



## Wetland management and conservation, Hail Haor, Bangladesh

**Author:** Paul Thompson ([paul@agni.com](mailto:paul@agni.com)) and Tasneem Balasinorwala (UNEP-TEEB)

**Short title:** Wetland protection and restoration increases yields, Bangladesh

**Key Message:** Wetland management and conservation integrated with ecosystem services and co-management practices.

**Suggested citation:** TEEBcase by P. Thompson and T. Balasinorwala (2010), Wetland protection and restoration increases yields, Bangladesh, available at: [TEEBweb.org](http://TEEBweb.org).

### What was the problem?

Bangladesh floodplains are one of the world's most important wetlands and support about 70 million rural households, including the very poorest (Thompson 2008). They are a critical source of income and nutrition (derived through agriculture, fisheries and collection of other aquatic resources), maintain the health of the local aquifer, reduce flood severity, and improve water quality.

Hail *Haor*<sup>1</sup>, one of the largest overexploited wetlands of Bangladesh, is situated in Moulvibazar District, in the northeast. It is located between hills, on both its west and east directions. These hills are covered by a chain of tea gardens and natural forest blocks. The total watershed covers about 600 km<sup>2</sup> and water from these hills flows through 59 streams (once 350 were reportedly active) into the haor. The water of the haor extends to cover 13,000 ha during the monsoon, but reduces to 3,000 ha during the dry season.

In the past, considered as wastelands, many wetlands were drained out for agricultural production. Existing wetlands continue to be under threat and have silted up, been drained for agriculture and industry, converted to fish ponds and blocked by embankments and roads. The result has been mainly visible through a decline in fish catches.

### What was done to solve it? How were ecosystem services considered?

In an effort to address this, the Bangladesh government and USAID (United States Agency for International Development) initiated a project in 1998 known as the MACH project (Management of Aquatic ecosystems through Community Husbandry)<sup>2</sup>. The project involved working with locals to develop a community-based approach to wetland restoration and management and was completed in 2008. One of the three project sites was Hail Haor.

Among the important early steps to assess the importance of the haor was to assess its economic benefits. This was derived through the annual value of various economic outputs from the area covered during the wet season. The study used detailed GIS-based land-use mapping and digital-elevation data for the haor, so that areas containing water in each

<sup>1</sup> A haor is a wetland ecosystem in the north eastern part of Bangladesh which physically is a bowl or saucer shaped shallow depression, also known as a backswamp, which is deeply flooded for about half of the year, and retains water in the lowest spots year-round.

<sup>2</sup> The word 'mach' means fish in Bengali

month could be estimated along with areas of land in different uses. It focused on direct values: fisheries, non fish aquatic products, use of aquatic vegetation by local people and by nearby tea estates, pasture (grazing in the haor), dry season (boro) rice, transportation and recreation. Indirect ecosystem services include flood control, water quality and aquifer charge, biodiversity and existence of intrinsic values. However, only surrogates for flood control benefits (valued as the opportunity cost of not having a flood control project that had earlier been proposed), and biodiversity (valued as the costs of the MACH project itself) were used. For the main use values, fisheries were estimated based on detailed weekly catch monitoring undertaken in a set of representative areas covering the range of haor habitats. An interview survey of a random sample of households living around the haor generated data on the amounts and value of 13 types of other aquatic products, key informants from three tea estates gave data on their aquatic plant use, and interview surveys of local hotels generated data on visitor numbers and expenditures that were complemented with a sample survey of visitors to investigate willingness to pay to preserve the haor. The tabulation below presents the resulting estimated value of benefits from the haor.

**Table 1: Estimated value of Hail Haor economic outputs in 1999-2000**

Type of goods and services	Total returns	Value per area (USD/ha)	Percent
<b>Commercial fisheries</b>	988 967	80,5	12
<b>Subsistence fisheries</b>	1 470 142	119,5	18
<b>Non fish aquatic products</b>	2 249 091	182,9	28
<b>Boro Rice Value</b>	1 122 276	91,2	14
<b>Project/biodiversity funds</b>	767 146	62,4	10
<b>Pasture value</b>	708 134	57,6	9
<b>Flood control</b>	412 007	33,6	5
<b>Recreation</b>	123 473	10	2
<b>Transportation</b>	153 924	12,5	2
<b>Total (in USD)</b>	7 995 160	650,2	100

*Water quality, aquifer recharge benefits and existence values were not valued. (Thompson 2008)*

The annual return from the haor was therefore estimated to be just under US\$8 million, providing mainly fish and aquatic plants - essential sources of food and income for the poor and indicating that the annual value of non fish aquatic products was as high as that of fish. It was also clear that if rice production was to be extended across the haor, it would result in a loss, and this strongly supported the need to maintain the haor and improve its management rather than encourage further expansion in rice production.

#### **What was needed to solve the problem in terms of data, resources and capacity to do the study?**

Thus the valuation study required detailed land use data and data on the areas of water in different seasons, which came from a GIS using ground-truthed satellite images. The larger part of the data came from detailed monitoring of fish catches, supplemented by customized one-off interview surveys conducted by the project team, and collection of some secondary

data (for example - on the returns from rice cultivation and grazing). However, this was much more than a study, the MACH project then worked with the communities to establish a community based co-management system for the wetland.

### **What resulted from taking an ecosystem service perspective? Did the approach influence public management or result in policy uptake?**

While taking the ecosystem perspective, the importance of community in decision making, management and participation was considered pivotal. MACH encouraged the formation of Resource Management Organisations (RMO) involving all wetland stakeholders from local communities with an overlapping membership from federations of poor wetland users. The RMOs were formally linked with the local government institutions such as local councils and sub-district administrations. These institutions have been recognized by the government.

In Hail Haor, local communities, from the eight RMOs, identified an area of approximately 100 ha called Baikka Beel that could be protected without disadvantaging poor people, who could continue to fish and collect aquatic plants elsewhere in the *haor*. This sanctuary, with similar smaller ones designated by the other RMOs, together with habitat restoration and closed seasons increased fish catches across the 13,000 ha of Hail Hoar by over 80 per cent and local fish consumption by 45 per cent. The community has also ceased to fish, hunt and collect aquatic plants in the Baikka Beel sanctuary. As a result, within two years, mid-winter water bird censuses revealed an increase in bird populations and species which helped promote ecotourism, the first of its kind in Bangladesh.

In 2001, silt loads of 22 streams were monitored and were calculated to carry 50,000 tons of silt, suggesting that all the 59 streams flowing into the haor carried up to 100,000 tons of silt into the haor each year. To address siltation, caused mostly by pineapple growing, changes in plantation techniques from an up-down slope technique to contour cultivation were introduced with a few farmers showing successful results in terms of profits and reduced soil erosion. Further adoption of soil conservation measures in cultivation on the surrounding hills were promoted, and in addition trees were planted by communities along streams to reduce erosion and in the wetland to restore swamp forests.

As a policy uptake or management decision, a strong point would be that the local institutional mechanisms are endorsed by the government; and that the success of Baikka Beel was enabled by the Ministry of Land designating the area as a permanent sanctuary to be managed by the community in July 2003, giving up an annual lease income of about US\$1,500.

### **What else was necessary for it be influential?**

Many natural resource practices widely acknowledge the need for community participation in natural resource management. The MACH project was successful in initiating bottom-up co-management of resources through participatory institutional structures and mechanisms.

### **References:**

Thompson, P. and Colavito, L. 2007. Economic value of Bangladesh wetlands and their restoration. Technical Paper 6. Management of Aquatic Ecosystems through Community Husbandry, Winrock International, Dhaka

**Acknowledgements:** Byomkesh Talukder for reviewing the case