

Multiple production systems boost pro-poor benefits from the floodplains

RIU

Validated RNRRS Output.

An integrated management system that presents a new take on systems that provide multiple products, especially fish and crops, is improving the livelihoods of both farmers and fishers. Floodplains are under threat from overexploitation and degradation, and in the past management has often put more stress on rice production at the expense of fisheries and other natural resources on which the poor depend. The new model aims to maximize the joint benefits of crops and fish for all stakeholders. These options are used at two sites in Bangladesh, Narail and Tangail, where the community has independently adopted the ideas. The practices have spread to adjacent areas, and have since been introduced at three more sites in the country.

Project Ref: **NRSP03:**

Topic: **4. Better Water Harvesting, Catchment Management & Environments**

Lead Organisation: **CNRS, Bangladesh**

Source: **Natural Resources Systems Programme**

Document Contents:

[Description](#), [Validation](#), [Current Situation](#), [Current Promotion](#), [Impacts On Poverty](#), [Environmental Impact](#),

Description

NRSP03

Research into Use

NR International
Park House
Bradbourne Lane
Aylesford
Kent
ME20 6SN
UK

Geographical regions included:

[Bangladesh](#),

Target Audiences for this content:

[Crop farmers](#), [Livestock farmers](#), [Fishers](#),

A. Description of the research output(s)

1. Working title of output or cluster of outputs.

In addition, you are free to suggest a shorter more imaginative working title/acronym of 20 words or less.

Better Options for Integrated Floodplain Management (IFM): Uptake Promotion in Bangladesh

2. Name of relevant RNRRS Programme(s) commissioning supporting research and also indicate other funding sources, if applicable.

Natural Resources Systems Programme

3. Provide relevant R numbers (and/or programme development/dissemination reference numbers covering supporting research) along with the institutional partners (with individual contact persons (if appropriate)) involved in the project activities. As with the question above, this is primarily to allow for the legacy of the RNRRS to be acknowledged during the RIUP activities.

R6756 (Resource Use Pattern in Floodplain Production System)
CLUWRR, Newcastle University – Julian Barr (now ITAD Ltd.)
University of Durham, UK - Paul Sillitoe and Peter Dixon
BARI –Dr. SB Naseem
BAU – Somen Dewan
Rajshahi University –Professor Zuberi
CNRS- M. Mokhlesur Rahman and M. Anisul Islam

R7562 (Consensus Building)
CLUWRR, Newcastle University – Julian Barr (now ITAD Ltd.)
University of Durham, UK - Peter Dixon
CNRS- M. Mokhlesur Rahman and M. Anisul Islam
WorldFish Center – Parvin Sultana and Paul Thompson (both now Middlesex University)
Banchte Shekha, Bangladesh – Anup Kumar Saha
CEMARE, Portsmouth University, UK – Roger Lewins (now independent)
BCAS, Bangladesh – Dwijen Mallik

R7868 (Joint benefit from multiple resource use in Floodplains)
Reading University, UK – Bhavani Shanker (now in FAO, Thailand)
CLUWRR, Newcastle University, UK - Julian Barr (now ITAD Ltd. UK)
MRAG Ltd., UK – Ashley Halls (now Aquae Sulis Ltd., UK)
Econ One, USA - Mursaleena Islam
CNRS, Bangladesh – M. Mokhlesur Rahman and Abu Mostafa Kamal Uddin

R8306 (Better options for IFM: uptake promotion)
CNRS, Bangladesh – M. Mokhlesur Rahman and M. Anisul Islam
Parvin Sultana and Paul Thompson (both Independent, now Middlesex University)

Banchte Sheka, Bangladesh – Anup Kumar Saha
WorldFish Center, Bangladesh
MRAG Ltd., UK – Ashley Halls (now Aquae Sulis Ltd., UK)
Reading University, UK – Bhavani Shanker (now in FAO, Thailand) and John Best (now independent)
ITAD Ltd., UK- Julian Barr and Abigail Mulhall (now DFID, UK)
Roger Lewins, UK-independent

R8486 (Promotion of FMSP guidelines for floodplain fisheries management and sluice gate control)
SCALES Inc., West Indies - Daniel Hoggarth,
IIED, UK - Saleemul Huq, Hannah Reid,
MRAG Ltd., UK - Ashley Halls (now Aquae Sulis Ltd., UK)
BCAS, Bangladesh – A.Rahman, Liaquat Ali, S.S.Alam and Mahbubul Alam
CNRS - Mokhlesur Rahman and Anisul Islam

R8223 (PAPD)
ITAD Ltd. UK – Abigail Mulhall (seconded to DFID)
CNRS, Bangladesh – M. Mokhlesur Rahman and M. Anisul Islam

R8495 (IFM Institutions uptake)
CNRS, Bangladesh – M. Mokhlesur Rahman and M. Anisul Islam
Roger Lewins, Paul Thompson, Parvin Sultana and Esha Hossain (all independent)
PPSBD, Bangladesh - Enamul Huda

R8195 (IFM Institutions)
Roger Lewins (Independent)
ITAD Ltd. UK – Julian Barr
CNRS, Bangladesh – M. Anisul Islam
WorldFish Center, Bangladesh
BARCIK, Bangladesh - Mahbub Alam
University of Durham, UK – Peter Dixon
Parvin Sultana (Independent, now Middlesex University)

4. Describe the RNRRS output or cluster of outputs being proposed and when was it produced? (max. 400 words). This requires a clear and concise description of the output(s) and the problem the output(s) aimed to address. Please incorporate and highlight (in bold) key words that would/could be used to select your output when held in a database.

This cluster of outputs focused on: firstly understanding the dynamics of **floodplain production systems** and complex resource use patterns among the multiple stakeholders in Bangladesh and South Asia, secondly identifying, demonstrating and promoting improved approaches for **pro-poor and integrated management of multiple production systems** specially fish and crops, and thirdly learning from past projects and promoting enabling **institutional arrangements**.

Floodplains are diverse resource systems that have supported the livelihoods of millions of poor people over

centuries, but are under threat of **overexploitation and degradation**. Management and policy has tended to emphasize agriculture (especially rice) at the expense of fisheries and other natural resources upon which the poor depend. Without improved resource management based on consensus and integrating all forms of production, the opportunities for ensuring sustainable pro-poor benefits from floodplains will be very limited.

These RNRRS cluster outputs addressed these complex issues and suggested methods and approaches to overcome the barriers. R6756-Resource use pattern in floodplain production system and socio-economic methodology (1997 to 1999) helped understand the dynamic and complex production systems and sub-systems in floodplains and tested **consensus building** methods **with multiple resource users** that paved ways for setting further actions. This led to the present cluster of projects and outputs and to the PAPD cluster which later fed back into the testing of IFM options.

R7868-Joint benefit from multiple resource use in Floodplains (2000 to 2001) built on the outcomes of R6756 and other (non-NRSP) projects and developed a **management model** to identify possible options for balancing water use to **maximize joint benefits of crops and fish** from floodplains thus benefiting both farmers and fishers. FMSP project R8486 (2005) offered technical and social findings on modification of sluice gate operation to mitigate fisheries impacts of embankments without adversely affecting crop production, which has helped inform IFM and complemented R7868.

The potential benefits from IFM have been demonstrated in two floodplains through community initiatives involving cropping changes, water management actions, and fishery management through R8306 (2003-2005) and the lessons promoted to government. Lessons on appropriate institutions and institutional monitoring have been drawn (R8195 2002-04), stakeholders informed (R8495 2004-05), and some examples taken up through R8306 and through influence on non-RNRRS initiatives. This offers an alternative to the history of sectoral and fragmented resource management in Bangladesh and elsewhere that has damaged the resource base and deprived the poor of benefits from the floodplain common pool resources (CPRs).

5. *What is the type of output(s) being described here?*

Please tick one or more of the following options.

| Product | Technology | Service | Process or Methodology | Policy | Other Please specify |
|----------------|-------------------|----------------|-------------------------------|---------------|---------------------------------|
| | X | X | X | | |

6. *What is the main commodity (ies) upon which the output(s) focused? Could this output be applied to other commodities, if so, please comment*

The outputs are focused on floodplain production systems and associated commodities with special focus on balanced production of fish and crops. Hence the outputs are not commodity specific but rather ecosystem specific in terms of IFM options and interactions, and are more general in terms of the institutional process and communication tools. The outputs continue to be used and CNRS has applied these outputs in natural resource management and disaster preparedness projects.

7. *What production system(s) does/could the output(s) focus upon?*

Please tick one or more of the following options.

Leave blank if not applicable

| Semi-Arid | High potential | Hillsides | Forest-Agriculture | Peri-urban | Land water | Tropical moist forest | Cross-cutting |
|------------------|-----------------------|------------------|---------------------------|-------------------|-------------------|------------------------------|----------------------|
| | | | | | X | | |

8. What farming system(s) does the output(s) focus upon?

Please tick one or more of the following options (see Annex B for definitions).

Leave blank if not applicable

| Smallholder rainfed humid | Irrigated | Wetland rice based | Smallholder rainfed highland | Smallholder rainfed dry/cold | Dualistic | Coastal artisanal fishing |
|----------------------------------|------------------|---------------------------|-------------------------------------|-------------------------------------|------------------|----------------------------------|
| | | X | | | | |

9. How could value be added to the output or additional constraints faced by poor people addressed by clustering this output with research outputs from other sources (RNRRS and non RNRRS)? (**max. 300 words**).

Please specify what other outputs your output(s) could be clustered. At this point you should make reference to the circulated list of RNRRS outputs for which proformas are currently being prepared.

Several RNRRS cluster outputs relevant to management of floodplain natural resources are already dovetailed and complement one another including this IFM-related cluster. For example, in addition to building on R7868, R8306 used the outputs of the FMSP sluice gate project R8210 (2003-2005) in demonstrating a system approach to enhancing the total returns from floodplain resources and ensuring a more equitable distribution of benefits by promoting IFM in Bangladesh. Moreover the PAPD approach, developed and tested and communicated by projects R6575, R7562 and R8223, has been used with modification in R8306 to build on existing resource management practices and institutions and help stakeholders, including farmers, plan and review changes in practices according to the needs of different floodplain stakeholders. The four IFM options as recommended by R7868 have not been found equally feasible in all settings (land retirement, for example is not acceptable to farmers, but shorter duration rice and other dry season crops are attractive. IFM options must be tailored to the local setting but the prospects for modifying crop management to optimize water use and enhancing natural fisheries through local institutions and participatory planning has been demonstrated. Similarly a non RNRRS wetland project (Management of Aquatic ecosystems through Community Husbandry (MACH) project, USAID supported 1998-2006) has demonstrated watershed restoration activities integrating with wetland NRM and offers lessons and practices that could be packaged with this RNRRS output cluster.

Overall this cluster relates to three areas of RNRRS related outputs: IFM options (including crop, fish, watershed and water technologies) and a floodplain systems approach; good practices for local institutional development; and participatory planning (PAPD) to enhance decision-making and institutional sustainability.

This output may also relate to aspects of the FMSP clusters "Floodplain fisheries management" and "Enhancement of inland fisheries".

Validation

B. Validation of the research output(s)

10. How were the output(s) validated and who validated them?

Please provide brief description of method(s) used and consider application, replication, adaptation and/or adoption in the context of any partner organisation and user groups involved. In addressing the "who" component detail which group(s) did the validation e.g. end users, intermediary organisation, government department, aid organisation, private company etc... This section should also be used to detail, if applicable, to which social group, gender, income category the validation was applied and any increases in productivity observed during validation (max. 500 words).

The main purpose of R8306 (Integrated Floodplain Management) was to maximize joint benefits of crops and fish by testing different options recommended in R7868 (Joint benefit from multiple resources use in Floodplains). At the local level, there has been field validation by community stakeholders (especially farmers and fishers) in their support of alternative IFM practices by local officials and extension workers in the two pilot sites in Narail and Tangail. At the primary stakeholder level, farmers and fishers are continuing the practices of alternative cropping in these two areas along with other options developed in the project. Crucially, the IFM options are being practiced outside the project area and the level of local uptake is gradually growing.

The approaches and findings were communicated with different levels of stakeholders, creating a demand among them. Uptake has occurred with a wide range of stakeholders who have transferred the outputs vertically and horizontally. Policy stakeholders from the fisheries and agriculture sectors and their line agencies (Department of Fisheries, Department of Agricultural Extension, Bangladesh Rice Research Institute and Bangladesh Agriculture Research Institute), District and Upazila level government officials, practitioner farmers, NGOs and projects have acknowledged the usefulness of the resulting IFM options.

As a result the practice of alternative (less water demanding) cropping options has continued since the end of R8306 and in sites under other projects such as CBFM (Community Based Fisheries Management - DFID), MACH (Management of Aquatic ecosystem through Community husbandry - USAID) and LEAF (Livelihood, Empowerment and Agro-Forestry - Swiss Development Cooperation-Inter Cooperation). CNRS is involved with these three projects, but the other partner NGOs of LEAF project are also extending alternative cropping.

Other validation includes commitment to future uptake within programmes now coming on line. The DOE (Department of Environment) CDMP (Comprehensive Disaster Management Program) is a project of DRR/DMB (Department of Relief and Rehabilitation/Disaster Management Bureau of Government) which has a component named CCC (Climate Change Cell). An agreement between

CCC and CNRS has been signed to undertake an action research project on adaptive cropping to address the consequences of climate change. The proposal that CNRS has developed was based on output of IFM project and commissioned by the CCC.

Although the tenure of MOUs signed between CNRS and DAE, BIRRI and BARI under R8306 is now over, many related activities are continuing. These include: testing deep-water *aman* rice with BIRRI; producing a video documentary and transmitting that by the national TV media with AIS (Agricultural Information Services) of DAE and; testing vegetable gardening opportunities in the north east *haor* region of Bangladesh with BARI.

There is recognition of several of the research outputs in the recent (2006) ICFS (Inland Capture Fisheries Strategy) of DOF. The ICFS recommends combined effort control, establishment of fish sanctuaries, habitat restoration and wise use of dry season water.

11. Where and when have the output(s) been validated?

Please indicate the places(s) and country(ies), any particular social group targeted and also indicate in which production system and farming system, using the options provided in questions 7 and 8 respectively, above (max 300 words).

Recommended options from R7868 were piloted and validated in Bangladesh through R8306 in Narail district southwest Bangladesh and Tangail district central Bangladesh. As noted above further validation has been in scattered project sites and in north-east Bangladesh.

The outputs are relevant to the land-water interface production system for floodplains where fish and rice are major products. Under the alternative IFM system, the focus is diversification of dry season crops in a rice-based farming system, and changing use and preservation of surface water for capture fisheries have been a priority, cross-cutting interests through the water resources sector.

The livelihoods of large numbers of traditional fishers in Bangladesh are dependent on inland capture fisheries. However, through their ownership of land and influence over public water management policies, farmers are the most influential stakeholders in rural Bangladesh and control floodplains systems. Cultivation of irrigated dry season rice became increasingly popular among the farmers from the late 1970s and now contributes a major share of rice production followed by two wet season types - *Aman* and *Aus*. Dry season rice is a water hungry crop that needs about 800 mm water/ha as irrigation, this causes dewatering of perennial water-bodies in the floodplains resulting in reduced fish production and loss of biodiversity. The livelihoods of professional fishers are threatened and typically fishers are functionally landless and poorer than other primary stakeholders. The outputs here target both the fishers and farmers to create a win-win situation. In testing options such as alternative cropping, women were directly involved in culturally suitable activities such as vegetable gardening. Women played a key role in decision-making in the Narail site, especially where CBFM2 adopted a women-led approach while in the Tangail site it was fishers-led.

Current Situation

C. Current situation

12. How and by whom are the outputs currently being used? Please give a brief description (max. 250 words).

Use of outputs of R8306 is related to behavioural change in the user community, i.e. farmers, fishers and women. Although the outputs were validated and found beneficial for the practitioner communities, these behavioural changes take time to become institutionalized (formally and socially/culturally). However, it is evident that the community members in the two sites at Narail and Tangail are still practicing the outputs where the project (R8306) tested the options. Moreover, these practices have been spreading in adjacent areas.

MACH and CBFM-2 project beneficiaries at the community level have been practicing the outputs at other sites and the LEAF project has been practicing the outputs through its partner NGOs.

The Department of Fisheries has incorporated the concept and options into their newly formulated ICFS for the country. Other organizations and projects also have incorporated the concept and their field staffs are implementing activities. These include about 280 staff of Department of Fisheries and NGOs has been trained on IFM and its options. DoF, DAE and many NGO staff including their participants have made field visits, and shared ideas with farmers and the facilitating staff involved. DOF has agreed, in principle, to incorporate the IFM training manual within their central training programme. DOF will require support for simple modifications to fit this into the ongoing training programme, however.

An action research project has been developed based on the output of the R8306 and commissioned by the CCC/DOE (a component of DFID/UNDP funded CDMP project, September 2006 to August 2007).

13. Where are the outputs currently being used? As with Question 11 please indicate place(s) and countries where the outputs are being used (max. 250 words).

The outputs are currently being used in the following districts of Bangladesh: Narail (R8306 site), Tangail (R8306 site), Moulvibazar (MACH and CBFM sites), Sunamganj (LEAF and CBFM sites) and Sherpur (MACH site).

Adaptive cropping- an action research project commissioned by of CCC/DOE and CNRS is implementing these approaches in the northeast *haor* region of Bangladesh in Jamalganj upazila of Sunamganj district. This project has been developed on the basis of R8306 outputs.

Methods and data from project R8306 have attracted the attention of the researchers of Natural Research Institute of Manitoba University in Canada. Some researchers (Bangladeshi) have studied R8306 outputs and it is expected that the project outputs will be used in their research activities.

Partner NGOs and many beneficiary members of CBFM and MACH have experienced the research activities and known about the outputs. At this stage there is no clear information indicating to what extent they are practicing the outputs.

14. *What is the scale of current use? Indicating how quickly use was established and whether usage is still spreading (max 250 words).*

Despite the high potential of the outputs of R8306, the present scale of use is quite low because time is required for spread and the outputs have been disseminated only relatively recently (2004 onwards). However at the community level, practicing the options is gradually increasing. It is evident that the horizontal expansion is steadily increasing, but is dependent on existing local floodplain management institutions. For vertical expansion a further push will be required at policy level to institutionalize the approach and operationalize the outputs.

The piloted IFM options appear very suitable for the haor basins of Bangladesh and other low-lying areas where their use is growing fastest. These areas include the districts Narail, Tangail, Sherpur, Moulvibazar and Sunamganj. Approximately 400 farmers have been practicing the alternative crops as opposed to winter rice while several hundreds of fishers have been practicing effort control options. Uptake was quite rapid with observation in the pilot year followed by adoption of alternative crops the following year. This is still spreading locally, but it might need some more effort to take it to new areas and achieve a spread effect with limited facilitation and support.

15. *In your experience what programmes, platforms, policy, institutional structures exist that have assisted with the promotion and/or adoption of the output(s) proposed here and in terms of capacity strengthening what do you see as the key facts of success? (max 350 words).*

Several policies, programmes and approaches within government have assisted with the promotion and/or adoption of the outputs proposed. Government policies are shifting towards conservation based management (for example, **fishing effort control**) of natural resources instead of those that encourage resource mining. Crop diversification is the mandate of several relevant government agencies and it has been possible to motivate and involve government structures in supportive activities. The importance of **effective communication** is recognized by the project partners for promoting the whole theme to all IFM stakeholders. Better approaches to ensure inclusion and participation in local planning are now available. In addition, projects and programmes that can form **institutions** for local resource users to take up R8306 outputs and help change the attitudes of different agencies and organizations are also critically important. Participatory Action Plan Development (PAPD) has been found an essential tool for developing widely-supported plans in multiple resource use systems viz. the floodplains and IFM activities for alternative cropping, for instance.

In the context of Bangladesh, Department of Agriculture Extension (DAE) and Department of Fisheries (DOF) are the key national level institutions who can take responsibility to implement the outputs at the national level. Both the Departments are convinced about the output. Some progress has been achieved at the DOF level as the ICFS has been approved by the government. Project team members had active participation in the formulation of the ICFS and successfully incorporated IFM related outputs in the ICFS. However, further effort is required to institutionalize the outputs so that they become widely applied. In addition, there is still little active cooperation between these two departments and between the other agencies associated with water management.

The outputs have been found suitable for farmer and fisher communities and they have shown that primary

stakeholders can tailor the outputs to fit the local context. The principles and practice can be sustained among the present users but wider uptake remains quite limited. In addition to greater awareness at government level, further dissemination to prospective beneficiaries is required at local level.

Current Promotion

D. Current promotion/uptake pathways

16. Where is promotion currently taking place? Please indicate for each country specified detail what promotion is taking place, by whom and indicate the scale of current promotion (max 200 words).

Currently, promotion is only occurring in Bangladesh. CNRS is promoting the outputs of R8306 with project-related communication materials (video clips for TV broadcasting, training manual for DOF, DAE and NGO staff, policy briefs, script for folk theatre groups), power point presentation, and CD copy of the FTR. All of these materials are available from CNRS and distribution of the materials has continued since the project ended. At community level, CNRS has formed and trained five folk theatre teams under the CBFM-2 project and the NGO Banchte Shekha has developed a special IFM script and specialist team

CNRS is involved with other projects as implementing partner in Bangladesh. Some of these projects are quite large in terms of geographic coverage and resources. The projects with which CNRS is involved are CBFM-2 (DFID/WorldFish/DOF), MACH (USAID/Winrock International), SHOUHARDO-Strengthening Household Abilities to respond to Development Opportunities (CARE/USAID), LEAF (SDC/IC), Adaptive Cropping (CCC/DOE), LDRRF-Local Disaster Risk Reduction Fund (CDMP/UNDP/DFID). These projects are dealing with livelihoods issues, food security, community conflict, local level institutions involving the poor, disadvantaged and women. These primary stakeholders are highly dependent on floodplain resources and CNRS has promoted appropriate outputs of R8306 within each of these projects.

17. What are the current barriers preventing or slowing the adoption of the output(s)? Cover here institutional issues, those relating to policy, marketing, infrastructure, social exclusion etc. (max 200 words).

The Government of Bangladesh is strongly sector-specific so that at sub-district level all line agencies approach communities with their own approach and set of options. For example, there may be five CBOs in one village formed by different line agencies and with 70% overlap in membership and with about 60% of objectives in common. Floodplain management requires a coordinated approach, but BWDB (Bangladesh Water Development Board), DAE, DOF, and LGED (Local Government Engineering Department) work separately. Integrated institutional arrangements from local to national level are lacking and coordination bodies at the sub-district and district government levels are non-functional.

Key barriers to the adoption of outputs are:

1. Government policies regarding wetlands and land use do not emphasis environmental sustainability. The

- present leasing policy of fisheries encourages resource mining rather than conservation-based management, for instance.
2. The powerful dominate access to public resources creating an obstacle in achieving pro-poor IFM.
 3. Farmers' traditional preference for growing rice is a barrier to promoting alternative cropping for both collective benefits and increased personal income.
 4. Government extension services for alternative rabi crops are weak.
 5. Access to quality seed and marketing of alternative perishable products remains a challenge for most farmers.

18. What changes are needed to remove/reduce these barriers to adoption? This section could be used to identify perceived capacity related issues (max 200 words).

Political commitment to cooperation between line agencies is essential. Devolving power and responsibility to representative local government bodies above the local council (Union Parishad) level would help increase this commitment.

Currently, representation of civil society and private development agencies is limited in the local level coordination bodies (upazila (sub-district) and district development coordination committees). Development partners in Bangladesh (DFID, USAID, World Bank, SDC, ADB, etc.) have been working to strengthen Union Parishads. However, these partners should also work with NGOs and civil society at upazila level.

Other changes needed to reduce these barriers to adoption are:

- Well-defined land use planning for the protection of wetlands and floodplains.
- Orientation of agencies working in the floodplains to take a systems view of total production and inter-dependence.
- Leasing and other wetland related policies of the government should be conservation based and discourage resource mining.
- The agricultural extension policy should be strengthened and include crop diversification in the floodplains and cultivation of more suitable (less water demanding) crops.
- A greater awareness is required among the primary stakeholders, extension officials and government agencies about the potential market for rabi crops, creation of employment opportunities during lean season and income opportunities during peak poverty period (time for winter rice harvesting is mid April to June thus February-March are considered as lean period for agriculture labourers and poverty situation peaked at that time).

19. What lessons have you learnt about the best ways to get the outputs used by the largest number of poor people? (Max 300 words).

Uptake of these outputs is enhanced by making use of existing local community organizations or institutions that are already perceived to represent the poor and are seen as legitimate. Participatory planning can work through these institutions to discuss and initiate IFM options. This has required inputs and support from both NGO facilitators and government agencies. Although the staffs of a range of agencies have been sensitized to IFM options and issues, they are limited by their subject focus. Despite this, direct exposure through visits by community representatives and officials has been effective.

DAE, DOF, BWDB and LGED are the key government players in floodplain management but Union Parishads also have an important role. DAE and DOF were sensitized about the outputs during the project period and evidence derived through the project should help influence departmental policy makers of the relevance of the outputs. A comprehensive communication strategy, over an extended period with suitable institutional linkage to government stakeholders, is required to achieve a common approach and understanding of floodplain development and management through participation.

Other conditions that would ensure these outputs are used by the greatest number of poor people include:

- Government policies incorporate the outputs and specify i. Conservation based management of natural resources; ii. Crop diversification; iii. Peoples participation and involvement of informal institutions; and iv. Due emphasis on communication tools and methods.
- Strong extension services by relevant government departments and NGOs communicate the messages with farmers, fishers and other floodplain resource users and stakeholders.
- A common understanding and institutional integration between the various stakeholders and resource users and resource management planning and implementation.

Impacts On Poverty

E. Impacts on poverty to date

20. Where have impact studies on poverty in relation to this output or cluster of outputs taken place? This should include any formal poverty impact studies (and it is appreciated that these will not be commonplace) and any less formal studies including any poverty mapping-type or monitoring work, which allow for some analysis on impact on poverty to be made. Details of any cost-benefit analyses may also be detailed at this point. Please list studies here.

Studies undertaken during the project period revealed that the cluster of outputs helps poor fishers (traditional and part time) strengthens access to natural assets. In addition, the outputs enhance social capital among the different community groups dependent on the floodplain resources. The studies also revealed that the outputs are beneficial for both farmers and fishers. In these floodplain sites, fishery benefits were accrued to poor households because the poor gain most from secured access to the fishery.

The outputs have been adopted in other projects such as CBFM and MACH. With respect to human capital, the CBFM 2 project conducted a baseline and impact poverty monitoring at one of the project sites (Tangail), where both IFM and CBFM had been active and revealed that the calorific intake has improved among the poor communities.

Studies:

CNRS (2005). Cropping Pattern Management (Chapter 5) and Fishing Effort Control (Chapter 6). *Better options for IFM: uptake promotion*. Final Technical Report R 8306: Volume 1. CNRS, Dhaka, Bangladesh.

Khan, M. Islam and Islam, Khaleda. (2006). Technical report of CBFM 2 project. *Report on Poverty Monitoring*. CNRS-WorldFish Center, Dhaka, Bangladesh (Draft).

21. *Based on the evidence in the studies listed above, for each country detail how the poor have benefited from the application and/or adoption of the output(s) (max. 500 words):*

- *What positive impacts on livelihoods have been recorded and over what time period have these impacts been observed? These impacts should be recorded against the capital assets (human, social, natural, physical and, financial) of the livelihoods framework;*

The project (R8306) started in 2003 and was completed in November 2005 and so large quantifiable impacts are not yet recorded. However, during the project period a qualitative survey (MSC-Measurement of Significant Changes) was applied to track developments with respect to capital assets.

Social capital: surveys captured the perception of target beneficiaries revealing that conflict between farmers and fishers over the use of dry season water at Charan Beel was reduced. In Narail, the community enhanced its access to advice and services from government to solve problems that it had identified, via new community organizations. Human capital: increases in knowledge were reported and new technology has been transferred to the participating communities. Natural capital: fisheries data from CBFM-2 revealed that the yield of fish has been increased at both the sites. Data from Narail showed a reduction in water abstraction and an increase in surface water. Financial capital: crop and farmer surveys showed that several of the alternative crops gave returns that exceeded those of irrigated rice. Physical capital: in Narail, the community shared the cost of enhancing water flow between two areas. A poverty impact survey revealed that the livelihood status has been improved and the process has contributed in empowering the poor.

- *For whom i.e. which type of person (gender, poverty group (see glossary for definitions) has there been a positive impact;*

R8306 was piloted in CBFM sites. The outputs have been adopted by the CBFM and MACH projects. Target beneficiaries in both those projects are mainly the extreme vulnerable poor (the traditional fisher community) and moderate poor (marginal farmers and part-time fishers). The fishers benefited from higher catches and extended fishing periods. In Tangail these beneficiaries are men, in Narail both men and women fish. Farmers (mostly male and either moderate poor or non-poor) benefited from crops with lower production costs and from subsistence fish catches and greater access to fish in local markets.

- *Indicate the number of people who have realised a positive impact on their livelihood;*

R8306 impacted directly and indirectly about 500 households in Narail and about 400 in Tangail. However, to the extent that CBFM-2 and MACH have encouraged adoption of the outputs of IFM, the communities supported by these projects benefit about 23,000 households in CBFM-2 and about 180,000 using MACH wetlands.

- *Using whatever appropriate indicator was used detail what was the average percentage increase recorded*

Although there is some evidence of improvements in food security, fish catches and income, percentage increases cannot be estimated over this period due to variability in these natural systems. Positive qualitative change in the livelihoods assets has been recorded, however.

Environmental Impact

H. Environmental impact

24. What are the direct and indirect environmental benefits related to the output(s) and their outcome(s)? (max 300 words)

This could include direct benefits from the application of the technology or policy action with local governments or multinational agencies to create environmentally sound policies or programmes. Any supporting and appropriate evidence can be provided in the form of an annex.

Degradation and over use of natural resources is causing habitat and biodiversity loss and reduced production. Mono-cropping in agriculture with water hungry dry season rice is detrimental both for fisheries (using reduced dry season water) and for soil quality. Past initiatives in floodplain management such as water control, have tended to reduce productivity of CPRs in favour of rice production. IFM can provide sustainable benefits to the poor and maintain ecological viability and diversity of the floodplain.

With respect to institutional partnerships, the DoF has included the concept and options in the national open water fisheries strategy (it is expected that the future DoF open water projects will implement the concept and options) and DAE and NGOs are interested in adopting the IFM options.

Environmental benefits:

- Cultivation of alternative *rabi* crops instead of water hungry *boro* rice reduces dry season water use; fish brood stock and other aquatic life is protected during the critical dry season;
- Crop diversity helps restore soil fertility;
- Conservation and sustainable use of aquatic resources allows fish and other species to survive and proliferate;
- Cultivation of other *rabi* (winter season) crops other than irrigated rice, and adoption of shorter duration rice crops, permits earlier entry, and longer retention, of water;
- A systems based approach and cooperation between local stakeholders can reduce chemical use and increase knowledge of alternative pest control;
- Indirectly, crop diversification can support a wide range of invertebrate and bird species many of which can be useful for natural forms of pest control.

25. Are there any adverse environmental impacts related to the output(s) and their outcome(s)? (max 100 words)

There are no adverse environmental impacts associated with the outputs and their impact.

26. Do the outputs increase the capacity of poor people to cope with the effects of climate change, reduce the risks of natural disasters and increase their resilience? (max 200 words)

The IFM options for alternative cropping patterns and management reduce risks associated with natural disasters, especially from flash floods which commonly occur and are responsible for crop damage every year. By growing crops that are harvested before water rises and fish migrate, the harvest is completed before flash floods occur, and livelihoods are safeguarded. Fisheries resources are benefited from conservation measures and reduced water use, increasing the security of communities and fishers that depend on these resources for food and financial income. There is evidence that climate change is accelerating the arrival of rains and that overall rainfall patterns are changing. PAPD is the tool proven to be workable at community level enabling the competing resource users (both poor and rich, fishers and farmers, men and women) come up with a consensual plan for rational use of resources including scarce water in the dry season would address the effect of climate change at rural setting. Communities that can access information relating to diversification and alternative land management practices from service providers should be more resilient in the face of increasing environmental uncertainty.
