



**Making a
difference
in Bangladesh**

For nearly 30 years, WorldFish Center scientists have been working in Bangladesh developing innovative ways for its poorest people to improve their livelihoods through sustainable, equitable and participatory fisheries management practices. Scientists have been suggesting ways to the villagers to grow fish in local ditches and backyard ponds as well as encouraging communities towards sustainable management of fish and aquatic resources in open waterbodies, beels, hoars, rivers and floodplains.

These innovative approaches have shown tremendous potential for reducing poverty and hunger in Bangladesh. The country, with a population of 140 million, is crisscrossed with hundreds of rivers and their tributaries. Fish and fisheries play an important role in the nutrition, employment and economy of the country. The sector contributes about 5 per cent of GDP and 6 per cent of export earnings. It is estimated that at least 1.3 million people are directly employed in the fisheries sector while another 12 million earn their livelihoods from fisheries related activities.



**Making a
difference**

Aquaculture Research

Low input seasonal and perennial pond aquaculture

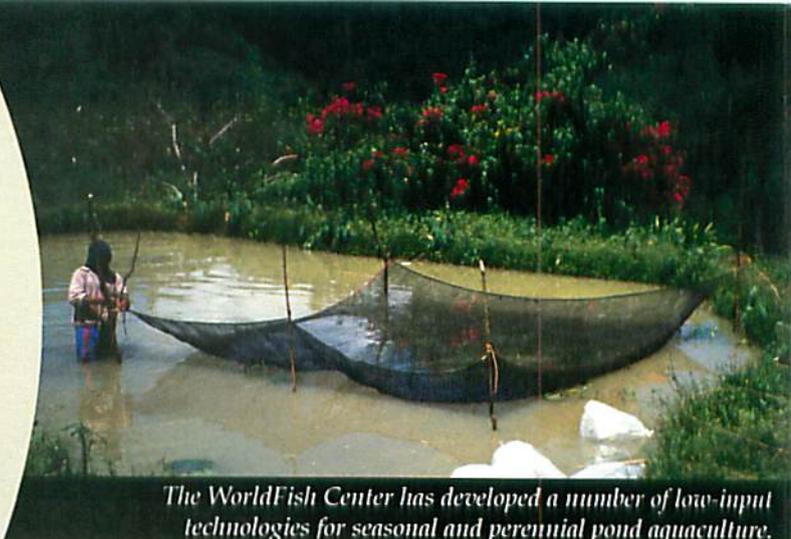
The WorldFish Center has developed a number of low-input technologies for seasonal and perennial pond aquaculture under its Dynamic Sustainable Aquaculture Project funded by USAID. Adoption of new technologies has resulted in fish production increases from seasonal ponds and ditches to over 2.5 t/ha in 4–6 months, and from 300 kg/ha to 3–5 t/ha in the case of perennial ponds.

These innovative technologies are contributing towards increased fish consumption and household income in poor communities. The goal to increase incomes and improve livelihoods for small-holder farmers is being achieved by training local NGOs and their extension staff to disseminate the technologies. One recent project implemented more than 50,000 aquaculture demonstrations between 2000 and 2005. During this period, capacity building and training support was provided to 477 staff members from over 170 partner NGOs.

Studies undertaken to assess the adoption of aquaculture technologies and the effectiveness of different aquaculture extension methods have revealed that even five years after project completion, farmers continue to obtain fish yields about four times higher than pre-project production levels.

To promote and develop production efficiency and equitable benefits for the poor, the Center is actively engaged with the Government of Bangladesh in developing policy briefs and, thereafter, new initiatives to improve integrated enterprise development of the aquaculture value chain, from enhancing seed quality and distribution through to marketing aquatic products.

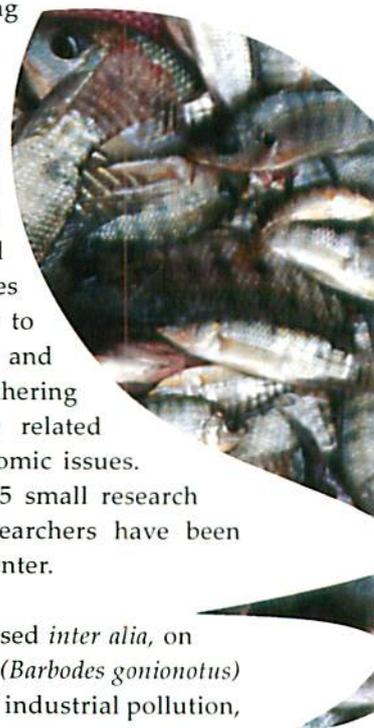
Integrated rice-fish farming: Integration of fish culture with rain-fed and irrigated rice farming has shown promising results with fish production of up to 1 t/ha. In addition, rice production has also increased by about 10 per cent, while the cost of rice farming has been reduced by 10 per cent. Average yield of carp polyculture in ponds and rice fields in 2003 was 2,460 kg and 1,960 kg per hectare per crop respectively. Investing one taka in fish culture in ponds provides a gross benefit of taka 2.29 while it is 2.03 taka in rice fields. There has also been less use of pesticides and insecticides as a result of this integration, leading to a healthier environment.



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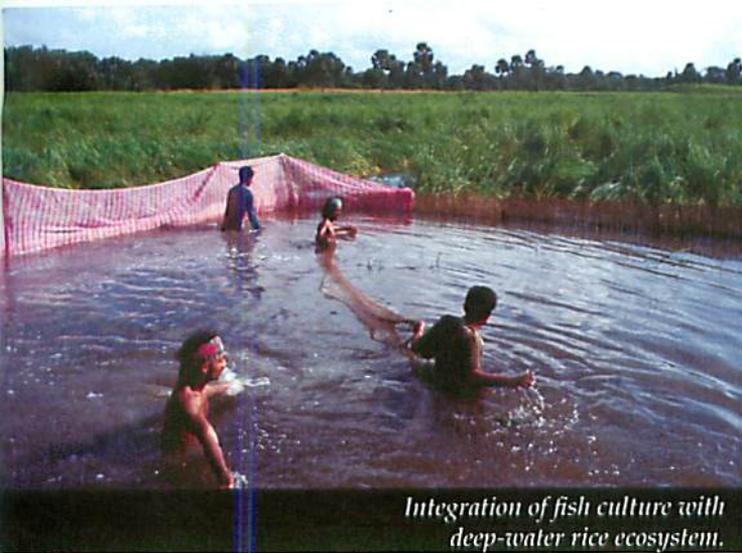
Integration of fish culture with deep-water rice ecosystem: Research undertaken on group managed rice-fish systems in deeply flooded ecosystems has resulted in cultured fish yields of 600 kg/ha when grown as a single crop after dry season rice, and 400 kg/ha when grown with monsoon rice. Integration did not affect the yield of small indigenous wild fish or rice, while costs of rice farming were reduced.

Small grant collaborative research: Two decades of collaborative research with the Bangladesh Fisheries Research Institute (BFRI) and reputable national universities have contributed significantly to the development of fisheries and aquaculture systems and furthering our understanding of sector related environmental and socio-economic issues. During the past three years 45 small research grants involving over 60 researchers have been supported by the WorldFish Center.

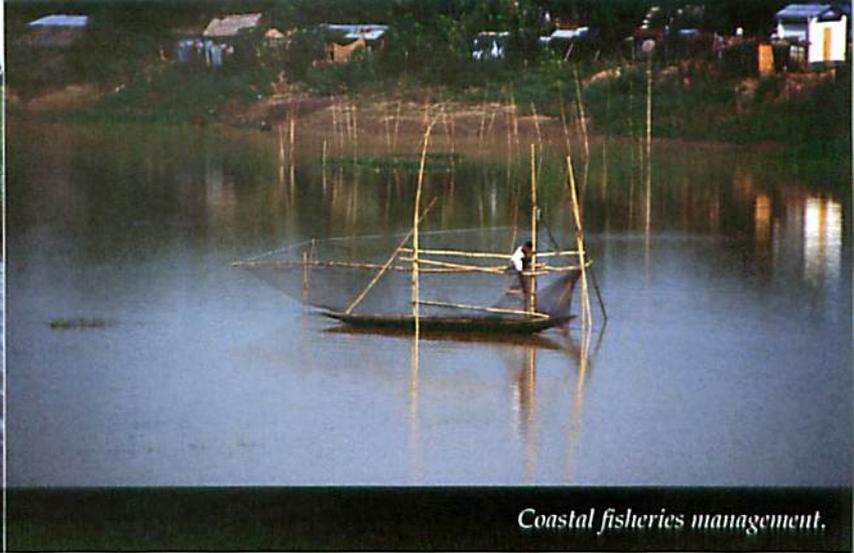


The most recent work has focused *inter alia*, on improved strains of silver barb (*Barbodes gonionotus*) and catla (*Catla catla*), impact of industrial pollution, population studies on fish, crustaceans and mollusks, alternative livelihoods for fishers and communities dependent on floodplain and river fisheries, marketing of aquaculture products, low cost feed development for fish and prawns, establishment of cryogenic gene bank and practice of cryopreservation techniques, decentralized fish seed production, and integrated aquaculture approaches.

Bangladesh is a recipient of the GIFT strain of Nile tilapia (*Oreochromis niloticus*), genetically improved by the WorldFish Center and its partners in the



Integration of fish culture with deep-water rice ecosystem.



Coastal fisheries management.

Philippines. The improved strain has shown 85 per cent faster growth than local strains, and continued research by BFRI has again contributed in a further improvement in growth by 10 per cent. BFRI is a member of the International Network on Genetics in Aquaculture (INGA), a global network for the genetic improvement of aquaculture species coordinated by the WorldFish Center.

Social and Policy Issues

Coastal fisheries management

In order to assess the status of coastal fisheries and develop long-term sustainable management strategies, the development of a regional database and an assessment of the status of fisheries resources have been conducted, as part of the collaborative research undertaken with the Department of Fisheries (DoF) and Bangladesh Fisheries Research Institute (BFRI). Studies showed that there is excess effort in shrimp fishing and that small-scale fishers benefit little from commercial trawling activities. The legal and institutional issues affecting coastal fisheries management have been reviewed with the Bangladesh Environmental Lawyers' Association (BELA) and a number of areas identified for further clarification.

Community Based Fisheries Management (CBFM)

Communities develop improved management approaches: Action research undertaken since 1987, in collaboration with DoF and a range of NGOs, has focused on improved management of the inland fishery and has resulted in i) the establishment of Community Based Fisheries Management (CBFM) in over 110 water bodies (seasonal and permanent lakes, floodplains and rivers) involving up to 25,000 fishing households; and ii) generation of information on fish catches, change in fishing effort, species diversity, impact of fish sanctuaries, fishing habitat

restoration, length-based fish stock assessment, fish population biology, fish consumption, household impacts and institutional frameworks for the management of open-water fisheries.

As a result of improved management strategies, e.g., establishing fish sanctuaries, restoring fish habitat, maintaining closed seasons, reducing destructive fishing practices etc., fish catches have increased, while benefits to leaseholders and intermediaries have fallen relative to the share of returns to professional fishers. Preliminary assessments of the introduction of fisheries management and habitat restoration through various CBFM approaches (fishers managed fishery, community managed fishery and women managed fishery) show significant increases in fish production (64 per cent) and biodiversity (28 per cent) in the project's water bodies. So far a total of 164 fish sanctuaries have been established in 81 water bodies under the CBFM approach. Preliminary assessments also show increasing populations of 8 critically endangered, 16 endangered, and 12 vulnerable fish species in CBFM project sites. Fish consumption is also significantly higher (12 kg/household) in CBFM sites, compared to other sites not using a CBFM approach (10 kg/household).

Training and information dissemination activities have contributed towards increased awareness and understanding by the community of the importance of fish conservation and biodiversity. The CBFM-2 project won the Outstanding Research Partnership Award from the CGIAR in 2004.

Data collection systems for co-managed fisheries: Since 2002, WorldFish has been working in collaboration with the Marine Resources Assessment Group, FAO, and the Mekong River





Commission to develop guidelines for designing a data collection and sharing system for co-managed fisheries. These will be published as a FAO Fisheries Technical Paper.

Collaborative Research Projects on CBFM:

In March 2005, WorldFish Center Bangladesh and Lund University, School of Economics and Management, Sweden signed an MoA for 1.5 years to undertake joint research at CBFM-2 sites in order to find out how far the new institutions have ensured successful collective action among the poor, have reduced poverty and achieved gender equity—the factors behind their success or failure.

In February 2005, under the CBFM-2 project, another MoA was signed between the WorldFish Center Bangladesh and the Natural Resources Institute (NRI), University of Manitoba, Canada towards improving various mechanisms for sustainable use

in aquatic resource systems, and to strengthen the capability of WorldFish and the NRI in the field of fisheries management through the cooperative use of materials and facilities, and providing access to pertinent field data and other information.

Capacity Building

Capacity building among partner institutions is an essential part of developing and maintaining effective collaboration. WorldFish conducts formal and informal training programs aimed at developing a critical mass of scientific competence in developing country institutions.

The Center in Bangladesh has developed programs for scientists, extension workers and farmers; has produced scientific publications, training manuals, and technology brochures; has supervised a number of studies by Bangladeshi graduate and postgraduate students, and examined MSc, MSS, MS and PhD theses.

Eighty scientists from Bangladesh are members of the Network of Tropical Aquaculture and Fisheries Professionals (NTAFP), an information network coordinated by WorldFish Center. The network assists fisheries scientists with information and database searches, analysis and interpretation of data, and publishing of research findings. ☺

Key Partners

WorldFish Center works with over 50 partners including:

*Bangladesh Fisheries Research Institute (BFRI)
Department of Fisheries (DoF)
Bangladesh Rice Research Institute (BRRI)
Bangladesh Agriculture Research Institute (BARI)
Bangladesh Agricultural Research Council (BARC)
Bangladesh Jute Research Institute (BJRI)
Sugarcane Research and Development Institute (SRDI)
Bangladesh Agricultural University (BAU)
Chittagong University
Dhaka University (DU)
Rajshahi University (RU)
Khulna University (KU)
Jahangirnagar University (JU)
Shah Jalal University of Science & Technology (SUST)
Non government organizations (NGOs) – ranging from small local ones to the largest national ones*

Investors

The following investors have supported collaborative research projects:

*United States Agency for International Development (USAID) (1989–2005)
Danish Agency for Development Assistance (Danida) (1990–94)
Ford Foundation (1987–94, 1996–99)
International Fund for Agricultural Development (IFAD) (1990–94, 1996–2006)
Asian Development Bank (ADB) (1994–2001)
Department for International Development (DFID) UK (2000–06)
Bunderministerium für Wirtschaftliche Zusammenarbeit/ Deutsche Gesellschaft für Technische Zusammenarbeit (BMZ/GTZ)*

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