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Citation	(2018-08-29)
Issue Date	2018-08-29
URL	http://hdl.handle.net/10069/38662
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This document is downloaded at: 2019-09-23T09:46:20Z

A study on the development, evolution and efficiency of floodplain aquaculture enterprises in Bangladesh

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Summary of the thesis

While floodplain water-bodies remain the largest source of captured fish in Bangladesh, small-scale and self-organized aquaculture ventures have been found in these water-bodies since the mid-1980s. Although most of the floodplains are used for agricultural purposes in the dry season and composed of private lands, they turn into seasonal water-bodies during the monsoon because of the inundation caused by overflowing of neighbouring rivers. Such a floodplain water-body can be classified as a common-pool resource (CPR) because of its finite aquatic resources, and the potential difficulties of excluding local users due to its usual large geographical size. In Bangladesh, the Daudkandi sub-district of the Comilla district has become an important site for the development of floodplain aquaculture enterprise (FPA) in floodplains composed of private lands. In this area an early FPA was formed by the landowners in 1984 and, since 1996, an NGO, named SHISUK, has been developing more FPAs. While the NGO-collaborated FPAs (NFPAs) have been later expanded into other districts, the landowners of the Daudkandi region continue to form independent FPAs (IFPAs) without any external support. Because of all these expansions over the last three decades, the initial FPA management system, along with later modifications, provides an opportunity to study a new CPR organization and, at the same time, to investigate the important aspects of development, evolution and performance of aquaculture practices in the floodplains of Bangladesh. This study tries to achieve these two purposes.

At first, considering the FPA management system practiced in CPR, we try to theoretically frame the system in terms of the design principles developed by Ostrom (1990), which are frequently used as defining features of long-surviving successful user-managed CPR organizations. We attempt to find the match between the management system of the first NFPA, Pankowri Fisheries Ltd., and Ostrom's design principles. While the management rules of the NFPA match with the design principles, the design principles are not formulated without considering important variables like the cost borne by excluded past users, community's internal power relationships, resource aspect (for instance, private ownership of floodplain lands), etc.

In the next stage, to study the evolution of the management system, fifteen FPAs are selected from five districts to chart the major modifications in organizational and operational aspects after their inceptions. Organization of the FPAs evolves with increased realization of profitability among the landowners. Consequently, they have not only formed new FPAs by themselves but have also tried to confine the management rights and benefits among themselves by excluding the non-landowner participants. Such realization also renders the previous support of the non-landowners unnecessary, as the landowners now are readily willing to take the risk and responsibility of FPA enterprises. The landowners' prominence is underpinned by the fact of their ownership of lands within the floodplain and, with FPAs being mature, this fact has gradually become more and more significant in determining the access rights to FPAs. Operationally, lease-based management has been introduced where the right of aquaculture operation are transferred to the lessees from FPA's management committee. This mode of operation is an adaptive response to the problem of lower profits which hurts FPA beneficiaries. In communities where the FPA trend is relatively new, the participation of non-landowners in management still exists and FPA management committee runs the aquaculture operation instead of lessees. It is important to see which direction the involvement of non-landowners will take in the future.

In the final stage, the FPAs are compared in terms of their relative efficiency using non-parametric Data Envelopment Analysis (DEA) methodology. By using production data of year 2015-16, the technical, scale and mix efficiency along with the overall efficiency are measured with the help of three DEA models. Utilized land area, fish feed, stocked fingerlings, wage and salaries are used as inputs, and fish sales are considered as output. While eleven FPAs turn out technically efficient, only six of them show overall efficiency. On average, the NFPAs are more efficient than IFPAs. The results indicate that lease management, which has gradually been adopted by many FPAs, is not necessarily more efficient than self-managed FPAs, since only two lease-managed FPAs show overall efficiency. The approach of intensive use of inputs in many older FPAs' doesn't make them efficient, despite their higher fish yield than relatively newer FPAs—which are performing technically efficient ways with optimal scale and mix. While the lease-based aquaculture operation ensures positive returns for FPA investors, the aquacultural operations by themselves remain unprofitable or inefficient in some instances. Given its linkage with government and academic experts, NGO may play an intermediary role to connect such low-performing aquaculture operations with expert knowledge