

# Community Fisheries Management of Freshwater Lakes in Bangladesh

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*The Oxbow Lakes Small Scale Fishermen Project in western Bangladesh is primarily a "Social Fisheries Project". The project aims at self-management of the oxbow lakes for fishing and fish farming by members of the local communities and the sharing of the benefits in an equitable manner. Project emphasis is on social and institutional aspects of community water resource management and on improving the fish yields through better fisheries practices.*

Fishers harvesting a komar, a kind of brushpark which is encircled by a net after two to three months. ▼





## Oxbow Lakes Fisheries

An oxbow lake (local name: *baor*) is an old cut-off river bend, usually in the shape of a horseshoe or ox-bow. The *baors* receive surface water run-off from the monsoon rains through seasonal inlets. At high water level, water is spilled into a network of old river channels through which the *baors* are linked to the surrounding floodplain.

The main parts of the *baors* are managed as culture-based fisheries, which includes fingerling stocking, fish harvesting and regular dewatering. As part of the project, *baor* inlets and outlets have been screened with bamboo or concrete-and-metal fences to prevent the fish from escaping.

The shallow and silted parts of the *baor* are being excavated into *baor* fishponds ('lake compartments') of 0.5 to 1.5 ha each, partly with support from the World Food Programme. Most of these *baor* fishponds are seasonal ponds.

## Government and NGO

The Oxbow Lakes Project II (OLP-II) is executed jointly by the Department of Fisheries (DoF) and Bangladesh Rural Advancement Committee (BRAC). Twenty-three oxbow lakes in five districts around Jessore, covering around 1 400 ha, have been handed over from the Ministry of Land to the DoF for a period of fifty years.

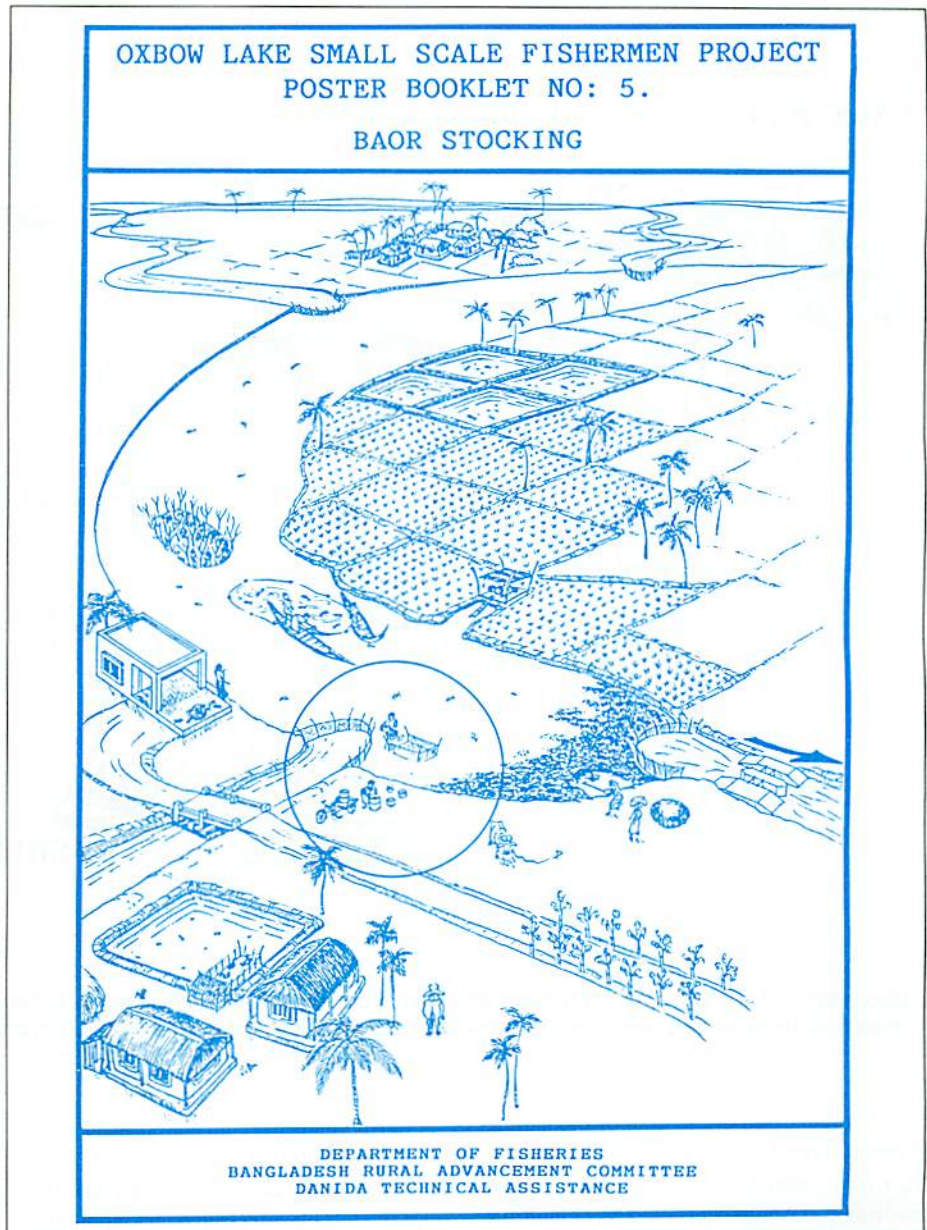
The DoF provides the legal framework for fisheries exploitation of the lakes by issuing individual licenses. There is a District Fisheries Officer in each district, and a Thana Fisheries Officer in each subdistrict (thana).

BRAC is by far the largest NGO in Bangladesh (more than 20 000 employees). BRAC organizes training for the beneficiaries and provides credit through the BRAC Village Organizations. The activities of BRAC are part of the BRAC Rural Development Program and one BRAC Program Assistant is based at each *baor* under the Oxbow Lakes Project.

OLP-II is supported by the International Fund for Agriculture Development (IFAD). Technical assistance to DoF and BRAC, including management support, is provided by Danida. Project activities started in 1991, but came only into full swing at the end of 1993.

## Community Resource Management

Fisheries management of the *baors* as a community resource is by the beneficiaries



Cover of a poster-booklet on *baor*-stocking, produced by the Oxbow Lakes Project.

themselves, organized in Lake Management Groups (LMG). Each LMG consists of a Lake Fishing Team (LFT) and a Fish Farming Group (FFG). The project target is 2 800 LFT fishers and 2 400 FFG fish farmers, which has been largely achieved for fishers but not yet in case of fish farmers.

The fisheries use right of the *baors* is leased by the DoF to the Lake Management Group of each *baor*. The LFT and the FFG share the *baor* lease fee, *pro rata* to the area occupied by ponds and open water.

The LFT fishers receive an equity share of the day's catch, thereby ensuring active participation of all LFT members. In addition, they

fish individually with their own gear for small indigenous fish and shrimp. Only licensed fishers are allowed to fish in the *baor* and in fact, poaching is most successfully reduced when all villages around the *baor* are well represented in the LFT and FFG ('social fencing').

FFG fish farmers manage the ponds in small subgroups for each pond and simply share their costs and profits. Guarding, however, is organized by the FFG as a whole, involving men as well as women members.

New LFT and FFG members are jointly screened by the field staff of DoF and BRAC, and then submitted for approval to the District Waterbody Committee. New members are

## LAKE MANAGEMENT GROUPS (LMG)



**Composition of Lake Management Groups. All fishers according to gear type operate as teams and elect a leader. Each year, a committee is formed from these leaders, and is responsible for the operation and unity of the LMG. The project targets one fisher per acre, total = 3 000.**

usually regularized at the time of the annual elections, when FFG and LFT members choose their new committee leaders. To encourage leadership development, elected committee members cannot stand for a consecutive term.

The poverty alleviation approach of the Oxbow Lakes Project is ensured by the BRAC rule that, before joining, only members of households earning less than US\$ 250 annual income and owning less than 0.5 acre of land are eligible as beneficiaries.

### Fish Yields from the Oxbow Lakes

Silver carp, catla, grass carp, rohu, mrigal and common carp are stocked in the *baors* at a recommended stocking density of 3 000-4 000 fingerlings/ha (12-15 cm). As a result of earlier project interventions, a thriving fingerling producing industry has developed around Jessore and large-sized fingerlings are easily available.

Fish yields have increased steadily over the years. In 1991-92, only 45 t of fish were harvested from ten *baors* (137 kg/ha). However, in 1994-95, nineteen *baors* reported 521 t of carps and miscellaneous fish (565 kg/ha). Total carp yield in 1994-95 averaged 520 kg/ha, varying from 175 kg/ha to 1 033 kg/ha. The project target is 700 kg of carps per ha in the fifth culture-based fisheries cycle.

Initial economic analysis showed that culture-based fisheries are at least as profitable as irrigated HYV paddy cultivation in Jessore district.

Water transparency as an indicator of primary production is measured weekly by Secchi disk in all *baors*. A high Secchi depth means clear water with little to eat for filter feeders such as silver carp and catla. It was found that *baors* with high average Secchi disk depths had significantly lower total carp yields in 1994-95 ( $p < 0.05$ ,  $n=19$ ).

Total carp yields proved also significantly correlated to stocking density and a multi-

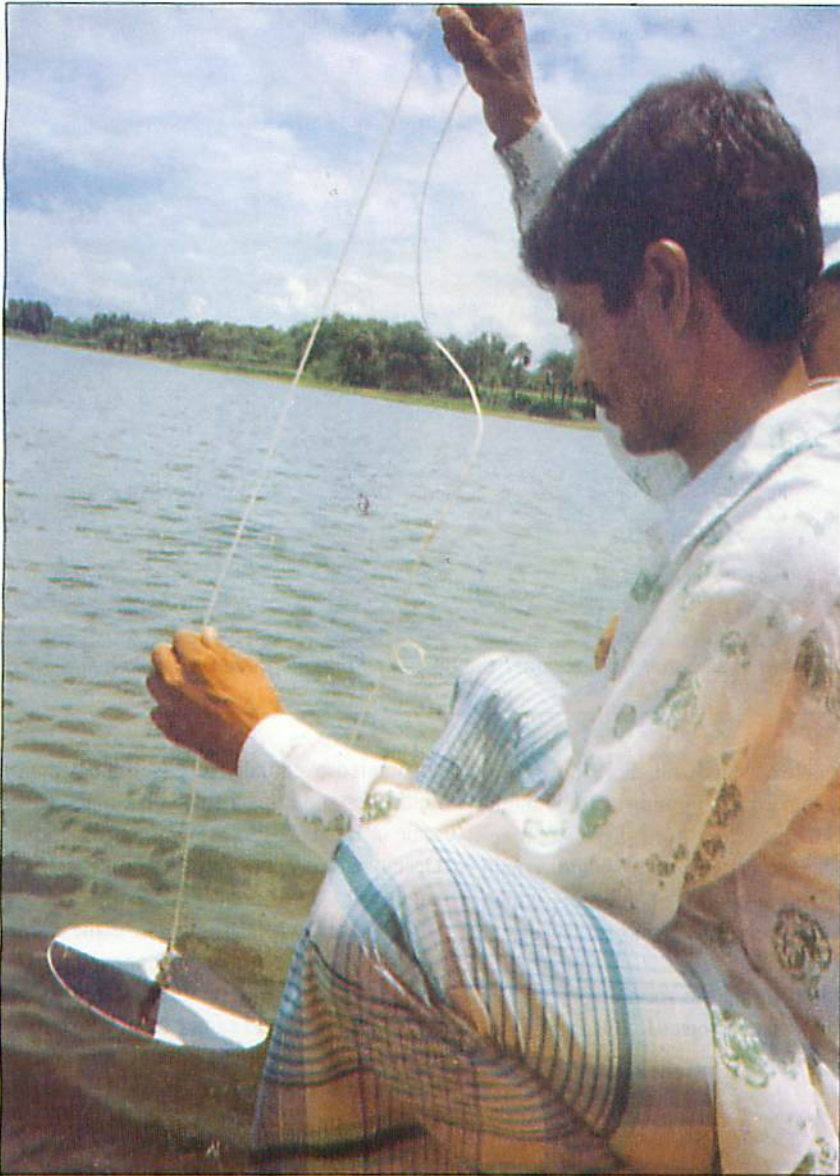
ple regression on annual carp yield including both Secchi depth and stocking density as co-variables was highly significant.

Yields of silver carp and mrigal were positively correlated, as were yields of catla and common carp ( $p < 0.05$ ). There was a negative interaction between yields of silver carp and catla (NS). In Bangladesh, it is often reported that catla do not grow well when silver carp are present in the pond.

High density of submerged weeds and other macrophytes was positively correlated with yields of grass carp and rohu, and negatively correlated with silver carp yield ( $p < 0.05$ ). Macrophytes take up nutrients, thereby competing with phytoplankton and increasing the Secchi depth.

Yield for rohu was not significantly related to any other carp species, although there was a positive interaction with grass carp. It is hypothesized that grass carp do well when macrophytes are abundant, which are the same





Measuring water transparency by Secchi disk for an indication of fish yield potential and hence required stocking density.

macrophytes on which the periphyton grows; the latter is grazed by rohu.

### *Baor* Fishponds

Fish farming in the *baor* fishponds only started in 1995 and no results are available yet. Pond yields are still quite low in Bangladesh, which is reflected in the moderate project target for *baor* ponds set at 4 200 kg/ha.

The main reason for compartmentalization of the shallow parts of the *baors* is that *baor* fishponds are likely to support 10-12 persons per ha, compared to only 2-2.5 fishers per ha of culture-based fisheries.

Given the population pressure in

Bangladesh, more intensive use of natural water resources is unavoidable even though the culture-based fisheries are quite successful. In other words, if the *baor* fringes will not be transformed into ponds leased out by the DoF, local destitute farmers will more and more encroach on these areas or powerful individuals will simply construct their own fishponds by illegally putting up dikes.

Pond management also includes growing vegetables on the pond dikes. Although income from fish is much higher, there is only one fish farming cycle per year. However, vegetables such as cucumbers, pumpkins, tomatoes, bananas, etc., may be grown almost year-round, leading to a small but regular additional

income. Many of the FFG beneficiaries are landless. A small garden with pond water available for hand-watering is especially appealing to women.

## Social Impact of *Baor* Development

The leasing out by the DoF of *baors* to Lake Management Groups has been shown to make the best use of the community resource in tonnes of fish produced compared to other types of *baor* management. By giving the people who actually fish a stake in the fish yield, they will invest time and money in maximizing the yield. The LMGs have become sustainable institutions for the management of the lakes as culture-based fisheries.

Secondly, leasing out of fishponds built on public land and constructed by the DoF to poor and often landless beneficiaries, who are organized and supported by BRAC, has strategic implications for the participation of the poor in the development of inland aquaculture. In fact, it is a novel land reform policy.

Presently, most fishponds in Bangladesh belong to rich people or have multiple owners, which make them unavailable for exploitation by the poorer segments of society. Also, as a rule, credit is not available if ownership or lease holdership is uncertain. However, the members of Fish Farming Groups formed under OLP-II enjoy fifty years of security of tenure under custodianship of the DoF and permanent access to credit from BRAC.

The implications of leasing out fishponds are even more important for women development. Bangladeshi women generally do not have access to land, while as an approved member of the Lake Management Group they obtain individual licenses from the DoF. For many women it is the first legal document in their name.

It is project policy to involve at least 75% women in the management of the *baor* fishponds (wives of LFT fishers are excluded). Fish farming in *baor* ponds at a little distance from the house is a serious outdoor economic activity, from which a good income may be earned. It is of a totally different magnitude compared to such small-scale women's activities as embroidering (for selling in Dhaka hotels) or the care of a few chickens around the house. After all, poverty alleviation in Bangladesh can only be successful if women also contribute to the household income (and get the chance to do so!).



## The Need for a Government Policy

An overall government policy on 'closed waterbodies' is needed if community water resource management is to be replicated on a much larger scale. For instance, the security of tenure under custodianship of the DoF, which now only counts for the *baors* under OLP-II, should be guaranteed to all waterbodies managed by local groups. Also, uncontrolled encroachment on the dried-up fringes of the waterbodies needs to be urgently addressed.

There is obvious potential to extend the concept of community management of water resources by the people living around them further to include all or most waterbodies nationwide, thereby improving the national aquaculture production as well as providing an opportunity in fisheries to large numbers of poor, landless and needy men and women.

Apart from the limited number of *baors*, there are also numerous silted dead river channels (local name: *khal*) in the western parts of Bangladesh formed by the shifting waterways of the Ganges Delta. These dead river chan-



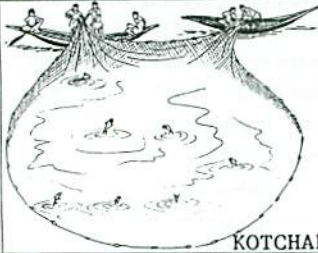













*Bamboo screen at the outlet of Bahadarpur baor near the border with India prevents stocked fingerlings from escaping.*

nels may be excavated and sliced up in segments suitable for fish farming, thereby multiplying fish production from these water resources. All the leased ponds should remain under the direct control of the DoF, which facilitates lease fee collection as well as extension support.

It is hoped that the social experience of the Oxbow Lakes Project II (OLP-II) is in-

corporated eventually in government policy guidelines and implemented on a much larger scale in Bangladesh. OLP-II is extended up to December 1997, possibly to be followed by a large-scale 'third' project (OLP-III).

The reality of Bangladesh is the necessity to provide for as many poor people as possible in a bid to alleviate the widespread poverty. Water resources can be successfully managed for fisheries and aquaculture by the beneficiaries themselves, of which the Lake Management Groups in the oxbow lakes are a prime example. Moreover, fish yields are high and often more profitable than paddy cultivation. Self-management by the Lake Management Groups also ensures that the benefits are spread over a large number of people. The main conditions for success are security of tenure guaranteed by the government, and easy access to credit by the target group.

BAOR FISHING METHODS	 KOTCHAL	 KOMAR	 CHAK JAL
SILVER CARP			
CATLA			
GRASS CARP			
ROHU			
COMMON CARP			
MRIGAL			

KOTCHAL: SEINE NET USED BY 2 BOATS TO ENCIRCLE CARP MID-WATER.  
 KOMAR: BRANCHES IN DEEP WATER ENCIRCLED BY NET TO CATCH CARP.  
 CHAK JAL: A PLUNGE NET USED IN SHALLOW WATER TO TRAP CARP.

*Baor fishing methods as illustrated by the project.*

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