

GENDER AND LOCAL FLOODPLAIN MANAGEMENT INSTITUTIONS: A CASE STUDY FROM BANGLADESH

PARVIN SULTANA* and PAUL THOMPSON

Flood Hazard Research Centre, Middlesex University, Enfield, UK

Abstract: Floodplain wetlands are the major common pool natural resources in Bangladesh. Men do most of the fishing, but women collect aquatic plants and snails. A women-only, a men-only, and a mixed community based organisation (CBO) are compared, each of which manages a seasonal wetland. The CBOs involving women are in Hindu communities where more women use aquatic resources and belong to other local institutions. In the oldest of these CBOs, women have gradually increased their role as community recognition of their success has grown. In the Muslim community few women collect aquatic resources, and they have no role in the CBO. Community compliance was higher where both men and women played an active role in the process. Copyright © 2008 John Wiley & Sons, Ltd.

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1 INTRODUCTION

The four million hectares of inland water bodies and floodplains in Bangladesh are among the world's richest fisheries. These wetlands support 260 fish species (Rahman, 1989). About 80 per cent of rural households catch fish (FAP 16, 1995), and fish provide about 60 per cent of animal protein (BBS, 1998). However, fish consumption declined between 1995–1996 and 2000 by 14 per cent (Muir, 2003). In addition to fish, shrimps and crabs are used as human food. Mollusks are used as feed for domestic ducks and in prawn culture. About 13 species of wild wetland plants are eaten (Karim, 1993). Wetland plants are also used for fodder, medicine, mat making, fuelwood, and construction. Fishing is traditionally the preserve of men. Men believe that women have no role in fishing, even though women

*Correspondence to: Parvin Sultana, Flood Hazard Research Centre, Middlesex University, Queensway, Enfield, EN3 4SA, UK. E-mail: parvin@agni.com

collect non-fish aquatic resources. Therefore, men prefer to control decision-making of fishery management institutions.

The majority of rural women in Bangladesh are not only poor but also caught between two very different domains: one determined by culture and tradition that confines their activities inside homesteads and the other shaped by increasing landlessness and poverty that forces them outside into wage employment. Women are traditionally perceived as responsible for the household, childcare and family management. Consequently women have lower literacy (38 per cent) than men (52 per cent) (BBS, 1998) and comprise only about 30 per cent of the secondary and higher roll (BBS, 1998). Only 18 per cent of women participate in the labour force compared with 43 per cent of men (United Nations, 2000)—and earn significantly lower wages when they do.

Since the 1980s, the status of women and the amelioration of their disadvantaged position in Bangladesh has been a major concern of the NGO movement, which has made impressive strides in the empowerment and economic emancipation of women. New economic opportunities have also arisen; women from poor and female-headed households have taken culturally unaccepted work in new industries such as garment and shrimp processing factories. Only within the last two decades in Bangladesh have policy-makers, planners, researchers and society in general begun to consider and value women's economic contribution to food production and income generation.

This paper investigates the development of institutions for community management of floodplain and fishery resources vis-à-vis the different roles of women and men in community-based organisations (CBOs) and the effectiveness of these CBOs in terms of resource management. The paper focuses on a women-only CBO, a men-only CBO and a mixed CBO, all established primarily for the management of capture fisheries. Despite similar facilitation from the same local NGO, the three study sites differ greatly in the extent to which women are involved in resource management.

2 STUDY SITES AND APPROACHES

Floodplain beels are natural depressions that are flooded in the monsoon by rain and river water. The three seasonal beels presented in this paper are located in Narail district in southwest Bangladesh and are protected by flood control embankments along the rivers. All of the land within these beels is privately owned. Access to aquatic resources during the monsoon floods is free for all people from the surrounding villages. However, in the post monsoon period when water levels fall, landowners stake claim to fish trapped in their lands in shallow ditches that are purposely dug to catch fish (locally called *kua*).

2.1 Goakhola-Hatiara

Goakhola-Hatiara Beel (hereafter shortened to Goakhola) covers at its maximum extent around 250 ha. It is connected by a natural canal via a sluice gate to a river. Most of the lower land is cultivated with rice in the dry season. Important aquatic resources here are fish (mostly small resident species) and snails. The area remains under approximately 1.2–1.8 m of water for five to six months each year. The five villages around the beel are entirely Hindu communities. In December 2002, there were 455 households living around the beel; women from 270 of these households were already members of groups organised

by the NGO (Banchte Sekha). There are hardly any professional fishers, but most households catch fish at some time in the year, over a third sell fish, and the remainder fish only for their own consumption. Household incomes are relatively high and on average about half come from occupations such as business and employment in nearby towns or remittances, with only 9 per cent from aquatic resources.

2.2 Maliate Beel

Maliate Beel covers 100 ha just east of Goakhola Beel, and the two beels connect with another three seasonal beels in the monsoon. Water stays permanently in only 3 per cent of the area. One channel from the beel is connected to the river. During the dry season 70 per cent of the low-lying land is cultivated with irrigated high yielding rice, while the rest of the land is cultivated with other winter crops. Important aquatic resources are fish (mostly small resident species) and snails. The few high lands are occupied by homesteads. The four villages around the beel were inhabited by 450 households in December 2002; women from 250 of these households were already NGO (Banchte Sekha) group members. They are all lower caste Hindus. On average about 29 per cent of household incomes come from aquatic resources.

2.3 Shuluar Beel

Shuluar Beel covers at its maximum extent around 1000 ha. It is connected by a canal to two secondary rivers, but rainfall is the main source of water. All of the land in the beel is cultivated, mainly with rice. In 2002, there were 1803 households living in five villages around the beel; women from 261 of these households were NGO members. Approximately 90 per cent of households are Muslim. The status and education of women here differs from the other two beels: 22 per cent of women and 23 per cent of men in poorer households have attended 5 or more years of school, compared with 30 per cent of women and 24 per cent of men in Goakhola and Maliate beel areas. Almost all of the households catch fish at some point in the year. Half of the households are poor and depend on fishing and other aquatic resources for income, the other households fish for their own consumption. On average about 24 per cent of household incomes come from aquatic resources including fish, snails and aquatic plants.

2.4 Project Approaches

Since November 1996, the community of Goakhola Beel has been supported by Community Based Fisheries Management projects (CBFM-1, funded by Ford Foundation, and CBFM-2 funded by the UK Department for International Development). An NGO, Banchte Sekha, which only works with poor women, has facilitated the projects with support from the government and WorldFish Center (Thompson *et al.*, 2003). In late 2001, Maliate and Shuluar Beels were added to CBFM-2 (WorldFish Center, 2003). The approach adopted is to include representatives of all types of stakeholders in a Beel Management Committee (BMC) formed through selection by the community members, NGO staff and the Department of Fisheries.

In Shuluar and Maliate the selection of committee members followed a planning process with representatives of all the stakeholders identified as having interests in the beel using Participatory Action Plan Development (Sultana and Thompson, 2004). This involved stakeholder analysis; developing consensus among all stakeholders on priority common natural resource management problems and possible solutions; analysis of social, economic and environmental impacts of the solutions and development of an action plan. In Shuluar men (fishers and farmers) were found to be the main stakeholders interested to take action, Banchte Shekha had not worked with those communities before. A Management Committee comprising of men involved in the participatory planning was formed. In Maliate Beel women were found to be the main stakeholders interested in taking action, Banchte Shekha had already worked there with women to form groups that can access microcredit. Linked with the women's groups, a Management Committee comprising only of women was formed in Maliate Beel. In Goakhola Beel also, women play a key role. These committees have worked to improve the lives of poor people using the beel through improved management practices that are sustainable, equitable and are based on participatory decisions (Figure 1).

In addition, from mid-2003 Integrated Floodplain Management (IFM) has been promoted in Goakhola (Sultana *et al.*, 2005), with implications for the local institutions. The focus has been to improve overall floodplain productivity by linking decisions of individual farmers and collective action over private and common pool resources. It has helped farmers (who also catch fish for food) adopt dry season crops that do not require irrigation. For example, in Goakhola between 2003 and 2005, farmers reduced their area of irrigated rice and increased the area cultivated with dry season crops (pulses and potatoes) that demand less water from 2 to 22 per cent. They also moved some land into shorter duration irrigated rice, enabling earlier opening of the sluice gate to allow fish in, and expanded the area of early wet season rice. Use of surface water for irrigation fell to a third of the 2003 level, resulting in more surface water in the dry season to support the fish protected by the community.

Because Maliate is adjacent to Goakhola Beel, IFM has effectively been extended from Goakhola to Maliate. The BMC members and farmers of Maliate were invited to IFM activities such as field days, participatory assessments and exchange visits. After taking part in these, the community in Maliate formed a 15-member IFM committee, but nine of its members are women from the BMC and most of the men come from its advisory committee. They took up some IFM options but without external resources for demonstrations.

3 DATA SOURCES

For Goakhola, data comes from surveys undertaken by CBFM-1 and IFM since late 1997, including monitoring by local women of fish consumption for 30 NGO (Banchte Shekha) group members and 30 other households for a week each month and monitoring of sample fish catches and fishing effort (numbers of people fishing with each type of equipment) twice a month. Fish catches were monitored in Maliate and Shuluar from 2002. For 40 households in each of Goakhola and Maliate Beels, and 50 households in Shuluar Beel, the number of days that men and women were involved in aquatic resource related activities was monitored each month in 2003 and 2004.

Men averaged about 80 days a year fishing in all three beels. However, there are strong differences in women’s use of aquatic resources between Goakhola and Maliate Beels (which are Hindu communities) and Shuluar Beel where the majority of the community is Muslim. No women caught fish in Shuluar, but on average at least one woman (including girls) from a household spent about 40 days a year fishing in both Goakhola and Maliate (Figure 2a). Similarly no women work as day labourers in Shuluar, but in the other two beels women were just as likely as men to do daily labouring.

This does not mean however, that women in Shuluar Beel do not earn a livelihood from aquatic resources. About 60 per cent of women and children in all three sites catch snails

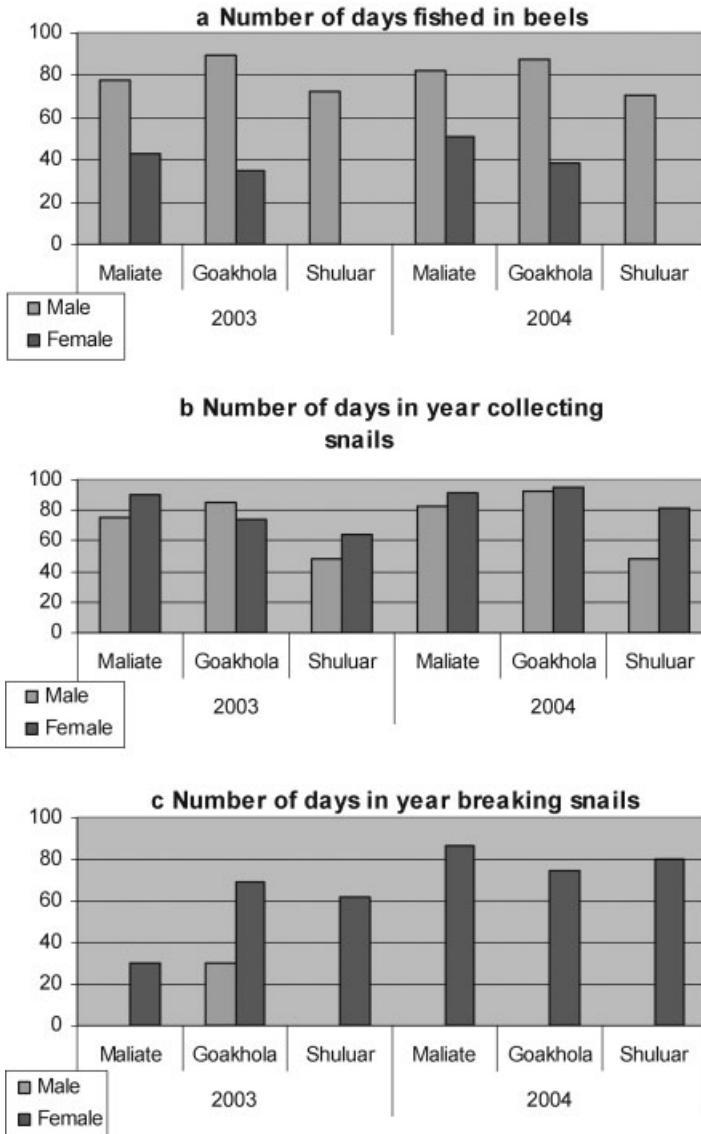


Figure 2. Number of days per household per year that men and women were involved in aquatic resource use

for household use or for income, and about 10 per cent of women are employed as snail breakers (Figures 2b and 2c). They sell snails to duck and prawn farmers. This has become a popular business in this region of Bangladesh where there has been a rapid expansion of prawn farming. While this provides an additional income source for women, it is increasingly held by local people that snails are overexploited.

Typically the women of Shuluar Beel who exploit aquatic resources are from very poor families without men to provide an income. Snails are only collected in the early morning when they can easily be caught as they float on the water surface; this is also when fewer men are around. Women break snails at home and sell to traders who come to their homes. In contrast, in the other two beels women from all categories of households catch snails whenever they have time, including when they are fishing.

5 FLOODPLAIN MANAGEMENT INSTITUTIONS

5.1 Goakhola-Hatiara Beel

The Beel Management Committee (BMC) was formed in 1997. Most of the members are farmers who also fish seasonally. The committee has always contained several women, all of whom are members of the microcredit primary groups formed by Banchte Shekha. Each primary group has 10–15 members, all female. The group members save regularly and have their own income-generating activities.

Table 1 shows how the committee has evolved since 1999. The BMC consists of group representatives, representatives of other stakeholder categories and local leaders whom the community and NGO selected. The BMC meets every month or more often as needed. They receive training in leadership, waterbody and fisheries management and accounting. All the members are literate and the women members also receive training to develop different individual enterprises. As the NGO facilitates no male primary groups, it cannot directly support men, who cannot fish for an income during the closed season (when the BMC bans fishing during the spawning season). However, credit is disbursed through the primary groups to women from those poor fisher households.

The BMC takes decisions through discussion with the primary groups, and has succeeded in taking up fish conservation measures. The women group members guard *kuas* protected as dry season fish sanctuaries in the day time while men in the BMC and husbands of the women guard at night. The BMC members make public announcements to inform the community not to poach in these sanctuaries and they claim that only 10 per cent of the community breaks the rules. Some people who fished during the closed season were punished when caught by the BMC members. The BMC has a bank account jointly operated with the NGO to which each member contributes, and the CBFM project has provided some funds. Moreover, the BMC successfully appealed to the Union *Parishad* (local council) chairman and got the lease to the *khal* (canal) free of cost to turn it into a fish sanctuary. For formal recognition, the BMC should be registered with the government, but this has not yet been possible.

Until 2003, there was an advisory committee composed of local male elites that helped the BMC liaise with local government. In 2002–2003 representatives from the BMC, farmers, fishers, a farmer field school and sluice gate operators formed an integrated floodplain management (IFM) committee that addresses a wider set of linked issues that the BMC alone had been unable to resolve, such as balancing sluice operation for crops and

Table 1. History and composition of Goakhola Beel Management Committee

Year	General body		Executive committee	Office bearers		Advisory committee
	Male	Female		Male	Female	
1999	19	8	None	President, Vice president, General secretary, Cashier	Only members	None
2000	19	8	None	President, Vice president, General secretary	Assistant secretary, Cashier	5 men
2001	19	8	None	President, Vice president, General secretary	Assistant secretary, Cashier	5 men
2002	22	9	None	President, Vice president, General secretary	Cashier, Communication secretary	5 men
2003	13	14	None	President, Vice president, General secretary	Cashier, Communication secretary	6 men
2004	16	11	8 men, 9 women	President, Vice president, General secretary, Assistant secretary,	Cashier, Communication secretary, Organising secretary, Women-issue secretary	None

fish. This committee coordinates the activities of all these local institutions. Of the 15 members, 6 are women from the BMC and the farmer field school. The advisory committee was disbanded in 2004 after the IFM committee was formed.

5.2 Maliate Beel

The institutional arrangement in Maliate Beel is similar to that for Goakhola Beel. The difference is that men were not interested in forming an institution to improve fishery management and so, given the strength of its primary groups in this area, Banchte Shekha helped the groups form a BMC in 2002 that comprised of 24 women from these groups. Observing that fishery resources are continuously depleted and that there was no conservation for future generations, women have taken a lead in fish conservation here. Not everyone in the community however, accepted the leadership of women in fishery management. Some men questioned the competence of women and a few started to catch fish to see how women would enforce the rules limiting fishing. Although, women were guarding sanctuaries during the day, at night it is not physically secure for women to be in the beel so they successfully asked their husbands to guard the sanctuaries.

The women felt the need to involve some men as advisors in order to better link with local institutions. An advisory committee was formed comprising of one woman and seven men; these are better off men who have substantial respect and influence in the community. In 2004, the advisory committee was reduced to the five most active men, and members of the BMC formed an executive committee of 17 women to make decision-making easier. The male advisory committee has played an important role in supporting the women. For example, the men talked to anyone who broke the rules to make them aware of the future impacts of not protecting fish, and subsequently the BMC reported that nobody from the community broke the rules. The men on the advisory committee also negotiate with the local government to support water retention and fish sanctuaries, and help the women of the BMC to access local officials.

Maliate BMC is registered with the Social Welfare Department, giving it a legal identity. It has a group savings, a rolling credit fund for income generation activities for women, and a fund for the BMC. The chairperson has been selected to be the vice-president of the District Committee against Women's Repression and she is also the secretary of the Cluster Committee that coordinates management of five connected beels including Goakhola and Maliate.

The Maliate BMC has also been adaptable, revising its management and rules in response to changes in the environment. For example, when the members saw juvenile fish or new species in the closed season they spontaneously motivated everyone to delay fishing so the fish could grow and the community could profit more.

5.3 Shuluar Beel

Before the CBFM project, this beel had never had any local institution for resource management or any development work. The community is mostly Muslim and women's voices are not heard. NGOs were not allowed to work freely with women so Banchte Sekha faced problems forming women's groups. During a Participatory Action Plan Development workshop that included women in separate sessions (Sultana and Thompson, 2004, 2006),

men did not allow women to come to the plenary. The men also did not allow women to join the BMC and formed a committee with a general body of 39 men. However, the BMC needed funds to establish sanctuaries, and men wanted credit for alternative occupations during the closed season. Banchte Sekha refused to lend to the men, so after 1 year the men allowed women to form a few groups. Women are now receiving credit. Eventually the BMC proposed adding women members so that they could publicise better management through contacts with other women, but this never occurred in a meaningful way. The original BMC was large and members were not attending meetings regularly, so in 2003, they reduced the general body by dropping those people who were inactive, retaining 29 men in the BMC and forming a nine-member executive committee that does not include any women. In addition, two women have in theory sat on the BMC since 2003, but they do not have a role in decision-making. Women in this beel do not identify natural resource issues as high-priority problems to the extent that they do in the other two beels, reflecting their lower direct involvement in exploiting these resources. The BMC reported that about 20 per cent of the community still breaks its resource management rules.

5.4 Changes in Beel Management Committees

The roles of women and men in Goakhola Beel have changed over time. This site has the longest history of CBFM and has always had men and women in its CBO. Between 1999 and 2002, about 30 per cent of the committee members were women; in 2003, this increased to 52 per cent, but from 1999 to 2002, there was a male advisory committee. Moreover, in 1999 all four office bearers were men so women's involvement in decision-making was limited; however, in 2000–2003, two office bearers were women. In 2004, the advisory committee was dropped, an executive committee was formed with 52 per cent of its members, and half of the eight office bearers, being women. Thus, over time women have become accepted by men as playing an active role in decision-making and now they have a roughly equal role to men.

There have been no significant changes in the last 3 years in the other two sites. Maliate has only women on the committee, but also has a male advisory committee which the women wanted as it helps them link with local institutions and obtain help for night-time guarding. Shuluar has throughout had all male decision-making committees.

These differences between sites are also reflected in other collective action endeavours. In both beels where women are involved, it was women office bearers who donated land to build a community centre, whereas the men-only CBO negotiated with a male landowner to temporarily make land available, and thus the CBO's tenure is less secure. In Shuluar Beel women are only involved in NGO groups, but in Goakhola and Maliate women are active in the CBM and IFM committees as well as in other institutions such as school committees.

6 IMPACTS

6.1 Outcomes for Fisheries

6.1.1 Management actions

In Goakhola Beel, from 1997–1998 to 2001–2002 five *kuas* were usually rented and protected as sanctuaries each dry season (about 0.16 ha out of a total *kua* area of 2.9 ha).

Since 2003 no *kuas* have been rented as sanctuaries; instead the BMC kept the whole of the khal (1–1.5 ha) as a sanctuary in the dry season and early monsoon, but allowed fishing there the rest of the year. In the 2004–2005 dry season, the BMC excavated some plots to create permanent sanctuary *kuas*. In Maliate and Shuluar Beels, the same strategy was adopted: during the dry season of 2002–2003 some rented *kuas* were protected as sanctuaries, and in 2004–2005 some permanent sanctuary *kuas* were created. In all three sites each year, the first three months of the Bangla year—mid April to mid-July, when fish are spawning—were declared by the BMCs as a closed season with no fishing permitted.

6.1.2 Fish catches

Data on fish catches in Goakhola indicate that between 1998 and 2001 the catches from nets, traps and hooks tripled to 36 tonnes, but fluctuated and declined thereafter. This benefit reaches both men and women, since women also catch fish and can show a return from their involvement in fishery management.

About a quarter of the fish catch comes from the many *kuas* in these floodplains. In Goakhola *kua* catches fluctuated around 50 kg per *kua* (average area 280 m²), but increased from 2002 with the increase in fish population. In 2005 to conserve some fish the *kuas* were harvested only one or two times and a few were left un-fished, but the catch remained high (Table 2). The trend was similar in Maliate. In Shuluar *kua* harvests increased considerably in 2005, suggesting that conservation measures there have been effective, but that the benefits may go more to owners of ditches who tend to be better off than to the other households involved in fishing.

6.1.3 Fish diversity

Fish species diversity appears to have increased in all three sites. In Goakhola 28 species were recorded per year during 1997–1999, rising to 34 per year during 2000–2004; in Shuluar the number of species caught more than doubled (from 23 to 47) between 2002 and 2004; and in Maliate 21 species were caught in 2003 and 36 in 2004. However, the diversity of fish consumed has not changed, because households buy fish that have been caught in any of the local beels or cultured ponds and appear in the local markets. The communities reported that some scarce floodplain species, notably *meni Nandus nandus* and *pabda Ompok pabda* have recovered since CBFM activities started.

The increase in fish diversity in Maliate Beel demonstrates that women are successful in protecting fish. In Maliate and Goakhola much of the pressure to ensure community compliance with sanctuaries and fishing rules comes from women who control what is cooked, discuss the issue in group meetings and decide to catch or not to catch fish by their own hands.

Table 2. Fish catch and returns from *kuas* in 2003–2005

Year	Goakhola Beel			Maliate Beel			Soluar Beel		
	No. of <i>kuas</i> fished	Catch (kg)	Mean (kg/ <i>kua</i>)	No. of <i>kuas</i> fished	Catch (kg)	Mean (kg/ <i>kua</i>)	No. of <i>kuas</i> fished	Catch (kg)	Mean (kg/ <i>kua</i>)
2003	87	6097	67	39	2583	66	49	4740	97
2004	87	9100	100	40	3088	74	52	5736	110
2005	83	6643	73	36	2688	64	60	12 106	202

Source: Census of *kuas* and reported catches according to owners.

Table 3. Annual value of natural resources (Taka/household) collected in 2003 and 2004

Income source	Goakhola Beel		Maliata Beel		Shuluar Beel	
	Male	Female	Male	Female	Male	Female
2003						
All aquatic resources	4240	4000	5300	4520	4330	720
Fishing	3910	800	4830	1860	4140	0
% Income from fishing	92	20	91	41	96	0
2004						
All aquatic resources	6080	4810	5970	3750	4350	670
Fishing	4900	1920	4490	2400	4160	0
% Income from fishing	81	40	75	64	96	0
Overall contribution of men and women						
% Of aquatic resource income	54	46	53	47	86	14
% Of fishing income	76	24	73	27	100	0
2005						
All aquatic resources		7060		10 630		8580
Total household income		81 320		37 170		35 070
% From aquatic resources		9		29		24

Figures are in Taka: US\$ 1 = Taka 62 in early 2005.

Data for 2005 were collected by recall from the respondents and did not distinguish income sources of men and women in the household.

Source: Household aquatic resource collection survey.

6.2 Income

In all three beels incomes from aquatic resources are substantial considering that these resources are seasonal (Table 3). Local people say that conservation of fish during the dry season is the reason for increased quantity and value of fish harvest. Benefits are not distributed evenly in Shuluar Beel where landowners now prevent other people from fishing their land. Women in Goakhola and Maliata obtain over half of the value of aquatic resources they collect from plants and snails. Moreover, women contribute almost half of the total household income derived from floodplain common pool resources in those two beels, but very little in Shuluar.

A separate survey for 2004–2005 showed household incomes in Goakhola averaging more than double those in the other two beels, but unlike at the other sites about half of total incomes there come from government service and business and not from the beel. Aquatic common pool resources contributed 24 per cent or more of household income in Maliata and Shuluar, but only 9 per cent in Goakhola due to the high non-beel related incomes there.

6.3 Social Capital

The committees that now take decisions on floodplain resource management and bring together the different users of these beels have strengthened structural social capital among community stakeholders by enabling these communities to take joint actions to improve the health and productivity of their floodplains. They have also improved access to and links with local officials such as extension workers and councillors. However, the extent

Table 4. Self assessments of social capital indicators in 2002 (scale 1–10)

Indicator	Goakhola Beel		Maliata Beel		Shuluar Beel	
	Male	Female	Male	Female	Male	Female
Trust	5	7	7	8	1	4
Unity	5	9	7	9	2	4
Empathy	5	5	8	8	2	5
Cooperation	7	8	10	10	2	3
Conflict minimisation	10	10	8	10	8	8

Source: Focus groups.

that these changes may be long-lasting is affected by the values and social norms of the communities such as levels of trust and cooperation—the cognitive dimension of social capital.

In the two beels where women play an active role, women and men reported much higher levels of trust, unity and cooperation than in Shuluar in 2002 when CBFM was initiated, according to focus group discussions (Table 4). In general, women scored all of the indicators higher or the same as men in all three sites, indicating that women saw their communities as more harmonious than men did.

In 2005 men and women were asked separately to score indicators of changes in community management and participation in management and decision-making for the present situation compared with 3 years earlier. The results (Table 5) indicate that in Goakhola participation and influence on community and fishery decisions have increased significantly for men and women, but men scored community influence and participation

Table 5. Changes in mean scores for community management indicators between 2002 and 2005

Indicator	Goakhola Beel (N = 30)			Maliata Beel (N = 28)			Shuluar Beel (N = 50)		
	Male	Female	Diff	Male	Female	Diff	Male	Female	Diff
	2005	2005		2005	2005		2005	2005	
Participation in community affairs	5.57*	4.04*	M	3.74*	2.85		3.11	1.67	
Influence over community affairs	5.41*	4.37*		3.30	3.04*		3.32*	1.83	M
Participation in fisheries management/IFM	4.63*	3.44*	M	2.22	2.48*		1.70*	1.23	
Influence in fisheries management/IFM	4.35*	3.62*	M	2.22	2.30*		1.82*	1.66*	
Decision making on fishing rules	5.64*	5.61*		5.26*	5.37*		5.28*	5.62*	
Fair access rights to fishery	5.57*	5.61*		4.22	4.19*	F	4.67*	5.22	
Active management of fishery	6.18*	6.29*		6.33*	6.19*		5.72*	5.37*	
Community compliance with fishing rules	6.21*	6.29*		6.67*	5.93*		6.21*	5.87*	

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. For simplicity scores for 2002 are not shown. Paired *t*-tests:

*Significant change in score for men or women, 2005 vs 2002, $p < 0.05$ (negative indicates 2002 was significantly higher than 2005).

Diff = comparing changes in scores 2002–2005 for men vs women: M = male score increased more than women $p < 0.05$, F = female score increased more than men $p < 0.05$.

Source: Interview survey with random sample; respondents were head of household (mostly men) and spouse/senior person of opposite gender in same household. Men or women were not willing to answer these questions in two of the Maliata Beel sample households.

significantly higher than their spouses, probably reflecting the traditionally greater role of men in community affairs and a higher involvement of men in farming and fishing. By comparison in Maliate, with the all-women BMC, only women reported significant increases in participation and influence with regard to the fishery and IFM. In Shuluar, only men reported significant increases in participation, and they also gave significantly higher scores for general participation and influence than their wives.

Respondents believe that decision-making on fishing rules, access and resource management have all improved significantly. In Goakhola, despite having the longest established CBFM institutions and activities, the scores did not differ much from the other two beels. In Maliate, where women take beel management decisions, they perceived more significant improvements than men, and reported a greater increase in fair access than men, which presumably reflects their increased role in beel management.

The most revealing evidence of differences that may affect the functioning of CBOs came from discussing with the committee members (i.e. women and men in Goakhola, women in Maliate, and men in Shuluar) what their criteria were for successful floodplain resource management. The committees that included women identified more criteria (16 for Goakhola, 20 for Maliate), compared with just 10 in Shuluar, and the criteria differed. All three agreed that strong leadership was the most important factor for success. The CBOs with women members rated establishing the authority (legitimacy) of the CBO for resource management next (and that they had achieved this), while the men-only CBO emphasised establishing a fund for future activities (which they had yet to achieve).

The women-only CBO placed as 3rd, 4th and 5th participatory decision-making, representation of different stakeholders in decisions and having a management plan (and said they had achieved these). The mixed CBO emphasised social responsibility in the community, awareness among all community members and timely implementation (and had partially achieved these). The men-only CBO emphasised cooperation and respect among committee members, establishing rules and compliance with the rules (and were also partially satisfied). Thus the women-only CBO places greater value on participatory processes, the mixed CBO on community wide action and norms and the men-only CBO on setting rules.

7 CONCLUSIONS

In all three beels the quantities and species diversity of fish catches were reported to have increased, indicating a healthier environment, and in Goakhola there have been changes in cropping patterns that maintain agricultural incomes while enabling greater returns from aquatic resources. In all three communities men and women recognise improvements in the health of the resource. The BMCs reported high acceptance and compliance with fishing limits, although this was higher in the sites where women and men both had active roles in decision-making (Goakhola) or men advised and endorsed decisions (Maliate), than in the site where women played no role (Shuluar). In each case, the number of conflicts decreased over time and the BMCs and their plans have been accepted by the communities. The Maliate BMC has been more adaptable, adding and adjusting the rules between years. For example, if the members see small sized fish or new species in the closed season they spontaneously motivate everyone to delay fishing so that they can profit more.

The ability to establish CBOs where women play an active role is influenced by local community norms and culture which in turn influence the acceptance of women's

involvement in economic activities outside the home. In the study area, this is greater among Hindu communities than in the Muslim dominated area. Education levels also differ: in Shuluar fewer women have attended school whereas the average education level of women and men in the other two beels is almost equal. There appears to be a compounding effect of education, social norms, economic activity and mobility which constrain or permit women to have equal roles with men in natural resource management. Hence in Goakhola and Maliate the communities are Hindu and women are more educated, contribute a higher proportion of household incomes and can regularly move between the villages, and are actively involved in resource management; which is very different from Shuluar.

The status and recognition given to women by the local community reflects this experience and was highlighted by women in focus group discussions. In Goakhola and Maliate, women reported increasing male recognition of their voices and willingness to listen to their opinions as the benefits of resource management decisions were realised, which in turn led to women showing more interest to join local institutions and greater acceptance by men of their decision to do so. By comparison, in Shuluar women have not been given a decision-making role by men, who do not acknowledge the fact that some women use non-fish aquatic resources.

Overall this study found that women can play an effective leading role in improving management of aquatic resources, particularly where most women earn some income from those resources. Their role strengthened as they experienced success. In these cases women still preferred to have an advisory group of supportive men who could help resolve problems and facilitate links with officials. This contrasts with the more male dominated community where men did not accept that women should have a role in decisions over aquatic resource management even though some poor women there do depend on these resources. Women appear to have different priorities for floodplain management institutions that they are involved in, favouring participation more than men which results in more adaptable decision-making. Committees involving women placed less emphasis on fixed rules than men, and were concerned with addressing a wider range of community needs through more participatory processes.

Finally, it is also evident that facilitation by an NGO that focuses solely on women's development is not sufficient to ensure women's participation in decision-making and community institutions. Hence it is important for those planning to support community based management of natural resources to follow processes that include women and that help both men and women recognise the uses, opinions and relevance of those resources to women. Where social norms and culture limit the public voice of women, women cannot be expected to take a lead in resource management and thus a long term plan for developing women's capacity and changing men's opinions is needed. This is important because involving women in resource management in the Bangladesh floodplains appears to be associated with greater acceptance of management rules and reduced conflict. Policies should aim for community-wide participation including an active role for women.

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REFERENCES

- BBS. 1998. *Statistical Yearbook of Bangladesh 1997*. Bangladesh Bureau of Statistics: Dhaka.
- FAP 16. 1995. Potential impacts of flood control on the biological diversity and nutritional value of subsistence fisheries in Bangladesh. Flood Action Plan 16 Environmental Study, Flood Plan Coordination Organisation, Ministry of Water Resources (Report prepared by Irrigation Support Project for Asia and the Near East), Dhaka.
- Karim A. 1993. Freshwater wetlands of Bangladesh: status and issues. In *Freshwater Wetlands of Bangladesh: Issues and Approaches*. IUCN: Dhaka; 75–103.
- Muir J (ed.). 2003. *Fisheries Sector Review and Future Development: Theme Study: Economic Performance*. World Bank, Danida, USAID, FAO and DFID: Dhaka.
- Rahman AKA. 1989. *Freshwater Fish of Bangladesh*. Dhaka University: Dhaka.
- Sultana P, Thompson P. 2004. Methods of consensus building for community based fisheries management in Bangladesh and the Mekong Delta. *Agricultural Systems* **82**(3): 327–353.
- Sultana P, Thompson PM. 2006. Gender and local floodplain management institutions—A case study from Bangladesh. *CAPRI Working Paper No. 57*. International Food Policy Research Institute: Washington DC.
- Sultana P, Thompson P, Ahmed H, Hossain A. 2005. *Better options for Integrated Floodplain Management in Bangladesh: Uptake Promotion Piloting of IFM Options: Narail site*. Centre for Natural Resource Studies and WorldFish Center: Dhaka.
- Thompson PM, Sultana P, Islam N. 2003. Lessons from community based management of floodplain fisheries in Bangladesh. *Journal of Environmental Management* **69**(3): 307–321.
- United Nations. 2000. *The Common Country Assessment: Bangladesh*. University Press Ltd: Dhaka.
- WorldFish Center. 2003. Community Based Fisheries Management Project phase 2 Annual Report 2002. WorldFish Center: Dhaka.