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Barriers to Developing the Fisheries Sector in Bangladesh

This Policy Brief identifies the barriers to development of the fisheries sector and makes specific policy recommendations for sustained growth of fisheries in Bangladesh.

1. Introduction

Bangladesh, like most tropical countries, derives its fishery resources from diverse and complex natural systems. These systems are related, intertwined, and affect each other and produce not only fish but other eco-system services as well. Catch from the capture fisheries comes from at least four sources: river and estuaries, beels, the Kaptai Lake and flood lands. The sector is endowed with more than 260 species of fish (Rahman 1989) and about 56 species of prawn (Kibria 1983).

The area under capture fisheries has been declining over the last decades while the area under culture fisheries has been rising. Catch from ponds and coastal shrimp farms almost doubled between 2001 and 2011. Before the 2000s, most of fishes came from the capture fisheries sector but now the situation has been reversed and most fishes come from freshwater aquaculture. This structural transformation in the inland fisheries sector has strong implications on consumption, nutrition, poverty and livelihoods of a significant share of the rural people who derive their livelihoods from the fisheries sector.

Though capture fisheries are declining, these activities are important for two reasons. First, the resource is more accessible and a large section of the population continues to depend on capture fisheries. Second, the significance of fresh water fishes as a major source of animal protein and micronutrients for the poor is well established (Minkin et al. 1997, Kawarazuka and Béné 2010, 2011, Roos et al. 2007). If the growth of this activity is hindered, it is likely to affect not only the livelihoods of a large number of rural population but also the nutritional status of many poor households.

Aquaculture is now recognized as one of the fastest growing animal food producing sectors in Bangladesh. The country is regarded as one of the most suitable countries in the world for freshwater aquaculture because of its favourable resources and agro-climatic conditions. There are about 371,309 hectares of freshwater ponds in Bangladesh and 3 million farmers are involved in fish farming. Aquaculture plays an important role in the economy of Bangladesh, providing food, nutrition, incomes, livelihoods and export earnings.

¹This policy brief is based on the study, Barriers to Development of the Fisheries Sub-Sector, carried out by K.A. Toufique and Nesar Ahmed under the Policy Research and Strategy Support Program (PRSSP) being implemented by BIDS with support from IFPRI and USAID.

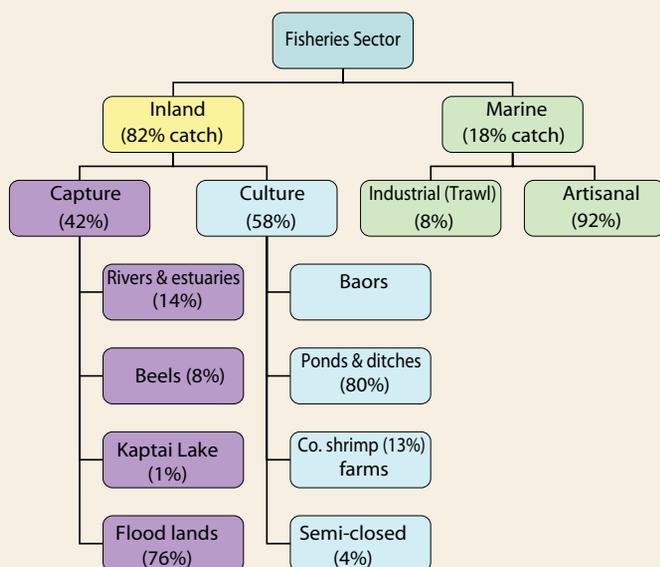


2. A Note on Methodology

The analysis adopts an institutional analysis and development (IAD) framework to analyze the problems of management of inland capture fisheries in Bangladesh. In this framework, appropriators working on a resource system face two types of problems: appropriation problems and provision problems. In appropriation problems, the production relationship between yield and the level of inputs is assumed to be given and the problem is how to allocate the yield. The provision problems, on the other hand, 'concern the effects of various ways of assigning responsibility for building, restoring, or maintaining the resource system over time' (Ostrom 1990: 47). The analysis of the culture fisheries sector is based on the experience of aquaculture growth in the district of Mymensingh.

Both primary and secondary level data have been used in the study. Primary data were collected from a *beel* environment and another from a river system. A re-visit was made to a river site studied by one of the authors in 2002. Both quantitative and qualitative data were generated using semi-structured interviews and focus group discussions. Information collected from the key informants was also used.

Figure 1: Structure of Bangladesh's Fisheries Sector, 2010-11



3. Major Issues for Analysis

Capture fishery refers to the harvesting of "fish and prawn populations in the open inland water systems (that are) self-reproducing and self-sustaining" (Ali 1989: 38). The key issue with capture fisheries is to ensure that this "self-reproducing and self-sustaining" property is maintained after human intervention over time. Capture fisheries in Bangladesh are generally characterized by small-scale/household-based activities. Participation in capture fisheries is high and the

bulk of the catch is consumed locally. Benefits from capture fisheries are more accessible, especially to the poor and are widely distributed. Unfortunately, capture fisheries are highly threatened in Bangladesh at present.

Bangladesh's capture fisheries are threatened by a wide variety of factors including habitat loss as a result of agricultural intensification, urbanization, environmental degradation, pollution, and overexploitation. The barriers to the development of capture fisheries in Bangladesh can be classified as both external and internal factors. Both these barriers are constraining growth of capture fisheries but the external factors play the key role. The most crucial external factor is the issue of governance, regulation and management of the capture fisheries sector. Destruction of immature fish (ova, larvae, breeding fish) and use of illegal fishing gears are the most important internal factors. Both of these relate to the external factor of poor resource governance.

Table 1: Barriers to capture fisheries

Internal Factors	External Factors
Overfishing	Governance, regulation & management
Destruction of immature fish (ova, larvae, breeding fish)	Contraction of fishing grounds (FCDI projects)
Use of illegal gears	Pollution
Unregulated FPA	Urbanization
	Environmental degradation
	Climate change

Source: Toufique and Ahmed 2013.

Historically, fish farming in Bangladesh has been a traditional practice since the country was ruled by Hindu kings. Many kings created ponds as sources of water for drinking, other household uses, and sometimes for irrigation. These ponds were also used for rearing fish as a recreation rather than for commercial purpose. Later on, these ponds were also devoted to fish culture. This got a boost when induced breeding of major carps using pituitary gland extracts was introduced in 1967.

Since the establishment of the Department of Fisheries (DOF) in 1977, it has been working towards increasing fish production to meet the growing demand for domestic consumption. The Bangladesh Agricultural University (BAU) and the Bangladesh Fisheries Research Institute (BFRI) also played key roles in the development of aquaculture.

The Mymensingh region is one of the most important places for freshwater aquaculture in Bangladesh. Mymensingh

is ranked first in fish production in ponds in the country and it produces about 220 thousand tons of fish per year from freshwater aquaculture, which is around 18 percent of total pond fish production in Bangladesh. Aquaculture is commonly regarded as part of the cultural heritage of the Mymensingh region. Geographically, Mymensingh has been identified as the most important and promising area for freshwater aquaculture because of the availability of hatchery produced fry, favourable resources and climatic conditions.

After independence of Bangladesh in 1971, extensive aquaculture in Mymensingh mainly involved stocking ponds with natural seed. Following the introduction of technology for induced breeding of carps, coupled with improved-extensive and semi-intensive aquaculture using fertilizers and supplementary feed in the early 1980s, fish farming became widespread throughout the Mymensingh region.

4. Key Research Findings

Capture fisheries

Manufacturing establishments in Bangladesh hardly have any facilities for handling effluents other than dumping them in the nearest available sources of water. As such, many industries are located close to the fisheries resource systems. There are 144 industrial units in Chittagong alone that pollute the water of the river Karnafuli and the estuaries of the Bay of Bengal. Similar pollution occurs in the Kushiyara river due to discharge from a pulp mill; in the Tulshiganga river due to discharges from a distillery and so on. The water of the Surma river is also heavily polluted by two industrial units, a pulp mill and a fertilizer factory (Ali 1989). As a result, the migration of hilsha fish through the river has substantially been reduced. Another important source of environmental degradation of the fishery resources is the increasing use of chemicals like insecticides and pesticides

applied to boost rice and other crop production. The retting of jute also affects fishes in open waters.

In Bangladesh, the Epizootic Ulcerative Disease (Syndrome) of fish was observed in February 1988. It took an epidemic form and vastly increased the mortality of fish at that time. One of the major impacts of Flood Control, Drainage and Irrigation (FCD/I) projects on the fishery resources is through breaking the links between the beels and the rivers via the canals. The implementation of such water management projects also reduces the size of the flood lands as well as the length and intensity of the floods.

Several studies have found that a significant amount of rent exists in inland fisheries in Bangladesh. However, the evidence regarding biological overfishing is somewhat inadequate and inconclusive. Increased application of fishing effort is often cited as a probable cause of biological overfishing. This observation often leads to the view that fishery resources are being gradually depleted. But much depends on the population dynamics of fishes. It is generally believed that reduction in fish stock is more due to environmental factors than through overexploitation of the resource. Most inland fisheries are multi-species, multi-gear in nature, so standard assessment models and concepts of overfishing are inappropriate and can only be superfluously applied. Overall, it seems that inland fisheries in Bangladesh are heavily fished and there is probably little scope for any substantial increase in catch from these resources.

It is widely observed that the destruction of immature fish (ova, larvae, breeding fish) and use of illegal gears have been affecting fish stock significantly in the capture fisheries sector. The management of capture fisheries in Bangladesh has gone through a long process of interventions by the state, private agents, donors, various interest groups representing the fishing community and so on. The crux of the management problem is seen as establishing fishing rights of the fishers over about 120,000 water bodies (*jalmahals*) owned by the state. These water bodies are in the custody of the Ministry of Land;





and the Ministry transfers leasing rights to registered fishers' organizations. This is generally referred to as the leasing system. The acute generic problem faced by the system is that the rights, in most cases, eventually end up with the non-fishers who are generally influential and powerful people. Thus the leasing policy concentrates more on identification of what is called "genuine" fishers or their organizations. At some stage, a licensing system was introduced where rights were transferred to individual fishers rather than to their organizations.

The water bodies are usually classified as closed and open. In 1995, the government stopped leasing out open water bodies. This triggered a period referred to as the open access system. The closed water bodies, on the other hand, are classified in terms of those having an area less than 20 acres and those larger than 20 acres. The Jalmahal Management Policy of 2009 (amended in 2012) sets the rules for the transfer of rights. Rights over fishing grounds are transferred to registered fishers' associations through negotiations for a period of one to three years. There are three specific aspects of this policy which can be distinguished from the past policies. First, water bodies less than 20 acres used to be under the Ministry of Youth and Cultural Affairs. They are now brought back to the Ministry of Land but preference is still given to youth fisher organizations. Second, leasing by negotiation has been introduced. Finally, committees are now formed at district and upazila levels for leasing out the water bodies. The local Members of the Parliament are included as advisors to these committees.

Historically, politicians have always played a prominent role in the leasing process. Through the arrangement, this has been formalized. No principle for managing the resource is stated apart from those given in the Fish Act of 1950. Water bodies less than 20 acres are supposed to be managed by community based fisheries management when a youth

fishers' organization is not available. The water bodies over 20 acres are expected to follow the principle of '*jal jar jola tar*' (those who own fishing nets will have the water body). None of these terms are defined or explained and they are used in a populist manner. Several attempts to biological management of the water bodies were made by interventions from the donors, NGOs and also the government. The FFP (Fourth Fisheries Project) and CBFM (community based fisheries management) are obvious examples of this attempt. However, these have not pursued as the leasing periods with the fishermen managing water bodies under CBFM or FFP have not been extended.

In practice, the existing management system focuses on altogether different aspect, the objective of transferring leasing rights to genuine fishermen dominates all other issues and concerns. The provision problem receives inadequate attention. There is no mention of any issues related to assignment problems or to effort control or rent maximization. Donor interventions also focused more on re-distributive issues and the emphasis on resource governance got the highest priority. The donor supported projects concentrated more on developing institutions that would ensure better governance of the capture fisheries sector. This, however, has not been emphasized in the leasing policy. The fishermen's cooperatives were assumed to act as an institution that would take care of resource governance without much problem. That is why often the maxim of '*jal jar jola tar*' is mentioned including the management of fishing grounds by the community.

Case studies on two water bodies

Case studies on two fishing grounds are used in this report to provide empirical support to the above hypotheses. These are the *Charan Beel* and the Tangaon River. Both were under donor supported projects in which the government also participated financially. The *Charan Beel* was under CBFM-II and Tangaon River was under the FFP. The *Charan Beel* was considered a success story, since like in Tangaon River, the fishermen could establish their rights over the water body with the help of the project. The present study examined whether the institutions developed by the projects during their implementation continued to exist and addressed appropriation and provision problems. The study also examined the nature of the barriers to growth of these water bodies in terms of internal and external factors identified above.

The analysis indicates that the two water bodies suffered most from external factors. In both fishing grounds, siltation of the water body is a big problem. This affected the Tangaon River more where fish catch declined as fishing days got squeezed due to the drop in the water levels. *Beel* catch, on the other hand, varies from year to year and is determined by the extent of flooding. Poor governance by the state also threatens the success of the institutions responsible for managing these water bodies. While formal rights over the water bodies have not been renewed by the state, the fishermen's groups still manage these water bodies with the institutions of the past. However, these institutions seem to be under threat from external agents.

It appears that the lessees were able to address, to a certain extent, the appropriation problems in fisheries, but they could not address the provision problems much in Bangladesh. However, the two donor supported projects mentioned above made good progress in addressing the provision problems. They ensured a closed season. They constructed several sanctuaries and established firm rules in the water bodies. The fishermen in Tangaon got some government funds for re-excavating the main sanctuary to remove silts. Despite the problems associated with the external factors, these measures helped the fishermen to keep fishing in these water bodies still profitable. Both the fishermen's organizations in these locations had good financial health and the fishermen were willing to negotiate with the state for formal right over the water bodies. However, the absence of these rights at present has given rise to a sense of uncertainty among the fishermen. It appears that the non-fishers are now progressively entering to dominate fishermen's organization in the Tangaon River.

The case studies thus show that the external factors form important constraints to growth in the country's fisheries sector. The study brings out that successful establishment of the rights of fishermen over water bodies are possible and effective institutions can be developed as an alternative to the leasing system. Moreover, well conceived institutions have the capacity not only to address the appropriation problems but also the provision problems. However, government support is needed for retaining the successes and replicating them to other fishing grounds. Current management policy rightly focuses on giving fishing grounds to the

fishermen but it must be understood that this is only the first step. The next step is to support the fishermen to develop appropriate institutions. In this respect, as the present study shows, successful cases exist to show how the government can facilitate the co-management processes.

Culture fisheries

As mentioned earlier, small-scale aquaculture is expanding fast in Mymensingh region where a large number of fish farmers are involved. There are nearly 140,000 farmers involved in aquaculture covering an area of 28,889 hectares. A total of 145,428 fish ponds have been identified in Mymensingh with an average pond size of 0.20 hectare.

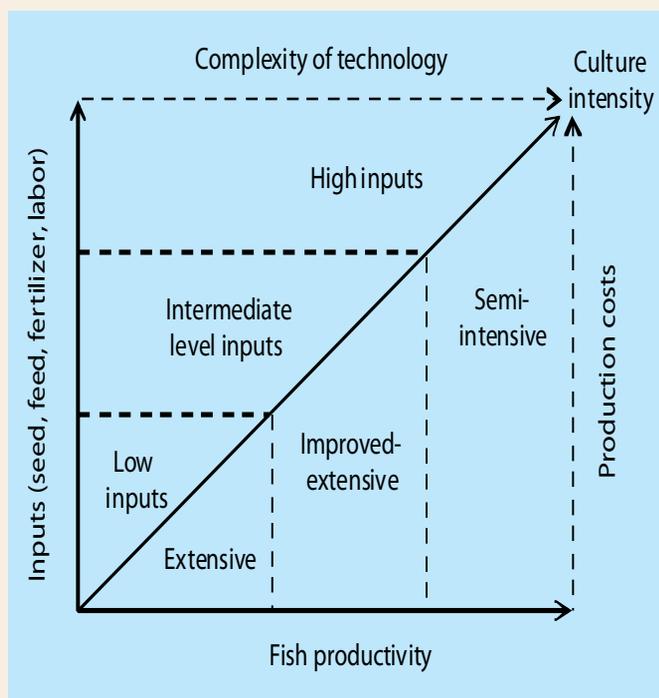
Most of the aquaculture technologies and farming systems currently practiced in the Mymensingh region are provided by the Bangladesh Agricultural University (BAU), Bangladesh Fisheries Research Institute (BFRI), Department of Fisheries (DoF), Mymensingh Aquaculture Extension Project (MAEP) and adapted through farmers' own innovations. At present, private hatcheries dominate the seed supply in Mymensingh region and there is an adequate supply of carp, catfish and tilapia seed from over 125 hatcheries. Feed is another important input for increasing fish production and there are 33 commercial fish feed industries in Mymensingh region.

The average annual fish yield in Mymensingh is estimated at 7.58 tons/ha. And it is estimated that total annual fish production in Mymensingh has increased from 50,427 tons in 1980 to 218,952 tons in 2010, showing an annual growth of 11 percent for aquaculture in Mymensingh.



Aquaculture in Mymensingh is divided into two classes: polyculture and monoculture. Most farmers (60 percent) are involved in polyculture, while only 40 percent of the farmers are practicing monoculture. Most fish farming households are also involved in small-scale pond dike cropping (vegetables and fruits). Based on the culture intensity, aquaculture in Mymensingh is classified as extensive, improved-extensive and semi-intensive (Figure 2). About 40 percent of the farmers are involved in extensive farming, while 35 percent and 25 percent practice improved-extensive and semi-intensive farming respectively. None of the farmers practice intensive farming mainly due to resource-poverty and inadequate facilities.

Figure 2: Inputs, fish productivity and culture intensity in aquaculture



Mymensingh is one of the most important places for pangas farming in Bangladesh. Pangas is the most dominant species in Mymensingh accounting for 54 percent of the total aquaculture production compared with its share of only 13 percent in national aquaculture production in Bangladesh. Traditionally, Indian major carps (catla, mrigel and rohu) have long been cultured in Mymensingh. Rohu is the most dominant species among Indian major carps contributing 11 percent to aquaculture production in Mymensingh, followed by catla (9 percent) and mrigel (6 percent). These three species account for 26 percent of the total aquaculture production in Mymensingh compared with their share of 52 percent in the national aquaculture production in Bangladesh.

Exotic carps contribute about 8 percent to aquaculture production in Mymensingh district compared with the share

of 17 percent of these species in the national aquaculture production in Bangladesh. Among exotic carps, silver carp is an important fish, especially for the poor. Other fish species including tilapia, climbing perch (koi), stinging catfish (shing) and walking catfish (magur) are also cultured in Mymensingh.

In general, fish productivity increases with the level of culture intensity. The annual yield of fish is higher in semi-intensive farming (above 10,000 kg/ha), compared with improved-extensive (5,000-10,000 kg/ha) and extensive farming (up to 5,000 kg/ha).

The fish marketing system in Mymensingh region is traditional but plays an important role in connecting the farmers and consumers, thus contributing significantly to the value adding process. The marketing channel from the farmers to the consumers intertwine primary, wholesale and retail markets involving local agents, suppliers, wholesalers and retailers.

A number of constraints are reported for aquaculture in Mymensingh region including technical, social, economic and environmental ones (Table 2).

Table 2: Major constraints of aquaculture in Mymensingh

Constraint	Element
Technical	<ul style="list-style-type: none"> • Low input farming systems • Inadequate technical knowledge on scientific fish farming • Poor water quality and fish diseases • Poor quality of hatchery fry
Social	<ul style="list-style-type: none"> • Multiple ownership of ponds • Poisoning of fish farms • Poaching of fish • Friction between rich and poor farmers
Economic	<ul style="list-style-type: none"> • High production costs • Lack of financial support • Low market price of fish • Inadequate marketing facilities
Environmental	<ul style="list-style-type: none"> • Unplanned conversion of rice fields into ponds • Impacts on rice field ecosystem and biodiversity • Climate change (flood, drought) • Impacts of excessive use of chemicals and growth hormone

Source: Toufique and Ahmed 2013.

Overall, the impacts of aquaculture development in Mymensingh appear to have a positive effect on fish production, livelihood opportunities, poverty alleviation and economic growth.

5. Major Policy Implications

- Wherever appropriate, community based fisheries management should be pursued.
- The open access policies in open waters should be abolished and, wherever feasible, they should be brought under community management.
- A cautious approach needs to be taken in promoting flood plain aquaculture (FPA). It should be promoted in areas where households are least dependent on the flood plains and also where it does not affect the stock of wild fishes.
- Public water bodies suitable for aquaculture should be leased out on the basis of efficiency and growth rather than equity/poverty reduction alone.
- More resources need to be invested in the development of capture fisheries. This may include habitat restoration, enforcement of Fish Acts and similar actions. Open water fisheries should be considered as the “bank of the poor” and should continue to get priority attention for its greater poverty reduction role.
- The provision of technical assistance along with institutional and policy support should be strengthened for promoting sustainable fish farming in Mymensingh.
- The basic technical knowledge of efficient and integrated fish farming should be provided to the farmers through the DOF and the NGOs.
- A range of public-private partnerships, higher investments, and more effective initiatives are needed to realize the potential of further development of aquaculture in Mymensingh.
- Further research is needed to better understand the environmental impacts on aquaculture and their implications.

For the future, it is desirable to integrate the targets of the fisheries sector with targets of other agricultural activities, especially dike cropping of fruits and vegetables and rice-fish farming. A range of public-private partnerships, investments, and initiatives are needed to realize these



potentials. Public-private partnerships offer potentially important opportunities for aquaculture development (World Fish Center 2010). Such collaborations would significantly contribute to food security, poverty alleviation, and economic growth as already achieved in many developing countries.

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Authors

K. A. Toufique is Senior Research Fellow, BIDS; and Nesar Ahmed is Professor, Department of Fisheries Management, Bangladesh Agricultural University, Mymensingh.

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Bangladesh Institute of Development Studies

E-17 Agargaon, Sher-e- Bangla Nagar

GPO Box # 3854, Dhaka-1207, Bangladesh

Telephone: 880-02-9116959, 9143441-8

Fax: 880-2-8141722, www.bids.org.bd

