

# **STRATEGIES FOR COMMUNITY BASED FISHERIES MANAGEMENT IN THE LOW LYING WETLANDS OF BANGLADESH AND THE MEKONG DELTA**

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## **Introduction**

Fisheries constitute a major component of food and livelihood systems in the flood-prone ecosystems in Bangladesh and Mekong delta of Southern Viet Nam. The fisheries sector in Bangladesh is an important source of employment, rural income, food security, import substitution and biodiversity. The sector accounts for 20.9% of agricultural GDP, 3.7% of the total GDP, 4.0% of the export earning and 58% of animal protein intake (DoF, 2009). Bangladesh is endowed with enormous inland fishery resources; approximately 28% of the total area of the country is floodplains, contributing significantly to national inland fisheries production (DoF-FRSS, 2006). There are 12 million people whose livelihoods depend directly on fisheries as full-time fishers, subsistence fishers, part-time fishery labourers, aquaculture operators, fisheries traders and business people.

Fisheries management in the past was mostly revenue oriented under the jurisdiction of the Ministry of Land (MoL) through the East Bengal State Acquisition and Tenancy Act in 1950 which allowed water bodies to be leased to the highest bidder, usually to the for 1-3 years. Poor fishers were thus practically excluded from participating in the process of bidding and, therefore, from the management of fisheries. In *haor* areas (extensively low lying and deeply flooded areas of floodplain) most of the land remains under water for about five months in a year, yet the benefits during a period when otherwise good crop land would be unproductive, was only for a few poor people who could access the fishery as fishing labourers under the conditions set by the leaseholder (Khan and Middendrop, 2006; Khan, 2007).

In 1986 in response to these problems and lobbying by the national fishers association, the government introduced a New Fisheries Management Policy (NFMP) and responsibility for nearly 300 water bodies was transferred from the Ministry of Fisheries and Livestock (MoFL) to the Department of Fisheries (Sultana and Thompson, 2000). The aim was to save fishers from exploitation by influential middlemen, and for the Department of Fisheries (DoF) to limit the number of fishers using the resources to ensure maximum sustainable catches (Ahmed *et al*, 1997).

## **Community based fisheries management project**

The 2002 Community Based Fisheries Management in South and South-East Asia (CBFM-SSEA) project started in the north-eastern part of Bangladesh and in the Mekong Delta, Vietnam. The results of project implementation in Bangladesh are reported here. Fish catch monitoring started in four project sites (*Chatol beel*, *Chatol-Moishakuri beel*, *Soma-nodi*, *Nainda beel*) in Sunamganj district of Bangladesh. By 2006 the project had facilitated the establishment of six Community-Based Organizations (CBOs) representing 504 direct participants and more than 1000 part-time and subsistence fishing households in Bangladesh. Two partner NGOs helped the fishers to organize *Beel* Management Committees (BMCs) for fishery resources management. In all six *beels* BMCs were formed through informal election of members by stakeholders and thus had their own resource management plans and rules. Committees generally adopted simple conservation-based measures under the CBFM-SSEA.

### *Cluster management*

The project partner NGOs – Efforts for Rural Advancement (ERA) and *Sunamganj Jonokalyan Sangshata* (SUJON) conducted fisheries resource management activities through involving beneficiaries in BMCs, and addressed the potential cluster management of *haor beel* habitats (a *beel* is a depression holding water for part or all of the year). ERA became involved with managing a cluster of three CBOs and BMCs (*Chatol beel*, *Nainda beel* and *Soma nodi*) and SUJON did so with three CBOs and BMCs (*Lomba beel*, *Chatol-Moishakuri* and *Chitlia beel*). The CBOs mitigated local conflicts with other interest groups, and prepared resource management plans. To develop institutional sustainability and networks, a cluster networking committee was formed at water body cluster level or at the Upazila (sub-district level). Emphasis was placed on CBO registration and memorandum of agreement was signed between the DoF and CBOs to promote institutional sustainability and enhance effectiveness of the cluster committee. Registration with government agencies was completed for all six CBOs.

## **Materials and Methods**

### *Gear survey and catch monitoring*

Gear surveys involved a regular spot survey for a sample of gears in operation, and the total catch from each gear type. The gear census covered the number and types of gear operating in the study sites. Catch statistics were recorded for each gear type for four days per month, per site.

### *Focus group discussions (FDGs)*

The study utilized a qualitative research methodology known as Focus Group Discussions (FDGs). The sample consisted of three groups (20-25 people in each group).

A discussion guide was used to guide the conversation and a structured questionnaire to get the participants views regarding fisheries management and lessons learned.

#### *Shannon-Wiener diversity index*

Species wise production rates were used to estimate the Shannon-Wiener (1948) diversity index ( $H'$ ).

#### *Species assemblage*

Similarities in the species assemblages were summarized in two-dimensional (2D) scatter plot using nonparametric multidimensional scaling (MDS) ordinations following a strategy proposed by Clarke (1993) based on Bray-Curtis.

#### *Household's income*

The monitoring measured changes household income over the project period. Assessment was done through a baseline study carried out in 2002 and an impact study carried out in mid-2006. The studies sampled 360 households (including both project beneficiaries and others) at six project water bodies. Household selection was based on random sampling of a comprehensive census in project areas.

## **Results**

#### *Annual catch trends*

The study covered catch monitoring, fishers' participation, fish biodiversity and changes in fishing intensity. This study reveals that production increased over the years due to management approaches that encouraged participation of the fishers, beneficiaries and community in managing fisheries resources. The annual average catch (kg/ha) trends for all six water bodies tended to increase over the study period from an annual average of 352 kg/ha in year 1 to 805 kg/ha by year 4, or 59% year<sup>-1</sup> (Figure 1). Considering individual sites, annual fish production per hectare per year increased on average by 114%, 68%, 95%, 40%, 27% and 9% for *Soma Nodi*, *Nainda beel*, *Chatol beel*, *Chatol-Moishakuri*, *Lomba beel* and *Chitlia beel* respectively.

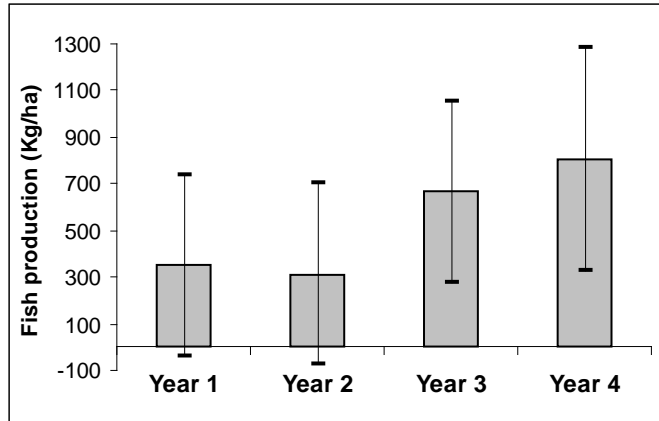


Figure 1 Combined production trend (between 2002 and 2005) from six project sites

A comparison of annual daily catch per fisher was made for all gear combined in 2003, 2004 and 2005. Using observations for 4 sites, the response on fish abundance (daily catch per fisher) was examined. The annual daily catch per fisher increased on average by 56%. Taking into account individual sites, annual daily catch per fisher increased on average by 11%, 73% 70% and 68% in *Chatol beel*, *Chatol-Moishakuri*, *Soma nodi* and *Nainda beel* respectively (Figure 2). These increases in fish catch were also reflected in income which was measured during the first and last year of the study period. The annual average share of profit per fisher also increased significantly during the last year of the project from an annual average of Tk.1846 (US\$27) in year 1 to Tk5947 (US\$ 87) by year 4.

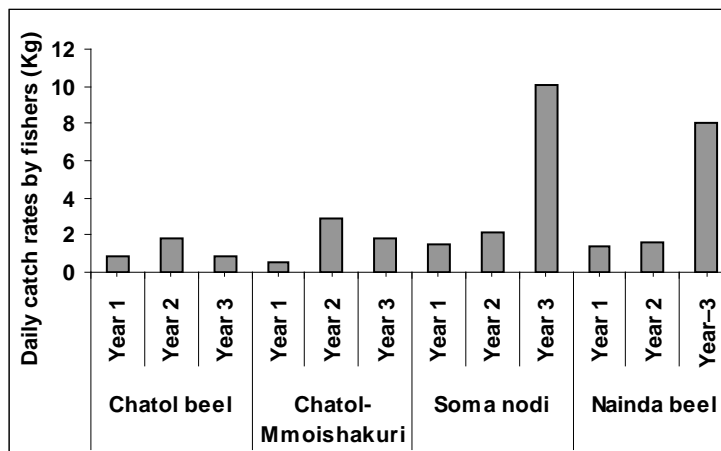


Figure 2 Catch per fisher's per day for all gears between 2003 and 2005.

### Species biodiversity

Among the four project sites the higher biodiversity index ( $H'$ ) was found in *Soma nodi* (2.635), followed by *Chatol-Moishakuri* (2.381), *Nainda beel* (2.379), and *Chatol beel* (2.058). The species biodiversity was higher in *Chatol-Moishakuri* in 2004 compared to

the preceding and following years. In contrast the species biodiversity in *Soma-nodi* was found slightly lower (2.607) in 2004 compared to 2.663 in 2003. Concurrently, species biodiversity in *Nainda beel* was lower in 2004 (2.11) compared to baseline survey in 2002 where it was found to be 2.699. The important status of species biodiversity in project sites appeared to be unchanged with slight deviation of annual biodiversity index. The annual mean biodiversity index ( $H'$ ) for four project sites increased from  $2.313 \pm 0.176$  ( $H'$ ) in year-1 to  $2.469 \pm 0.203$  ( $H'$ ) in year-3.

### Cluster management

The Community groups involved 503 direct beneficiaries for cluster level management. Through cluster management the following improvements were observed:

- Better linkages were established with local administration and elites,
- Better leadership was developed and larger incidence of community mobilization,
- Effective coordination was developed among partners,
- CBOs appeared empowered, but required a considerable time for better empowerment.

No significant dissimilarities were found in the management performance of the two partner NGOs ( $p = 0.175$ ). Average linkage from cluster analysis, using Bray-Curtis similarities on square root-transformed species abundances are given in Figure 3.

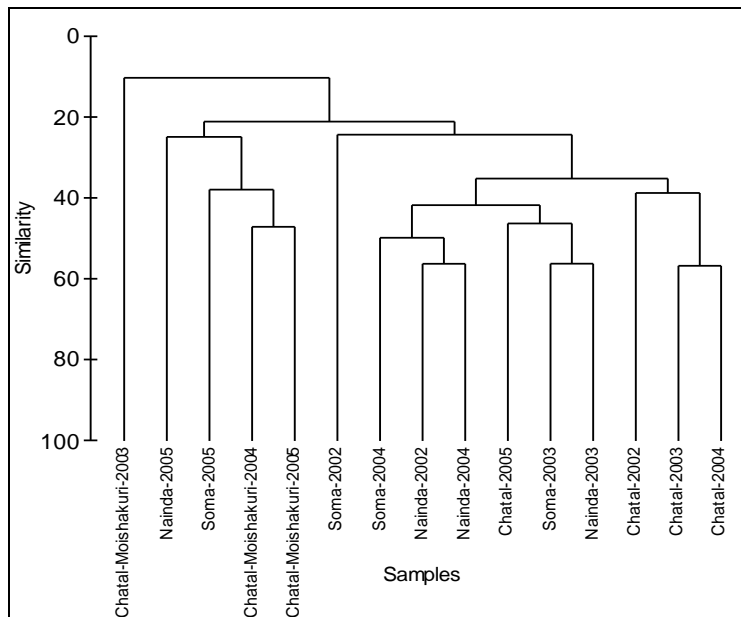


Figure 3 Site dendrogram of the 15 samples, using Bray-Curtis similarities.

### Species abundance - baseline year and impact year comparison

In Bangladesh for project sites, both fish and prawn species were either absent or less abundant during baseline year compared to impact year during 2004-05 (Figure 4).

Among 20 principal species 18 species were more abundant during impact year compared to baseline year. Only two species were more abundant during baseline year compared to impact year in CBFM-SSEA sites.

Figure 4 Average abundance [all gear catch per unit effort (kg 100 gear<sup>-1</sup>)] of species caught from six sites during base line year (2002) and impact year (2004-05).

#### *Fisheries impact*

1. The project has provided evidence that annual fish production (kg/ha) increased significantly.
2. Future programme might comprise some form of adaptive approaches to community-based management to help categorize which interventions are most likely to be considered to improve fisheries management performance.

#### *Impact on household incomes*

Average household incomes (adjusted for inflation) have increased by 13% over the project period - 2002 to 2006. Incomes for fishers have increased by 16%, for better-off households there were similar increases (15%), while there was a modest rise in income for non-fishers of 11% in the project area. This indicates that project fishing households have significantly ( $P < 0.05$ ) improved their income levels compared to the non-fisher counterparts over the project period.

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