwater fish of Bangladesh*. Dhaka University, Dhaka.
- Shelly, A.B., S.M.N. Alam and M. D'Costa. in press. Organizing fishers for community based fisheries management: Caritas approach and constraints encountered. *In* H.A.J. Middendorp, P.M. Thompson and R.S. Pomeroy (eds.) *Sustainable inland fisheries management in Bangladesh*. ICLARM Conf. Proc. 58, ICLARM, Manila.
- Thilsted, S.H., N. Roos and N. Hasan. 1997. The role of small indigenous fish species in food and nutrition security in Bangladesh. *NAGA The ICLARM Q.* 20(3 and 4) 82-84.
- Toufique, K.A. in press. Property rights and power structure in inland fisheries in Bangladesh. *In* H.A.J. Middendorp, P.M. Thompson and R.S. Pomeroy (eds.) *Sustainable inland fisheries management in Bangladesh*. ICLARM Conf. Proc. 58, ICLARM, Manila.

Ullah, M. 1985. Fishing rights, production relations and profitability: a case study of Jamuna fishermen in Bangladesh. pp. 211-221. *In* Panayoton, T. (ed.) Small-scale fisheries in Asia: Socio-economic analysis and policy. International Development Research Center, Ottawa, Canada.