



# COMMUNITY BASED FISHERIES MANAGEMENT FISHERIES YIELDS AND SUSTAINABILITY

## BACKGROUND

The importance of Bangladesh's inland fisheries resources for the livelihoods and food security of the poor and landless is widely acknowledged. The management of these resources, based upon a combination of short-term leased access to water bodies or *jalmohals* supported by a combination of conventional management interventions, has, however, often excluded the poorest fishers and encouraged leaseholders to effectively 'mine' resources at non-sustainable levels of exploitation.

To address these concerns, the Department of Fisheries of the Government of Bangladesh and the WorldFish Center, with funding from the Ford Foundation (1994-1999) and the UK's DFID (2001-2006)\*, have been working in partnership with 11 NGOs<sup>1</sup> and fisher communities, to test a range of community-based approaches to fisheries management at pilot sites throughout Bangladesh covering 23,000 direct beneficiaries. The aim of the Project is to promote the sustainable use of, and equitable distribution of, benefits from inland fisheries resources by empowering communities to manage their own resources.

\* Extended up to March 2007.



By 2006, responsibility for management of 116 government-owned and privately owned water bodies including *beels*\*, rivers and floodplains had been transferred to 130 community groups. Working in partnership with project NGOs, these Community-Based Organisations (CBOs) implemented a variety of management interventions designed to increase fish abundance, biodiversity and fisheries yields by reducing levels of exploitation on juvenile and adult fish during critical periods during the year, or by augmenting natural recruitment through stocking.

The interventions included observing closed fishing seasons, developing fish sanctuaries (areas closed to fishing), controlling and removing destructive fishing gears that capture juvenile fish or that are highly efficient (e.g. dewatering, and monofilament gill nets), controlling fisher access and fishing effort and in a limited number of water bodies, stocking with juvenile fish.

Members of the communities monitored their own management performance using catch assessment surveys and ledgers containing details of any stocking and harvesting costs and revenues.

The expectation was that devolving management responsibility to fisher communities would improve the condition of fisheries because:

- Fishers have a sense of ownership over the resource encouraging more responsible exploitation;
- Appropriate interventions and activities can be selected and implemented by the community according to local ecological and institutional conditions;
- Compliance with rules should be greater through greater perceived legitimacy and peer pressure (self-regulation).



Although community managed approaches have been tried with many fisheries, use of statistically robust evidence showing clear gains in terms of yield increases and improvements in sustainability are few and far between. However, the CBFM-2 project was in a unique position to provide conclusive proof on these issues because of the number and types of water body being monitored by the project and the length of time over which data had been collected.

\* Lakes or depressions in the floodplain.

## LESSONS LEARNT

Using survey data collected by participating fisher communities between 1997 and May 2006 and supporting studies, the CBFM project has produced compelling evidence that fisheries management performance does improve under community-based approaches.

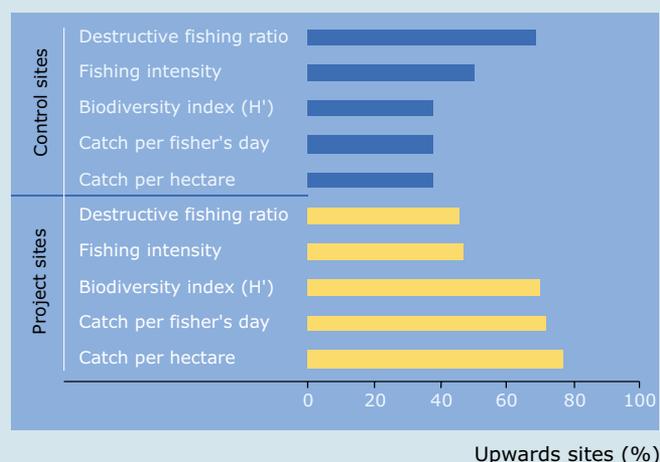
### 1. Fisheries Production (Yield)

Trends in capture fish production through time were upward at 77% of the 64 project sites that were monitored monthly for at least three years. At these sites, annual fish production (kg/hectare) increased on average by 13% per year. Taking account of habitat type, annual fish production per hectare per year increased on an average by 22%, 29%, 12% and 22% for closed beel, floodplain, open beel and river habitat respectively. In contrast, production decreased by 19% per hectare per year for *haor*\* habitat. Improvements in yield were linked to increases in fish abundance. Harvests from stocked water bodies also improved significantly during the second phase of the project from an annual average of 380kg/hectare in 2002 to 921kg/hectare by 2005.

### 2. Sustainability

These modest but important increases in capture fisheries production also appear to be sustainable. Trends in fish abundance, indicated by annual average daily catch rates by fishers, were also upward at 72% of monitored sites, with an average increase of 17% per year. Taking account of habitat type, annual daily catch per fisher increased on average by 22%, 12%, 9%, 21% and 19% for closed *beel*, floodplain, *haor*, open *beel* and river habitat respectively. Improvements in fish abundance were strongly linked to reductions in fishing intensity and destructive fishing activities. Trends in fishing intensity and

Comparison in the sustainability performance indicators for CBFM and control sites with at least three years of observation



destructive fishing activities ratio were downward at 53% and 55% of monitored sites respectively. These increases in fish abundance were also reflected in biodiversity measured using the Shannon-Weiner Index (H'). Trends in biodiversity were also upward at 70% of monitored sites.

### 3. Site Scores

By combining the results from fisheries production and sustainability indicators, it was possible to derive an overall mean site score for individual water body. Statistical comparison of the site scores for CBFM project sites with those for control sites showed that site scores (a composite indicator of management performance) were significantly ( $<0.01$ ) higher for CBFM sites than for control sites.

### 4. Food Security

Bi-monthly household fish consumption was significantly higher at CBFM (12 kg) compared to control sites (10 kg). However, significant ( $p<0.05$ ) downward trends in fish consumption were observed between 2002 and 2004 at both CBFM and control sites possibly reflecting increasing un-affordability of fish nationally.

### 5. What Management Interventions Work Best?

The research clearly shows that at most CBFM sites the combination of sanctuaries, gear bans and closed seasons result in upward trends for enhanced fishery management performance. Experimentation or adaptive approaches to management will be required to determine which are most important and, when using combinations determine the relative emphasis of each intervention for different sites.

\*Small lake or a large low-lying depression in a floodplain that may be reduced during the drying season to a series of beels.

## 6. Variation in Management Performance

Most sites performed particularly well with increases in yield, fish abundance, and biodiversity and declines in destructive fishing activities, whereas a few sites showed consistently poor results. Whilst a number of potentially important factors such as habitat type, region, water body size and NGO support were tested, the most important factor affecting overall management performance was habitat type and significant differences in mean site score were detected for closed beel ( $p < 0.03$ ), open beel ( $p < 0.01$ ) and river habitat ( $p < 0.01$ ).

## POLICY RECOMMENDATIONS

1. The CBFM project has provided compelling evidence that community-based management approaches aimed at the poor and vulnerable are effective in a wide range of different inland water body types in Bangladesh, resulting in improvements to key management performance indicators including yield, fish abundance, destructive fishing, biodiversity and food security. The approach should be extended beyond pilot sites and be adopted as a key strategy for development of fisheries resources in Bangladesh.

2. Communities appear to embrace the concept and perceive significant benefits, however questions remain over the financial and institutional sustainability of CBFM approaches - further support may be needed for existing CBOs and will be needed for extension of these approaches.

3. Future or ongoing activities might include some form of experimentation and/or adaptive approaches to community-based management to help identify which interventions are most significant in improving fisheries management performance.

4. Future programmes or research might also aim to understand why the approach is successful at some sites but not others, perhaps using some case study sites and comparing the management activities and performance of facilitating NGOs. Pooling or sharing lessons and experiences with other fisheries projects such as the Fourth Fisheries and Management of Aquatic Ecosystem through Community Husbandry (MACH) projects that have also employed community-based management approaches might accelerate this research.

## Ongoing Research

Unsurprisingly, both fish production and abundance were found to vary significantly with fishing effort. Research is currently underway at WorldFish Center to estimate levels of fishing effort that maximize sustainable yield.

A bioeconomic model is also being developed to provide managers with guidance on how best to stock water bodies to maximize their economic returns (profit).

### Source of Information

1. Halls, A. S., Mustafa, M. G and Rab, M. A. (2005). An assessment of the Impact of the CBFM Project on Community-Managed Fisheries in Bangladesh. Report to the WorldFish Center, Bangladesh, July 2005, 67pp.
2. Halls, A. S. and M. G. Mustafa. (2006). Final Assessment of the Impact of the CBFM Project on Community-Managed Fisheries in Bangladesh. Report to the WorldFish Center, Dhaka, Bangladesh (Unpublished).
3. Mustafa, M. G. and Khalilur, R. (2006). Fisheries Management in Closed Water Bodies; Experience of CBFM, WorldFish Center, Dhaka, Bangladesh (Unpublished).

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