

An analysis of fisheries exploitation and management practices in Sundarbans mangrove ecosystem, Bangladesh

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Abstract

Sundarbans mangrove of Bangladesh—a World Heritage Site has been providing a wide array of fisheries activities for a large number of coastal people. Over-fishing, particularly collecting *Penaeus monodon* postlarvae from mangrove and near-shore waters, due to increasing demand from shrimp farming, and over exploitation of plant and wildlife species are exerting increasing amount of stresses on the viability of this delicate ecosystem. A number of regulations have been enacted for the conservation of the resources and ecosystem, but yet to rigorously enforced. The initiative to institute a comprehensive fisheries management system by the recent Asian Development Bank supported “Sundarbans Biodiversity Conservation Project”, therefore, marks the beginning of a new era for sustainability of aquatic resources in the Sundarbans.

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1. Introduction

The Sundarbans, the largest single block of mangrove ecosystem in the world, is located in the estuary of the river Ganges, spanning an area of about 1 million hectares in Bangladesh and India. The Sundarbans in Bangladesh cover an area of 6017 km² along its southwestern part sharing 4143 km² of land and 1874 km² of water body. The ecological succession of West Bengal area of the Sundarbans in India is quite different from that of the Bangladesh’s Sundarbans. Unlike most mangrove forest of the world, the tree vegetation of Sundarbans is not dominated by the members of the family Rhizophoraceae

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[1]. The existence of Sundarbans, forming an ideal mangrove ecosystem, supports a large groups of fish, shrimp, edible crab and also supplies food and cash to the coastal communities. One-third of the country's population is dependent on Sundarbans [2]. With over 3.5 million people from the surrounding areas depend directly or indirectly on the Sundarbans for their livelihood, the forest has been reducing alarmingly day by day.

The Sundarbans mangrove forest was declared as “Reserve Forest” in 1875–76 under the first “Forest Act” of the British India. As a reserve forest, control of fishing within Sundarbans is exercised by the Forest Department (FD) and the output from the fishery being regarded as “minor forest products” [3]. As with other forest products, FD exercises their control by issuing of boat/transportation and fishing permits. Activities of the FD on fisheries are exclusively focused on revenue collection. The fisheries resources are exploited on the basis of maximum sustainable yield (MSY), which is not ideal for sustainable management for the fisheries resources of Sundarbans [4]. The UNESCO has declared the Sundarbans as a World Heritage Site in 1999. No comprehensive fisheries management system has ever been existed in the Sundarbans, although currently Asian Development Bank is supporting a project “Biodiversity conservation in the Sundarbans” and some management options are in the process of implementation [5]. The present report aimed at evaluating the fisheries structure and management practices in Sundarbans Reserve Forest (SRF) and, to some extent, the coastal shrimp farming in Bangladesh.

2. Resource exploitation in SRF

The Sundarbans water supports 208 species of fish and crustaceans belonging to 84 families [3], a higher total than that of other tropical mangroves [6]. The mean fish biomass is 39 kg/ha [7], which is comparable to the *Rhizophora*-dominated forests of Malaysia [8]. Table 1 represents the commercial landings of major fisheries group, as recorded by FD from 1985–86 to 1999–2000. Landing of white fish, which represents major share of Sundarbans fisheries, is gradually declining. Marketable shrimp landings is also in a decreasing trend. Landing of *Tenulosa ilisha* and production of dried fish are fluctuating. *Penaeus monodon* fry collection was in peak during 1993–94 to 1996–97, but started to reduce from 1998 to 2000. Harvest of *Scylla serrata* increased from 1993 to 1994, but also reduced during the year 1998–2000.

The magnitude of stock of fishery resources in Sundarbans water has not been assessed systematically and there is very little information on their quality. The production figure assessed by the FD shows sharp fluctuations from year to year and cannot be used to correctly guess the possible availability of stock. The total annual fisheries landing, including the offshore catch in Sundarbans, may be as high as 75,000 MT [9]. Estimation of yield, exploitation rate and MSY of major shell- and finfish species in SRF are presented in Table 2. The fishery of *T. ilisha*, *Pangasius pangasius*, *Plotossus* spp., *S. serrata* was found to be over-exploited at $E = 0.36$ – 0.42 . The exploitation of *Lates calcarifer* has been estimated to be at its optimum at present with a yield of about 150 MT. The fishing of *Johinius argentus* is nearly fully exploited. The current *Macrobrachium rosenbergii* harvest is far from the optimum. The exploitation of gastropod and oyster seems to be underutilized. The IUCN [10] listed some species of Sundarbans as threatened which are presented in Table 3. Abundance of riverine catfish *Pangasius pangasius* and *Plotosus canius* in the SRF is very low and in the verge of extinction.

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