

# Important and Over-exploited

**A case study of baor fisheries management of Bangladesh**

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*Community-based fisheries management has long been practiced in baor fisheries  
(Photo: Md. Monzurul Islam, 2019).*

## Abstract

*Oxbow lakes, locally known as baor, have formed during the decades-long process in which dead sections of rivers altered their course while keeping in a considerable amount of water. This chapter discusses the historical evolution of baor management regimes, different management systems, resource status, and users. The findings suggest that the baor resources are being governed by Jolmohal Management Policy (2009) under three management categories: the first category, initially started in 1978, falls under the Oxbow Lakes Fishery Project OLP I and is directed by the Department of Fisheries; the second category, started in 1989, falls under Oxbow Lakes Small-Scale Fishermen Project OLP II within the community-based fisheries management system; third category governs the lease of the baor resources to genuine fisher association. This chapter highlights the limitations of management regulations and discusses fishers' rights, hazards, and livelihoods, concluding that the second management approach category is the best. Based on field observations and stakeholders' input, the chapter provides recommendations on overcoming challenges and ways to improve the management and sustainability of resources.*

## Introduction

Baors, globally known as oxbow lakes, are a particular type of water bodies found in the southwest region of Bangladesh. These water bodies are semicircular, dead sections of rivers that have been altering their courses for decades, keeping in a considerable amount of water. The arc size may vary in length, ranging from 10 to 95 percent of a circle, never completing a full circle. Baor is typically a semi-closed water body that is still part of the river floodplain, connected by its inlets and outlets. It is considered a natural habitat and breeding ground for different indigenous fish and has a huge potential for fish culture. A unique characteristic of a baor is that both aquaculture and capture fisheries are practiced without installing any

specialized system/structure. *Baors* are located in the southwestern districts of Bangladesh: Jashore, Jhenaidah, Chuadanga, Kushtia, Bagerhat, Magura, Meherpur Satkhira, Faridpur, Gopalganj, Madaripur and Rajbari. These are important ecosystems for the country's inland small-scale fisheries and are common property resources for the local people (DoF, 2019). About 600 *baors* are occupying 5,671 hectares (ha). The area of each *baor* ranges between 10–500 ha, and there are typically one to seven villages located on its shores. Historically, *baors* were considered rich in fisheries resources. The total fish production in the *baor* ecosystem is 10,343.00 metric tonnes (MT), and the average production is 1,824.00 kg/ha, with an annual growth of 28.13 percent in the financial year 2018–2019 (DoF, 2019). Though these *baors* are mostly semi-closed, they are rich in biodiversity. In most of the *baors*, there are two types of fisheries population: stocked (hatchery-reared fish fry is released into *baor* for stock enhancement) and non-stocked (indigenous to *baor* ecosystem).

Over the years, *baor* ecosystems have been facing pressures from natural and anthropogenic threats and risks, including increasing population, siltation, low water flow from the upstream, unplanned Flood Control and Drainage (FCD) and Flood Control Drainage and Irrigation (FCDI) programmes, turning roads in open water bodies, alteration/disappearance of aquatic habitats, loss of river *beel* connection, myopic government agriculture and water leasing policies, and global environmental change, that have led to a loss of breeding and nursery grounds as well as an overall decrease in fisheries productivity (Alam *et al.*, 2017). Most of the *baors* are silted up, resulting in reduced water volume available for fisheries productivity and other benefits due to intensive agricultural farming in their catchment area. To address these challenges, the development of responsible *baor* management and proper use of its resources should be a priority.

## History and evolution of *baor* management regimes

According to the 'Jalmahal Management Policy 2009', *Jalmahal* is a body of water in which the water stays occasionally or remains throughout the year. *Jalmahal* is also known under the following terms: *haor*, *baor*, *beel*, *jheel*, pond,

ditch, lake, *dighi*, *khal*, river, and sea. *Jalmahal* can be a closed or an open water body. Fishers' access to these *Jalamahals* has a long history. Before the British colonial regime (1757), fishers had traditional rights over open water bodies, including rivers, floodplains, wetlands, lakes, and oxbow lakes. At that time, fisheries resources were treated as common property and managed by the local fishing community. Fishers held this right up to the early stages of the British colonial regime. To generate revenue for the colonial government, the Permanent Settlement Act was passed in 1793, and these rights over the *Jalmahal* shifted to the *Zamindars* (landlords). At that time, the *Jalamahals* and the surrounding land were sub-divided among *jotedars*, who gave them to *ijaradars* through a lease system. *Ijaradars* collected a toll (tax) from the fishers for fishing on behalf of the particular *jotedar*. Most of these leaseholders were non-fishers. Low caste Hindus were fishers and some rural low-status holder Muslims became fish traders. This system continued till the division of India in 1947.

Afterwards, the new Pakistan government abolished the *Zamindar* system. The *Jalmahal* became government property through a land settlement act (Section 3, The East Bengal State Acquisition and Tenancy Act, 1950). The responsibilities of *Jalmahal* (except reserved forest area) went to the revenue department. An open-auction leasing system was practiced from 1950 to 1965 and during this time the right to use *Jalmahal* was given to the highest bidder. From 1965, preference was given to the fishers' co-operative societies registered at the co-operative department in order to help the poor fishing communities. In independent Bangladesh, during 1973-74, the preference was given to the registered fishers' co-operative society to agree to the highest bid value. However, this system was unsuccessful. Because the leasing system was introduced by the previous leaseholders taking the co-operatives façades and arranging a sub-leasing system also having an effective control, all *Jalmahal* including *baors* have started to be transferred from the Ministry of Land to the Ministry of Fisheries and Livestock (MoFL) with an attempt to change these from revenue-earning to sustainability by a presidential order during 1974-84 (Ahmed *et al.*, 1996; UK Essays, 2018; Mamun and Brook, 2015). During 1984-86, *Jalmahal* were leased out through an open auction system within the

fishers' co-operative societies that replaced the negotiation system, which was ultimately changed to a sealed-envelope tender system (UK Essays, 2018).

The New Fisheries Management Policy (NFMP) was launched in 1986 to emphasize ecological management of selected *Jalmahal*. Under this rule, a licensing system was introduced to protect fishers' rights over the water body. Due to its failure, this policy ended in 1995 (UK Essays, 2018). During 1995–1996, the Open Access Policy was launched, abolishing the lease system of flowing rivers. Under this policy, license-free fishing was made available for all except for fishers using mechanized boats. In 2005, the Water Body Management Policy was passed to ensure poor fishers get access to *Jalmahal*. In 2009, *Jalmahal* Management Policy was adopted when the government approved some changes in Water Body Management Policy 2005 (UK Essays, 2018). With the evolution and changes of *Jalmahal* management over hundreds of years, the *baor* management also faces transformation. After Bangladesh achieved independence in 1971, several projects were undertaken for different *baor* ecosystems. To demonstrate the possibilities of a major increase in fisheries production, a pilot project called Oxbow Lakes Fishery Project (OLP I) was launched during 1978–1986 with financial assistance from World Bank/IDA (Ahmed D, 1998). Through the OLP I project, six *baors* were brought under culture-based fisheries management during 1978–1986. Under this system, the *baors* are directly managed by the Department of Fisheries (DoF) and fishers enjoy their rights to *baor* resources on a catch share basis. After completing the project, the government was inspired to undertake Oxbow Lakes Small - Scale Fishermen Project OLP II (1989 – 1997). The OLP II was introduced in 1989 to establish the rights of poor fishers by ensuring their participation in the management process. The project was implemented in 23 *baors* by the DoF and the Bangladesh Rural Advancement Committee (BRAC) with technical assistance from the Danish International Development Assistance (DANIDA) and funded by the International Fund for Agricultural Development (IFAD) and DANIDA (Middendorp *et al.*, 1996). Under the OLP II, *baors* are being managed through Community Based Fisheries Management (CBFM) with the supervision of DoF. Although both projects have been completed, currently, these 28 *baors* are being cultured and managed like “OLP

I programme (6 *baors*)” and “OLP II programme (22 *Baors*)” for enhancing overall productivity of these *baors* and to uplift the socio-economic condition of the fishing communities. The rest of the *baors* are leased out to private bidders under the ‘*Jalmahal* Management Policy 2009’ by the district *Jalmahal* committee on behalf of the Ministry of Land. This policy ensures that only genuine fishers can get a lease of *baors* by creating an officially registered fishers’ association or co-operative. However, the reality is that the powerful local individuals had convinced the poor fishers to form an association to get the lease of the *baors*. At the same time, the rural elite became the de-facto owner of the lease.

## Types of baor resource management

Over the years, three different types of management practice have evolved in *baors* enforced by three different types of controlling bodies. Thus, the *baors* are historically categorized under three categories based on their management.

In the first category, the *baors* are managed under the OLP I programme; the government provides necessary technical and administrative management such as fingerling stocking, that is managed and supervised by the *baor* manager and assistant hatchery officer. The DoF provides the fishing license to lakeside fishers. Members of *Matsajibi Samiti* (fishers’ organization) receive the license for the non-stocked fish catch. However, some selected fishers get licenses to harvest cultured and non-stocked fish. Non-stocked fish can be harvested freely, around the year, using different gears, while cultured fish is harvested twice a year. Fishers get a 40 percent share of the total catch, and 60 percent goes to the government. Of the 60 percent, the DoF receives 35 percent, and the Ministry of Land (MoL) gets 25 percent of the revenues.

In the second category, *baors* are managed under the OLP II programme, where the fishing communities are the main governing body. The government provides technical support through the local fisheries office. The Lake Management Group (LMG) implements the CBFM. The LMG is an elected body voted by the local fishers’ association members. The committee of

LMG is comprised of a chairperson, a secretary, a cashier, and the fishing group leaders. A fishing group consists of fourteen to sixteen members. Each LMG consists of a Lake Fishing Team (LFT) and a Fish Farming Group (FFG) (Middendorp et al., 1996). LFT members are men, while women belong to FFG. FFG members are only involved in fish farming in the *baor* fishponds.

Unfortunately, a conflicting relationship exists between the two groups. The main reasons behind the conflict include: (i) objection from LFTs and the wider community regarding the participation of women in fisheries activity; (ii) both groups claim their demands on *baor* fishponds; (iii) dispute over the share of fish harvest during the floodwater inundation of *baor* fishponds; and (iv) inability of women to directly partake in fishing. However, communities developed some management rules focusing on sharing benefits, access to the common resource pool, conflict prevention, and keeping the ecosystem healthy. As part of successful management, they unified the two groups (LFT and FFG) as part of which men from fish farmers' households take part in *baor* fishing activities on behalf of women. Fish is harvested (both stocked and non-stocked) at least thrice a year. Net income is equally distributed among the fishers. However, the level of success is not the same for all lakes under this management category. For example, only a few *baors* have sanctuary because all fishers need to agree on establishing a sanctuary. Still, this category is the best of the three management systems.

Under the third category (in a leased *baor*), resources are managed by a lease holding fishers' association. The leaseholders have full control over the water body and access to both the stocked (culture) and non-stocked (capture) fisheries. The leasing policy itself restricts many fishers from benefiting from the *baor*. Despite several local fishers' associations, only one association can get the lease, which creates conflicts between fishers' associations. A small mesh-sized net is used to harvest both stocked and non-stocked fish. Some leaseholders allow local fishers to catch non-stocked fish in small quantities, although this is not permitted in most cases. The high cost of leases motivates the leaseholders to cultivate fast-growing fish in high density, hampering the natural balance of the water body, which eventually affects the overall biodiversity. For example, small indigenous species in these *baors* are on the

verge of extinction.

## Fishers' livelihoods

The majority of the fishers in *baor* areas have been fishing for, on average, 20–30 years. Most of them are lower caste Hindus for whom *baor* fisheries is a traditional occupation. The total number of fishers of a particular *baor* is divided into sub-groups of fourteen to sixteen members, each led by a group leader. Each group operates their fishing net separately from others near the *komor* (bush shelter), which is selected for them during stocked fisheries harvesting time. Most fishers have 3–4 pieces of *komor* and *kochal jal*, which they join together during operation. In addition, most fishers have their fishing craft (*dingi nouka*) by which they can catch non-stocked fish round the year. Women don't participate in harvesting activities, but they are involved in mending nets and fish sorting alongside their husbands.

Before introducing cultivated fisheries, *baor* resources used to be open for all fishers. After the aquaculture was introduced, a section of fishers was left out. However, some interventions were beneficial, such as marketing activities, improving transportation modes, new trading opportunities, and crop production increment. Altogether, these transformed the effect of oxbow lakes, contributing to the well-being of the people living around the catchment area. Specifically, the project helped part-time and full-time fishers (those with landholdings of 2.5 acres or less) by providing employment opportunities. In this way, the project activities helped different landless people boost their income and increased the productivity of the oxbow lakes and their adjacent water bodies. At the same time, the intervention led to some fishers losing their fishing opportunity as they are not selected as project beneficiaries. As a result, the fishers' human rights and *de facto* rights have been violated since they traditionally utilize *baor* resources. Consequently, they are forced to adopt various new livelihood strategies, including working in agricultural and non-agricultural activities.

During the lean times and fishing ban periods, the livelihood of fishers is tough. As they have limited alternative income options, most of them

take loans from middlemen or NGOs at a high-interest rate, making them further vulnerable to poverty. In coping with such a situation, some adopt different strategies, including working as day laborers and reducing the daily meal intake in terms of number, size, and quality of meals at the household level. Moreover, they take their kids back from school and employ them to work to supplement the family income. Additionally, overexploitation of common-pool resources and other environmental degradation undermine the community's adaptive capacity to a severe level. Food insecurity, malnutrition, and human causality are the typical consequences of such disasters.

## Obstructions to baor fisheries management

The barriers to managing *baor* fisheries are multi-dimensional, caused by different management, natural, economic, and social factors in *baors* that are managed under different regulating bodies (Ahamed *et al.*, 2019). These challenges and their likely causes and effects on *baor* fisheries management are shown in Table 1.

Table 1: Challenges in *baor* fisheries management with their likely causes and effects.

## IMPORTANT AND OVER-EXPLOITED

Key challenge	Type of <i>baor</i> management category	Likely Cause	Impacts
Flawed leasing system	ABC	<i>Jalmahals</i> belong to the Ministry of Land, and beneficiaries must lease these water bodies for a particular period without any time-length guarantee.	DoF/fishers/leaseholders must follow top-down decisions by the Ministry of Land that may create unfavorable conditions in the fish population.
Absence of sanctuaries	BC	Lack of agreement among fishers when it comes to establishing a sanctuary and lack of incentives from the authorities	Decreased species diversity of non-stocked fish species
Insufficient fry release	A	Lack of attention and care of the <i>baor</i> management authority	Targeted production of fish not being achieved
Poaching	A	Insufficient monitoring and lack of attention of <i>baor</i> management authority	Poaching of fish that causes a decline in fish production
Pollution from agricultural waste	ABC	Fertilizers and pesticide run into <i>baors</i> through rainwater from the catchment area.	Deteriorated water quality that causes fish mortality
Jute retting	AB	Local communities use <i>baor</i> water as the primary source for the jute retting process.	Water quality deterioration affects fish production and domestic use of water.
Aquatic weeds	A	The growth of weeds is stimulated by the runoff of nitrogenous fertilizer from the catchment area.	Declined water suitability and decreased water depth for fisheries habitat
Insufficient rainfall during monsoon	ABC	Seasonal disturbance due to climate change effect	Hampered recruitment in the population of non-stocked indigenous fish
Decreasing water depth	ABC	Siltation and lack of excavation	Decreased fish stock abundance in <i>baor</i>
Decreasing water area	ABC	<i>Baor</i> periphery is more silted due to jute retting and crop cultivation, and the <i>baor</i> area is being squeezed	Decreased fish stock abundance in <i>baor</i>
Heavy rainfall and floods	ABC	Climate change anomalies, surface runoff, and siltation caused floods in the <i>baors</i>	Overflowing water from a lake causes fish to escape
Poverty	AB	Income from <i>baor</i> remains low	Fishers face trouble in securing the money needed for investments in fishing
Poor interest in secondary occupation	A	Fishers entirely depend on <i>baor</i> resources and consider it as a traditional occupation	Vulnerable livelihoods
Exploitive loan system	ABC	High-interest rate and difficulties in securing loans from banks and NGO	Unable to make investments that would improve livelihoods and help in coping with shocks
Poaching	AB	Insufficient guard and livelihood vulnerability drives local people (mainly those who don't have the membership) to poach	The decline of fish production and fishers' income
Ignorance of local fishers	ABC	The fishers lack awareness of good governance practices and resource stewardship	Unsustainable fish production

A: *Baors* managed by the DoF, B: *Baors* managed by CBFM, C: *Baors* managed by the leaseholders

## Conclusion

In southwestern Bangladesh, a considerable portion of the population depends on *baor* fisheries resources for their livelihood and well-being. While once *baors* were rich with fisheries resources, environmental changes have been gradually slowing down the free-flow of these open waters. However, these changes made many *baors* suitable for aquaculture. Now *baor* fisheries in Bangladesh are mostly filled with extensive culture systems. A proper management strategy and introduction to modern aquaculture practices, such as semi-intensive and intensive practices, can improve production. The CBFM based management has been identified as the best among the three existing management systems in *baor*. However, even under this management scheme, the diversity and abundance of small indigenous fish species is declining due to natural habitat degradation. The majority of *baors* have no fish sanctuaries to protect fish species from overexploitation. The government should take the necessary steps to establish at least one permanent sanctuary for each *baor* with regular monitoring through the Department of Fisheries. Additionally, ecosystem-based *baor* management should be practiced. It is also urgent to introduce a fair leasing system, developed specifically for poor fishers. The government should implement a monitoring system. Credit facilities that are mortgage-free and with low interest rates should be available to fishers. Finally, technical measures such as excavating silted lakes and establishing no-take fish sanctuary should be properly managed in each *baor*.

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