

# Adaptive Learning for Floodplain River Fishing Communities in Asia

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by Daniel D. Hoggarth, Fisheries Consultant, MRAG Ltd, 47 Prince's Gate, London SW7 2QA, United Kingdom, Email: d.hoggarth@ic.ac.uk

**Tropical floodplain river systems are potentially highly productive but also highly vulnerable to degradation. As shown in this article, these complex environments require locally appropriate management approaches, built on the knowledge and capacities of both governments and fishing communities.**



### Hard times for Asian floodplain river fishers

Salima and Karim Sarder live in Darimalanchi village, on flood lands close to mighty Ganges and Brahmaputra rivers in Bangladesh. Their father Nezham Sarder struggles to feed his family of six by fishing the open floodplains in the wet season and labouring during the dry season. The family live in a one room mud hut in the basic style of rural Bangladesh and have no land on which to grow their own food. At dawn every day, the children are sent to the local Talimnagar fish market to beg for fish. In Bangladesh, even the smallest fish are sold, and the children might be lucky to get just a few dirty shrimps or fish fry left on the ground.

#### Biography:

Dr Hoggarth is a fisheries ecologist with 15 years experience in the assessment and management of natural resources. Since 1992, he has worked mainly on DFID-funded projects on floodplain river fisheries in Bangladesh, Indonesia, India and Thailand. These projects initially investigated the technical and ecological aspects of these resources, before progressing on to their social and institutional dimensions. His current work is developing new approaches for the collaborative management of reserves in tropical river fisheries for the long-term benefit of fishing communities.



Salima and Karim Sarder hoping to beg a few scrap fish at Darimalanchi market (all photographs by D.D. Hoggarth).

The poverty of landless Bangladeshis like Nezham's family has worsened since the wide-scale construction of flood control schemes in the 1970s and 80s. These schemes have stabilised flood levels to protect housing, and to improve conditions for agriculture. Some land-owning farmers have gained much from the schemes, but fishing conditions inside the polders have declined. In Darimalanchi village, the traditional wet season floodplain fishing of landless people is now largely prevented by the extensive rice fields. Many valuable fish species have also declined in number as they are unable to follow their habitual migration routes on and off the floodplains due to the new embankments. For the landless poor, fishing opportunities are thus restricted by agricultural extension and the quality of fishing in the remaining fishing grounds is also diminished.

In 1990, according to FAO, 84% of the world's 28.5 million fishers were concentrated in Asia, many of them dependent on floodplain rivers for their livelihoods. Increasing demands are now being placed on the aquatic resources of the region, and floodplains are now among the fastest disappearing of all ecological systems. The high productivity of these fisheries is threatened by their over-exploitation, the competing demands of other sectors such as agriculture, flood protection, water abstraction and drainage, and the impacts of pollution from both local and

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Bangladesh's heavily exploited floodplains support millions of fishers, but catches now mainly comprise the very smallest fish and prawns.

upstream sources. Effective management solutions are urgently required.

## DFID's research programme on Asian inland fisheries

With its historic links, the south Asian region is one of the primary geographic targets of the UK's Department for International Development (DFID). Recent inland fisheries projects funded by DFID's Fisheries Management Science Programme (FMSP, managed by MRAG Ltd), have been based in Bangladesh, India, Indonesia, Laos, Nepal and Thailand. In collaboration with government fisheries departments, research institutes, universities and private companies, these projects have focused on a range of different subjects, from the ecology of floodplain resources and the technical aspects of the fisheries, to the social and institutional factors required for their effective management.

In one DFID project, based in Bangladesh and Indonesia, the movement patterns of floodplain fish stocks were studied by tagging fish in a 'mark, release and recapture' programme (see article 'Restocking the Floodplains ... from Natural Sources', published in the June 1997 issue of *Aquaculture News*). This study confirmed the existence of two distinct types of fish: strongly migratory 'whitfish' found in the main river channels, and other more locally-resident 'blackfish'. The tagging

studies revealed which water bodies were used by the blackfish species to survive over the harsh conditions of the dry season. They also showed how some of the whitfish species were able to penetrate flood control sluice gates in certain flow conditions, if the farming committees allowed the gates to be opened. Based on these results, the research provided simple guidelines to raise the value of floodplain fisheries, such as the use of 'harvest reserves' to increase the dry season survival of fish and the management of sluice gates to maintain fish migrations without harming agricultural production inside flood control schemes.

While such tools may benefit the productivity of river fish stocks, their application in floodplain river fisheries



Large scale flood control schemes may give agricultural and social benefits, and create some fishing opportunities for a few 'jump trap' fishers, but they may also have negative impacts on other fishers inside the scheme.

will require a significant shift in management style from the 'top-down' approaches currently used in many countries. Due to the highly variable ecological and social characteristics of floodplain river fisheries, a management regime suitable for one locality may be either socially unacceptable or technically inappropriate in another. These systems thus demand locally-appropriate solutions, rather than a single 'blueprint' approach. Such local solutions may best be found by a process of 'adaptive learning' in fishing communities.

## Adaptive learning - simple science in the community

A new strategy promoting the use of adaptive learning in the management of floodplain river fisheries has recently been developed, based on DFID's research projects (see references below). To allow flexibility, this strategy recommends a spatial approach to management, based on the division of the floodplain into nested units, and their collaborative management by government agencies, communities and other stakeholders.

The subdivision of the floodplain river resource into units must be based on its physical morphology, its inhabitation by fishing communities, and on the behaviour of its different fish species. Due to their varying scales of migration, the different blackfish and whitfish species may be best managed in quite different spatial units. Since their long migrations take them through the waters of many different communities, the whitfish species will usually require coordinated management in 'Catchment Management Areas' (CMAs), at a catchment-wide scale. In contrast, the more locally-resident blackfish species are less vulnerable to capture by 'outsiders' and may be more effectively managed in 'Village Management Areas' (VMAs) for the maximum local benefits.

The DFID logo, consisting of the letters 'dfid' in a bold, blue, sans-serif font, set against a light blue background.



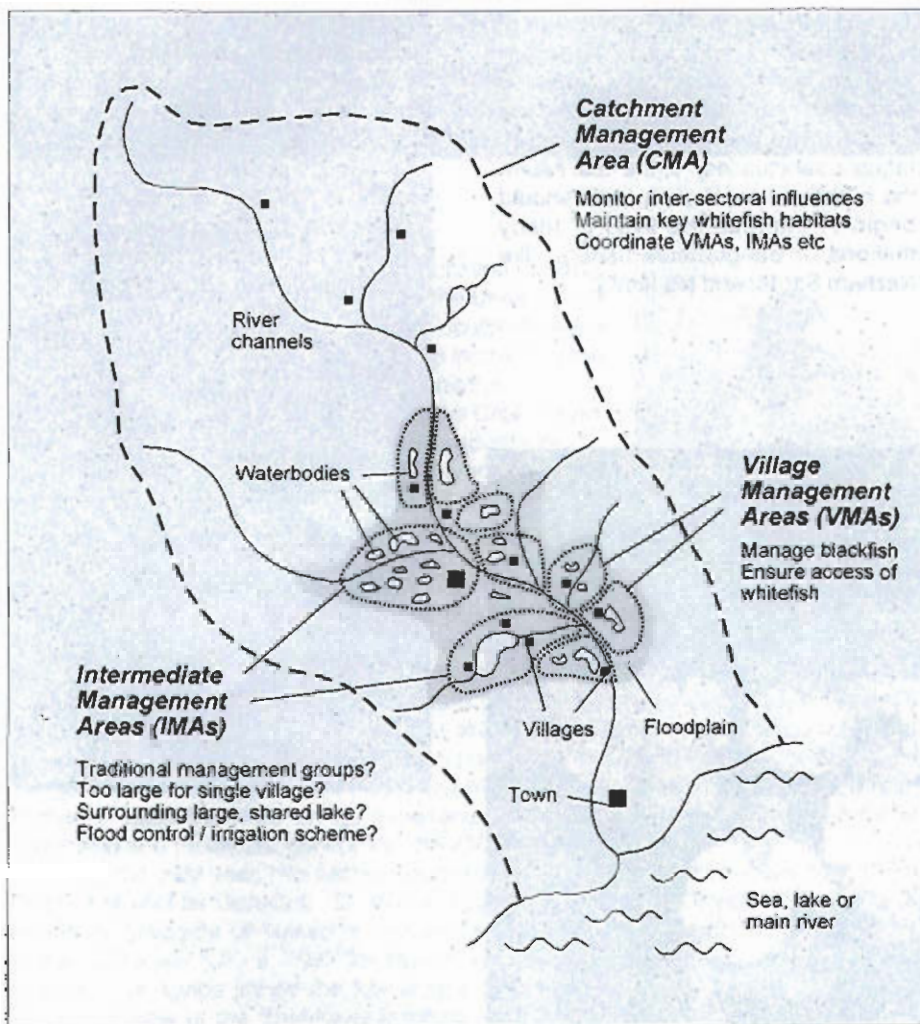


Illustration of the division of floodplain river systems into a nested arrangement of fishery management areas, promoting local control in 'VMAs' and 'IMAs' and catchment-wide coordination at the 'CMA' level.

Floodplain river catchments may thus be subdivided into fishery management units to allocate fish resources into the hands of those most able to manage them. The managers of CMAs should be responsible for managing migratory whitefish stocks for the overall benefit of the catchment's fishers, for coordinating management activities in the smaller village units, and also for representing fishery interests in sectoral talks on integrated catchment management. Other Intermediate Management Areas (IMAs) may also be identified in between CMAs and VMAs. In both IMAs and VMAs, traditional institutions and government administrative systems should be built upon wherever possible, to take advantage of existing management skills, local knowledge and systems of authority.

Due to the high variability between floodplain systems, the local impacts of different management tools are

impossible to predict in advance. An *adaptive management* approach is therefore recommended, which:

- \* actively monitors and evaluates any management intervention or change;
- \* compares the outcome with that in other places or in previous times; and thus
- \* develops management strategies based on learning and feedback.



The above spatial subdivision of the floodplain system into management units is ideally suited to such an adaptive management strategy, as each VMA and IMA may function as an 'experimental unit'. While each unit may follow its own preferred strategy, the comparative outcome of each of these local strategies will contribute to the overall understanding of the system.

Such an approach will require strong local leadership at the VMA and IMA level, and good coordination at the CMA level. Government, community and other stakeholders all have important roles to play. At the simplest levels, government agencies (e.g. fisheries departments) must take the lead in catchment level management as they have the greatest capacity to coordinate and manage fisheries on this scale. Floodplain communities are often in a better position to take responsibility for managing the local areas (within a supportive framework provided by government). Intermediary organisations (NGOs, development projects etc.) may play a facilitating role, supporting both governments and communities in the clarification of roles, improving capacity and developing management plans.

### Applying the lessons in Asian floodplain fisheries

These new *collaborative* and *adaptive* management approaches will require government agencies to adopt new forms of partnership with communities and other stakeholder organisations. Such partnerships must be allowed to evolve and develop, with effective participation from below. Time must be allowed for differences to be negotiated and conflicts to be resolved. As with the adaptive approach used to determine the most effective local management tools, the creation of management partnerships should focus on learning continuously from experience, rather than on promoting a blueprint approach.

These ideas are now being applied in new DFID projects in both Indonesia and Bangladesh. In Indonesia, a new FMSP project is working with local agencies and communities to identify 'selection criteria and co-management guidelines for harvest reserves in tropical river fisheries'. With clear guidelines tailored to the Indonesian situation, the project will be followed by locally funded pilot projects in the study provinces, ready to implement the new co-management approaches.



In Bangladesh, similar developments are being led by the Bangladesh Department of Fisheries' new 'Fourth Fisheries Project', funded jointly by DFID, the World Bank and the Global Environment Facility. This project, designed to 'improve the capacity of local users to manage aquatic resources in a sustainable and equitable fashion' will build local co-management institutions

for a range of possible management interventions, including floodplain stocking; the excavation of canals and the construction of fish passes; and the establishment of harvest reserves (aquatic sanctuaries). In the near future, the effective use of such tools should begin to improve the lives of many millions of Bangladeshi fishers, like Nezham Sarder and his family.



Don Hoggarth with Indonesian community representatives involved in floodplain river management.



Existing links between government and fishers in Indonesia are now being developed into co-management institutions for harvest reserves.

## Useful information

Details on these management approaches and the research they originate from may be found in the following sources:

Hoggarth, D.D., V.J. Cowan, A.S. Halls, M. Aeron-Thomas, A.J. McGregor, R.L. Welcomme, C. Garaway & A.I. Payne, 1999. Management Guidelines for Asian Floodplain River Fisheries. Part 1: A Spatial, Hierarchical and Integrated Strategy for Adaptive Co-Management. FAO Fisheries Technical Paper 384/1.

Hoggarth, D.D., V.J. Cowan, A.S. Halls, M. Aeron-Thomas, A.J. McGregor, R.L. Welcomme, C. Garaway & A.I. Payne, 1999. Management Guidelines for Asian Floodplain River Fisheries. Part 2: Summary of DFID Research. FAO Fisheries Technical Paper 384/2.

For further information about DFID's current fisheries research and development programmes, please contact Neil MacPherson (DFID, 94 Victoria St, London SW1E 5JL; email: [n-macpherson@dfid.gov.uk](mailto:n-macpherson@dfid.gov.uk)), or Prof John Beddington (MRAG Ltd, 47 Prince's Gate, London, SW7 2QA, UK; email: [j.beddington@ic.ac.uk](mailto:j.beddington@ic.ac.uk)).