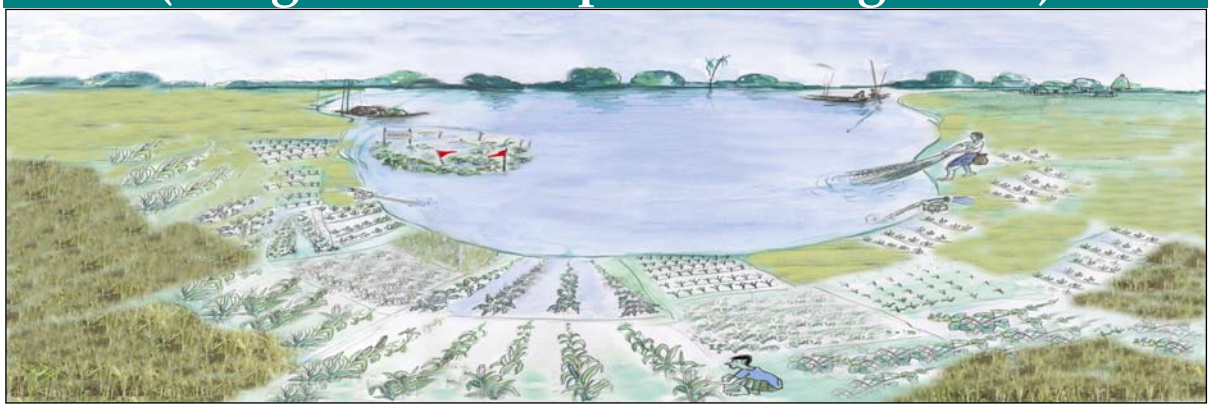
Promotion of Sustainable Institutions for Integrated Floodplain Management

NRSP Project R8495

Final Technical Report
Annex B VI

Training Module on
Institutional Integration for Sustainable IFM
(Integrated Floodplain Management)



Duration : 2 Days

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TABLE OF CONTENTS

SESSION WISE OVERHEAD LIST

Session No.	Overhead/Slides No. and Name	Page
Session 1 :	Overhead 1 : Course Objectives	10
Session 2 :	Overhead 2-3 : What are floodplains?	14-15
	Overhead 4 : Floodplain categories	16
	Overhead 5 : Examples of floodplains	17
	Overhead 6 : What is integrated floodplain management (IFM)?	18
	Overhead 7 : Difference between normal floodplains and IFM?	19
	Overhead 8 : Problems of floodplains	20
Session 3 :	Overhead 9 : An Idealized cycle of pro-poor IFM	28
	Overhead 10 : Lessons on barriers to IFM: Research findings	29
	Overhead 11-12 : Further elaboration of barriers to IFM: Research findings	30-31
	Overhead 13-16 : Challenges in sustainable IFM: Research findings	32-35
Session 4 :	Overhead 17 : Define stakeholder	43
	Overhead 18 : Define institution	44
	Overhead 19 : Examples of stakeholders of a floodplain resource system	45
	Overhead 20 : Resources and stakeholder of the floodplain beel	46
Session 5 :	Overhead 21 : Force field analysis diagram	55
Session 6 :	Overhead 21-23 : Key lessons and best practices in institutional integration in IFM	58-60

Note: Copy of overheads may be given to the participants at the end of each session.

SESSION WISE HANDOUT LIST

Session No.	Handout No. and Name	Page
Session 1 :	Handout 1: Course Objectives	10
Session 2 :	Handout 2: Understanding Floodplain Resources System and Production Dynamics	21
Session 3 :	Handout 3: Integrated Floodplain Management: Barriers and Challenges of Institutional Sustainability	36
Session 4 :	Handout 4: Present Status of the Floodplain Resources, Use Pattern and Need for Integrated Management	47
Session 5 :	No handout	
Session 5 :	Handout 5: Integrated Floodplain Management (IFM): Better Options for Sustainable Livelihood	61

Note: Handouts are useful to read. Handouts contain some added information related to floodplain resource systems and IFM. Distribution of handouts to the participants is optional.

An Introduction to Training Course

Background

Floodplains are multiple resource systems with many different types of users and other types of stakeholders. Technical report on 'natural resources system management in Bangladesh' produced by ITAD based on an in-depth assessment, identified lack of stakeholders' participation as the main constraint towards sustainable management of natural resource systems, especially the floodplains. One of the recommendations of this report was to involve all stakeholders and build-up a productive linkage among them for sustainable uses of floodplains with greater benefits to the communities and industrial and agricultural activities.

In this technical report it was also recommended to develop a short-duration training module to train the government, NGO staff and others involved with flood plain management on institutional integration and linkage in sustainable IFM. This training module is the outcome of this recommendation.

Targeted Participants

All the institutions who have involvement and influence over IFM projects are the targeted participants of this training. They may be NGO staff, Govt. officials such as Fishery Officers (at different levels such as EFO, SUFO, UDCC), Agriculture Extension Officers, Employees of Water Development Board, Engineers and Administrative Officers of LGED, etc. Lease holder of floodplain water bodies, CBO members, local elites, etc.

Aim of Training

Overall aim of this training will be to aware targeted participants about importance of institutional integration in IFM projects for sustainability. The course will equip participants with knowledge and skills in identifying institutions, analyzing their roles and vested interests, and integrate them in IFM projects in a win-win situation. Also the aim of this training is to share the lessons learned and best practices in IFM with the participants that have been synthesized from a recently completed DFID research project, "Integrated floodplain management-institutional environments and participatory methods (R8195) so that participants can consider the lessons learned and best practices to apply in their own context while designing new IFM projects.

Specific Objectives

After attending the training on this module, the participants will be able to:

1) Define the concept of sustainable Integrated Floodplain Management (IFM) and identify various problems / barriers in floodplain resources systems.
2) Define 'formal' and 'informal' institutions and identify various stakeholder institutions directly and indirectly have linkage and influences on floodplain resources systems.
3) Explain the importance and nature of institutional participation and linkage in sustainable IFM.
4) Prepare force field analysis of positive and negatives roles of the influencing institutions, and identify effective strategy to integrate institutions in sustainable IFM.
5) Familiar and apply the best practices and lessons learned on IFM in their own context.

Number of Sessions and Total Training Hours

Session 1	:	Introduction and getting acquaintance	1 hour
Session 2	:	Defining and understanding 'Floodplain' and 'Integrated Floodplain Management' (IFM)	2 hour
Session 3	:	Barriers and Challenges in Sustainable Integrated Floodplain Management (IFM)	2 hours
Session 4	:	Identifying Resources and Stakeholders of different Forms of Floodplain Resource Systems	2 hours
Session 5	:	Identification of Negative and Positive Roles of the Stakeholders and Force Field Analysis of their Roles	3 hours
Session 6	:	Integrating stakeholder institutions: Key lessons learned and best practices from IFM projects	2 hour
		Total Training Hours	**12 hours**

Equipment and Logistics Requirement

Following equipment and logistics will be needed to facilitate the sessions of this training:

- OHP/Multi-media projector
- Transparency sheets/Laptop (with PowerPoint)
- VIPP board, board pin, and color cards
- White board and white board markers
- Easel, poster paper and permanent markers
- Pens, notepads, name tag, file folder for participants
- Handouts of slides/overhead set for participants
- Scotch tap or glue stick
- Other required stationeries

Session 1

Course Inauguration and Getting Acquaintance

Objectives:	Upon completion of this session, participants will be able to: • Describe the course objectives, course schedule, time-plan and physical facilities of the training venue. • Introduce with each other.
Time:	1 hour
Method:	Presentation and Self-Introduction
Resource Materials:	Overhead/PPP Slides: 1 Handout – 1 : Course Objectives
Equipment & Logistics:	Pen, pad, name tag, file, flipchart paper, markers, white board, OHP/Multimedia Projector, etc.
Notes for Facilitators:	This is the introductory session. Main activities are: to describe the course objectives, course schedule, time plan, physical facilities of the training venue and introduce participants with each other. Facilitator has to collect and arrange all the required equipment and materials in the training room before starting the session. Training schedule is not attached here, facilitator will prepare it. If the training will be inaugurated by someone, request him/her to attend the training timely.

Process:

Step 1: Welcome participants to the training course.

Step 2: Distribute pen, pad, name tag, file folder (for handout keeping), etc. to each participants.

Step 3: Ask participants to introduce themselves giving their names, designations, organizations, etc.

After self-introduction, ask participants to write their names on the name-tag supplied and pin it with the cloths so that one can see the names easily.

Step 4: Invite the guest(s) who will inaugurate training course to say few words (if there is such a provision).

Step 5: After finishing the speech by the invited guest, explain the objectives of the course showing the overhead/slide 1. Give the copy of objectives (handout 1) to the participants.

Step 6: Next, share the training schedule with the participants and explain the timetable for tea and lunch break. Distribute the copy of training schedule to the participants.

Note: Training schedule is not attached in this manual. Facilitator will prepare it as convenient for him/her.

Step 7: Ask participants if they have any expectations to learn specifically from this training which are not covered in the training schedule described.

Write the expectations, if there are any on a flipchart paper and preserve it on in corner of the training room for review at the end of the course.

Finally conclude this session with thanks to the participants.

Overhead **1**

Training Objectives

Upon completion of this course, the participants will be able to:

- Define the concept of sustainable Integrated Floodplain Management (IFM) and identify various problems / barriers in floodplain resources systems.
- Define 'formal' and 'informal' institutions and identify various stakeholder institutions directly and indirectly have linkage and influences on floodplain resources systems.
- Explain the importance and nature of institutional participation and linkage in sustainable IFM.
- Prepare force field analysis of positive and negatives roles of the influencing institutions, and identify effective strategy to integrate institutions in sustainable IFM.
- Familiar and apply the best practices and lessons learned on IFM in their own context.

Handout – 1

Training Objectives

1) Define the concept of sustainable Integrated Floodplain Management (IFM) and identify various problems / barriers in floodplain resources systems.
2) Define 'formal' and 'informal' institutions and identify various stakeholder institutions directly and indirectly have linkage and influences on floodplain resources systems.
3) Explain the importance and nature of institutional participation and linkage in sustainable IFM.
4) Prepare force field analysis of positive and negatives roles of the influencing institutions, and identify effective strategy to integrate institutions in sustainable IFM.
5) Familiar and apply the best practices and lessons learned on IFM in their own context.

Session 2

Defining and Understanding Floodplain and Integrated Floodplain Management (IFM)

Objectives:	Upon completion of this session, participants will be able to: • Define what a floodplain is; identify various types of floodplains in Bangladesh. • Define the concept of Integrated Floodplain Management (IFM). • Differentiate between unmanaged floodplain and IFM. • Identify problems in flood plain management.
Time:	2 hours
Method:	Brain storming, and Large group discussion
Resource Materials:	Overheads/PPP Slides : 2-8 Handout – 1 : "Understanding Floodplain Resources System and Production Dynamics" (As additional materials useful to read).
Equipment & Logistics:	White board/Easel, Flip chart paper, VIPP cards and board, Marker, Multi-media projector/OHP, Glue stick/Scotch tap, board pin, etc.
Notes for Facilitators:	It is assumed that participants who will be attending this course have connection with floodplains or IFM projects and thus keep some knowledge on the subject matter of discussion. What they might be lacking are the right kind of understanding, positive attitude and believe in potentials of IFM. Providing a clear understanding on - what an IFM is, how it is different than a normal floodplain that is not managing properly, what benefits IFMs give us, etc. are thus some important aspects that has been tried to address in this session. In this session, through individual experience sharing, participants will also learn about some problems usually we do face in IFM so that they become aware of those problems in future. At the end of this session, a handout is attached. Please read the handout to have a better understating on the content of discussion of this session. Also reproduce sufficient quantify of the handout so that each of the participants get a copy of the same at the end of session.

Process:

Step 1: Introduce the session saying a few words about objective of this session.

Step 2: Invite participants to share their ideas what they mean by the terms 'Floodplain' and 'IFM' and the differences between two.

Arrange two flipchart papers side by side on easels or white board. Write the word 'Floodplain' on one and the word 'IFM' on another piece of flipchart papers.

Write the key words come from the participants relating to each of the terms on the respective flipchart paper.

Lead a discussion focusing the key words written on the flipchart papers to define 'floodplain' and 'IFM'.

Step 3: Post two VIPP cards on VIPP board; one is written with the word "IFM" and the other with the word "Floodplain".

Give some VIPP cards to each participant and ask them to write in short one point on each card that differentiates IFM from normal floodplain which is not managed properly.

Collect the cards from the participants whenever they write a point on it and post under the appropriate heading posted on the VIPP board.

Review all the cards came from participants and posted on the VIPP board. Remove the cards which contain duplicated points.

Read all the points finally stayed on the VIPP board and draw attention of the participants if those points can make us clear what are differences between IFM and a normal floodplain and if we can realize the importance of IFM.

Step 4: Now, show and analyze the overheads/slides 2 to 7 for further clarification of the terms 'Floodplain' and 'IFM' and their differences.

Step 5: Invite participants to discuss on identifying some barriers in IFM.

Encourage participants to share some of their bad or good experiences on IFM, if they have worked in any IFM project.

Listen to the experiences of participants, is some of them come forward to share their experiences on IFM.

Step 6: Write down the barriers mentioned by the participants on a piece of flipchart paper. Make a short discussion analyzing each point identified as barrier to make the participants clear – why the point considered as barrier.

Step 7: Show the overhead/slide # 8 prepared on barriers to IFM based on experiences from IFM projects. Explain each point on the slide and make necessary elaboration to enable participants to understand the nature and magnitude of the problems.

Step 8: Conclude the session with thanks and distribution of Handout # 1: "Understanding Floodplain Resources System and Production Dynamics" to the participants.

Overhead **2**

What are Floodplains?

- Floodplains are the all inland water areas, except large rivers, which remains under water almost round the year where bio-aquatic resources are grown and habited naturally. So the floodplain habitats can be identified are beel, haor, baor, small rivers and canals with associated vast seasonally flooded lands used mainly as rice fields.

- Floodplains are the vast water bodies along with their diverse fauna and flora.

Overhead **3**

What are Floodplains?

- Floodplains are generally characterized by highly productive ecosystems, providing many important benefits.

- These benefits, sometimes described as 'goods and services', may be floodplain functions (e.g., groundwater recharge, soil fertility), uses of the wetland or its products (e.g. fishing, wood collection or research site) or attributes of the wetland (e.g. aesthetic component of the landscape).

- Floodplains are normally common property own by government. Rural communities living around the floodplains are largely dependent on floodplains for their livelihood.

Overhead **4**

Floodplain Categories

- Broadly floodplains are of two categories:

  - Perennial
  - Seasonal

  Perennial: floodplains remain submerged under water year round.

  Seasonal: floodplains become dry for certain period of the year, especially during summer.

Overhead **5**

Examples of Floodplains

- Open beels
- Semi closed beels
- Inundated rice fields
- Khals
- Cannels
- Rivers
- River basins
- River scour holes
- Haors
- Baors
- Oxbow lakes

Overhead **6**

What is Integrated Floodplain Management (IFM)?

- Integrated floodplain management (IFM) is an approach of using and managing floodplains in a sustainable way maintaining their ecosystem and biodiversity up-hold after giving maximum benefits to the communities, and to agricultural and industrial users.

- Here integration refers to balancing of diversified uses of bio-aquatic resources and coordination of users or stakeholders of floodplains. Some of the prominent uses are fishing, farming, agriculture, horticulture, irrigation, wood collection, transport, research, etc. where some of the major users are general community people, fisherman, farmers, boatmen, traders, businessman, govt. officials, agricultural department, water board, forest department, etc.

Overhead **7**

Difference between Unmanaged Floodplains and IFM

Unmanaged Floodplains	IFM
• It simply refers to natural vast water land with diversified fauna and flora remains fallen, unprotected and thus using unrestrictedly by multiple stakeholders.	• This refers to floodplains brought under planned management with an objective sustainable use. Thus emphasize on systematic management rather than resource system itself.
• Agriculturalists view the floodplains as rice production fields.	• Concern about sustainable use of resource systems.
• The fisheries sector sees floodplains as fish production grounds.	• Concern about making the habitat pristine for original aquatic life.
• Resources are under over extraction by the stakeholders.	• Concern about stakeholders' participation to ensure sustainable use of resource systems.
• Degrading rapidly because of unplanned and un-coordinated extraction of resources.	• Want to ensure balanced use of water for fish, crops and vegetation in the system.

Overhead **8**

Problems of Floodplains

General Problems

- Over extraction of resources
- Construction of embankments and regulators
- Cuts off wetlands from the larger floodplain-river
- Disrupting connectivity
- Converting wetlands into rice fields
- Siltation / Sedimentation
- Resource flow reduction
- Pollution
- Conversion of aquatic habitat
- Rapid degradation of floodplain habitats

Watershed Degradation

- Unsustainable cultivation in hill slopes
- Cutting of hills
- Loss of riparian vegetation cover
- Increased HYV boro cultivation
- Water abstraction/diversion

Handout - 2

Understanding Floodplain Resources System and Production Dynamics

Floodplains are generally highly productive ecosystems, providing many important benefits. These benefits, sometimes described as 'goods and services', may be floodplain functions (e.g.: groundwater recharge, soil fertility), uses of the wetland or its products (e.g. fishing, wood collection or research site) or attributes of the wetland (e.g. aesthetic component of the landscape). Many of the benefits provided are essential to communities, and to industrial and agricultural activities. Floodplains are extremely productive systems and may exceed the productivity of intensive agricultural systems.

Most professionals suggest all inland water areas except the big rivers are floodplains irrespective of their temporal dimension. So the floodplain habitats can be identified are beel, haor, baor, small rivers and canals with associated vast seasonally flooded lands used mainly as rice fields.

Perhaps the most important of all the common property resources of the floodplains are the floodwaters themselves. They enable the fundamental process of land formation itself to occur and also bring great benefits that underpin the fishery and agro-ecology and economy of the entire country.

Loss of wetlands will remove these benefits. This is not to put a case for 'development vs conservation', but simply to state that maintenance of wetlands as functioning ecosystems will often ensure that important contributions to development are maintained.

Floodplain Habitats

Bangladesh is a floodplain of three major river systems – the Ganges the Brahmaputra and the Meghna. The country is literally crisscrossed by around 250 large and small rivers; there are thousands of haor, baor, beel, khal etc. along the floodplains of these rivers. The vast water bodies along with their diverse fauna and flora present a unique highly productive floodplain ecosystem.

Floodplain ecosystems are influenced by the prevailing hydrological regime. The spatial and temporal variation in water depth, flow patterns and water quality, as well as the frequency and duration of inundation, are often the most important factors determining the ecological character of a floodplain, which influences fisheries production, fertility of land and production of many other aquatic resources and agriculture.

Floodplain habitats are a. tributaries and distributaries; d. canals; e. beel, haor, baor; f. seasonally flooded areas – inundated rice fields; g. river scour holes and deep part of a beel including kua/pager.

All the major rivers flow into the Bay of Bengal. At the confluence of the rivers, fresh water mixes with seawater producing brackish water that forms a distinct estuarine zone.

The richness in inland open water fisheries yield and species diversity in Bangladesh is due to its high diversity of habitats, microhabitats and seasonal features along with hydrological features. Natural system of replenishment of varieties of fish species in the open waters is possible due to the combined effect of hydrology and habitat diversity over the seasons.

Fish behavior and their use pattern of habitats are sharply different between dry and wet seasons. This difference influences fish lifecycle including growth – they use almost every divers habitat type in completing their lifecycle; on the other hand this difference determines fishing practices and efforts.

Features of floodplain habitats in Bangladesh

1. The floodplains in Bangladesh presents a very rich and diverse fisheries comprising over 300 species of finfish and shellfish.
2. Diverse habitat systems and complex hydrological regimes having strong seasonal dimensions provide opportunities for the entire fish communities to renew and replenish annually and thereby contribute to sustain the yield and diversity of species in the this open waters.
3. The hydrological regime has a vital role in maintenance and sustenance of the inland fisheries production in typical flooded river basins like Bangladesh. Seasonal contraction and expansion of water regime is the characteristic feature of the flooded river basin, which determine the fisheries production through providing opportunities for performing various biological functions of fish.
4. Diversity of habitats is also another major contributor in having a robust inland fisheries yield and biodiversity, which provide diverse microhabitats essential for various fish species to complete their natural biological cycles.
5. Strong seasonal changes in the hydrological regime in the flooded river basins resulted in changes in the qualitative and quantitative dimensions of wetland habitats over the seasons.

The fish communities also adjust and adapt their life cycles in accordance with the changing hydrological cycles and so with the changing habitat features. People living at the ecosystem level who are the users of the flooded basins either for fishing or farming also determine their fishing and farming strategy and actions with the changing hydrological regimes over the seasons.

Broad-based Classification of Habitats in Open Water Ecosystems:

Habitat types	Seasonal features	Dry season status	Wet season status
Major or Primary Rivers	Perennial	Mostly isolated but linked with secondary rivers, may have link with some tertiary rivers	May become flooded over bank and get connected with wider complex floodplain habitats
Secondary Rivers	Mostly perennial	Lost connection with floodplain complex but linked with rivers	Flooded over bank and connected with floodplain complex
Tertiary Rivers	Mostly seasonal	Lost connection with floodplain and poorly linked or no link with river systems, beds are often cultivated (seed beds & boro rice)	Flooded over bank and connected with floodplain complex linked with river systems
Khals	Mostly seasonal	Isolated from floodplain and having poor or no link with rivers, beds cultivated (seed bed and boro rice)	Flooded and connected with rivers and floodplain beels
Beels	Mostly perennial	Become smaller, isolated from khals and rivers, cropland and fallow	Flooded and connected with rivers, khals and adjacent flooded lands

Habitat types	Seasonal features	Dry season status	Wet season status
Haors	Mostly seasonal	Most part becomes dry, crop lands, grassland or fallow except for beels within haors.	Flooded and connected with rivers, khals and adjacent flooded lands
Flooded Lands	Seasonal	Dry, crop land grassland and fallow	Flooded and merged with vast sheet of water in the basin
Baors	Perennial	Isolated, edges under crop cultivation (boro rice, seed beds)	Isolated, some are linked with flooded lands or beels
Kuas/Pagars	Mostly perennial	Isolated, not under cultivation often pumped out to dry for fishing	Flooded and merged with vast sheet of water in the basin

Hydrology, Habitats and Fish Biological Functions

Ecosystems Considerations for management

- Habitat quality and quantity
- Seasonality
- Connectedness
- Fish biological functions
- Human practices

Hydrology in the flooded river basins is the major factor for sustaining fisheries production, maintaining biodiversity and determining fishing practices. Therefore, the hydrology has great influence on inland capture fisheries production and thus governs the whole system. There are annual changes in the hydrological regime. In the monsoon season, a huge volume of floodwater from vast watershed in the upper riparian areas drains through Bangladesh to the Bay of Bengal through around 700 rivers.

The extent of monsoon floodwater varies between years due to various reasons: intensity and volume of monsoon rains, amount and timing of snow melt in the Himalayan hills. These annual hydrological regimes determine the spatial and temporal aspects of wetland habitats in terms of hectare-months of water and accordingly change in fisheries production occur between years both in terms of its quality (composition) and quantity.

Therefore, **habitats** alone cannot determine the fishery rather all these are highly depended and influenced by the annual hydrological regimes. In low flooding year, many habitats in relatively higher elevated basins could not adequately support the fish to perform their biological functions in full, although the habitats are comparatively in good shape. On the other hand, in high flood year higher fish production is experienced due to increased spatial and temporal habitat area in terms of hectare-months, which allow fish to perform their biological functions more successfully than in a dryer year.

Fish life cycles in the typical floodplains like in Bangladesh are adjusted to the annual hydrological features and fish accordingly move out to various habitats at different times of the year in order to complete their life cycles. Therefore, any changes in hydrology affect the habitats (quality and quantity) and eventually in the fisheries production.

Wetland habitats including microhabitats are essential for the sustenance of fisheries production and biodiversity. Fish and other aquatic biota require suitable habitats for performing their various biological functions and unless these habitat requirements are met, fish cannot perform their biological functions. For example, Major Carps (*rui, catla, mrigel*)

require flooded basins in the upper riparian areas of major rivers with current and rain fall for spawning. These species will not spawn if they do not get suitable habitats. It is seen that adults of these species remain in abundance in tertiary rivers in the lower riparian areas or in beels but they do not spawn there. In culture ponds, eggs develop in the gonad of major carps in the early monsoon but are absorbed in the late monsoon as they do get suitable spawning habitats in ponds.

The ease of fish movement among the habitat is also a determining factor of the habitat. In addition to habitat types, water depth range, vegetation and its type are also a part of habitat diversity.

Hydrological regimes of floodplains are one of the major factors sustaining fisheries production, maintaining biodiversity and determining fishing practices. There are annual changes in hydrological regimes; a huge volume of floodwater is a feature of monsoon season. This annual hydrological regime determines the spatial and temporal aspects of wetland habitats in terms of hectare-months and accordingly changes the fisheries production. In a high flood year higher fish production is observed.

Hydrological Seasons, Fish Habitat Features and Fish Biological Functions

Seasons/ Months	Habitat Quantity	Habitat Quality	Fish Biological Functions	Fishing Practices	Remarks
1. Dry Season (December-February)	Habitats become isolated, lowest spatial water area, lowest depth, many wetlands become dry	Highest pollution concentration, low temperature, bad water quality, many wetlands can not support fish	All biological functions of fish reduced, fish take refuge in rivers, river pools, and perennial beels	Fishing intensity peaks, perennial wetlands pumped out to dry for fishing, most wetlands are fished out	Fish become vulnerable or exposed to natural and fishing mortality
2. Pre/Early-Monsoon (March-May)	Water area starts to expand spatially with the onset of rain	Water quality improves with rising water volume and temperatures	Biological functions initiate, fish perform longitudinal (long distance) and lateral (short distance) migrations for spawning and feeding	Less fishing intensity. Fishing in beel edges with less harmful gears but fishing in khals cause destruction due to catching of migrating fish	Sensitive time for fish migration, fish productivity and diversity depends on successful migration
3. Monsoon (June-August)	Spatial and depth parameters of wetland reached the highest, huge area under water, all sorts of floodplain habitats get integrated	Best water quality with rich fish food, huge area for spawning, feeding and growth	All biological functions of fish (migration, spawning, nursing, feeding, growth, etc.) peaks	Fishing peaks in flooded areas with various gears, open access fishing with few exceptions, use of harmful gears like *kona jal, current jal* peaked	Best time for the entire fish community for natural replenishment, however, harmful gears cause damage to fishery
4. Late/post Monsoon (September-November)	Spatial water area rapidly decreases, different wetland habitats become isolated	Water quality still remains good,	Fish migrate to their dry season refuge areas like perennial beels and rivers	Fishing peaks in khals during their return migration, beel, river fishing continues	Sustained natural fish production depends on successful return migration

					to their refuge areas.

Source: Mr. Mokhlesur Rahman, CNRS

Fish migration and growth

Open water fish are broadly categorized into two groups: white fish, that reside primarily in flowing waters such as rivers; and black fish that primarily reside in static waters such as lakes and beels. White fish typically migrate upstream into floodplains, beels, haors through connectivity's during spawning season. Black fish on the other hand spawn and remain in the same lake or beel.

Daget (1960) described two types of river fish migrations in Bangladesh: i. longitudinal migration within the river channel and ii. lateral migration to and from floodplains. Welcome (1975) mentioned that each type of migration requires a different type of behavior and probably different sets of physical stimuli. A gradual rise in the river water in different areas of the country usually starts from late February or early March (pre-monsoon). The process of sexual maturation and staging migration and movement for breeding activity occur in this pre-monsoon period when the air and water temperatures rise. During the early monsoon (April-May), almost all species of fish are seen with ripe or ripening gonads. For the major carp species of Bangladesh, the upper reaches of the Brahmaputra in the Assam Hills, the Ganges below Farakka and upper Barak region are the major breeding areas according to Tsai and Ali (1985).

Some species of prawn and fish require brackish/saline water to spawn; they migrate downstream to estuarine and coastal environments. The juvenile's then undertake upstream migration through the rivers to reach the food rich floodplains to feed and grow until recession of flood. The growing prawns, like the carps, move back into the flowing river habitat with the receding waters. The opposite of prawn is Hilsha, a fish that lives in marine environment in the Bay of Bengal but migrates into the fresh water habitats in the upstream of the river system to breed.

Maintaining ecosystem functions

- ☺ Protection of ecosystem components
- ☺ Restoration of degraded ecosystem components
- ☺ Preservation of ecosystem components
- ☺ Wise use of ecosystem resources

Session 3

Barriers and Challenges in Sustainable Integrated Floodplain Management (IFM)

Objectives:	Upon completion of this session, participants will be able to: • Identify the barriers and challenges in sustainable IFM and rank them according to magnitudes. • Identify the stakeholders' participation and institutional integration as the main barrier and challenge to make the IFM successful.
Time:	2 hours
Method:	Brain storming, Small group and Plenary discussion
Resource Materials:	Overheads/PowerPoint Slides : 9-16 Handout – 2 : "Integrated Floodplain Management: Barriers and Challenges for (Institutional) Sustainability".
Equipment & Logistics:	White board/Easel, Flip chart paper, Marker, Multi-media projector/OHP, Glue stick/Scotch tap, board pin, etc.
Notes for Facilitators:	This session will be focusing on participants' experiences on various challenges and barriers that they have had experienced while implementing IFM projects. Therefore, in this session participants will be given with scope to share their experiences so that they can exposed to a versatile form of challenges given the types of floodplains and can learn from each others' experiences. Here the facilitator needs to play an important role to create a favorable environment so that participants are encouraged to share their experiences. In this session the research findings on barriers and challenges in IFM that are summarized from a research work conducted on DFID funded IFM projects will also be shared with the participants. Therefore, the facilitator must read the handout attached at the end of this session so that s/he can explain the barriers and challenges correctly with examples. Most importantly, the facilitation of the session should be preceded in such a way so that participants can draw a conclusion that the stakeholder participation and institutional integration is the main challenges to be overcome in sustainable IFM to make the endeavor a success.

Process:

Step 1: Introduce the content to be discussed in this session. Explain that they are going to identify in this session some barriers and challenges to an IFM project. If required, make a small discussion – what is meant by barrier and challenges saying that these are the negative factors that always hinder the success of an IFM project.

Step 2: Divide participants into four small groups, give them adequate flipchart paper and marker.

Ask participants to work in small groups for 30-40 minutes to identify barriers and challenges in an integrated flood plain management (IFM) project based on their own experiences and write those on the supplied flipchart papers to present in the plenary.

Step 3: Allow participants to work in small group and prepare the flipchart.

At the end of given time, ask the small groups to reconvene in plenary and present their findings with necessary explanation.

When the small groups will be presenting their findings, facilitator will write down the points in point form on VIPP cards and arrange on the VIPP board. Avoid duplicate points if come from different small groups.

Read all the points written on VIIP cards to summarize major barriers and challenges came out from the small group exercise of the participants.

Step 4: Now ask some of the participants to volunteer in arranging the cards in descending order according to gravity of affects/impacts that hinder the success of the IFM projects and read the list once more.

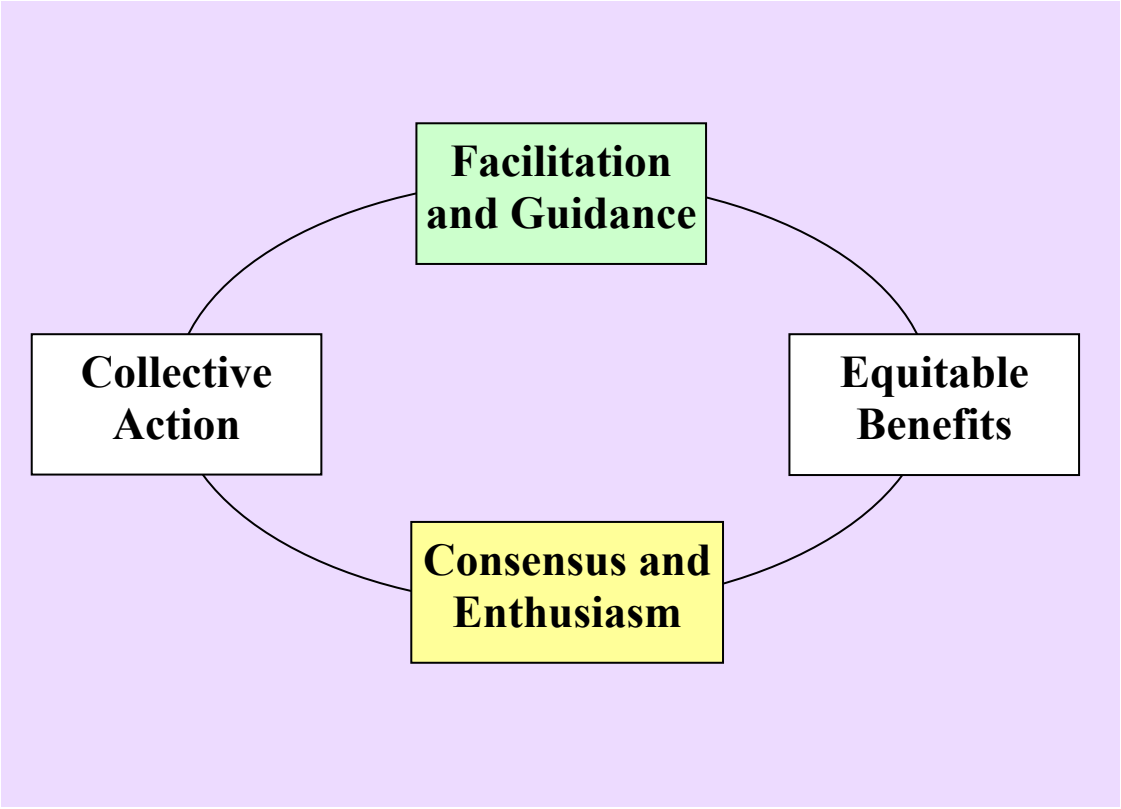
Step 5: Show the overhead/slides 9 to 12 prepared on an idealized cycle of pro-poor IFM and barriers related to that based on research findings from different *DFID funded 'Natural Resources System Management' project in Bangladesh.*

Step 6: Now show the overhead/slides 13 to 16 on 'challenges to be overcome in sustainable IFM' that are also prepared based on research findings. Explain the challenges with examples.

Step 7: Conclude the session with reinforcement that the stakeholder participation and institutional integration are the main challenges to the sustainable IFM. Distribute the Handout #2 to the participants before concluding the session.

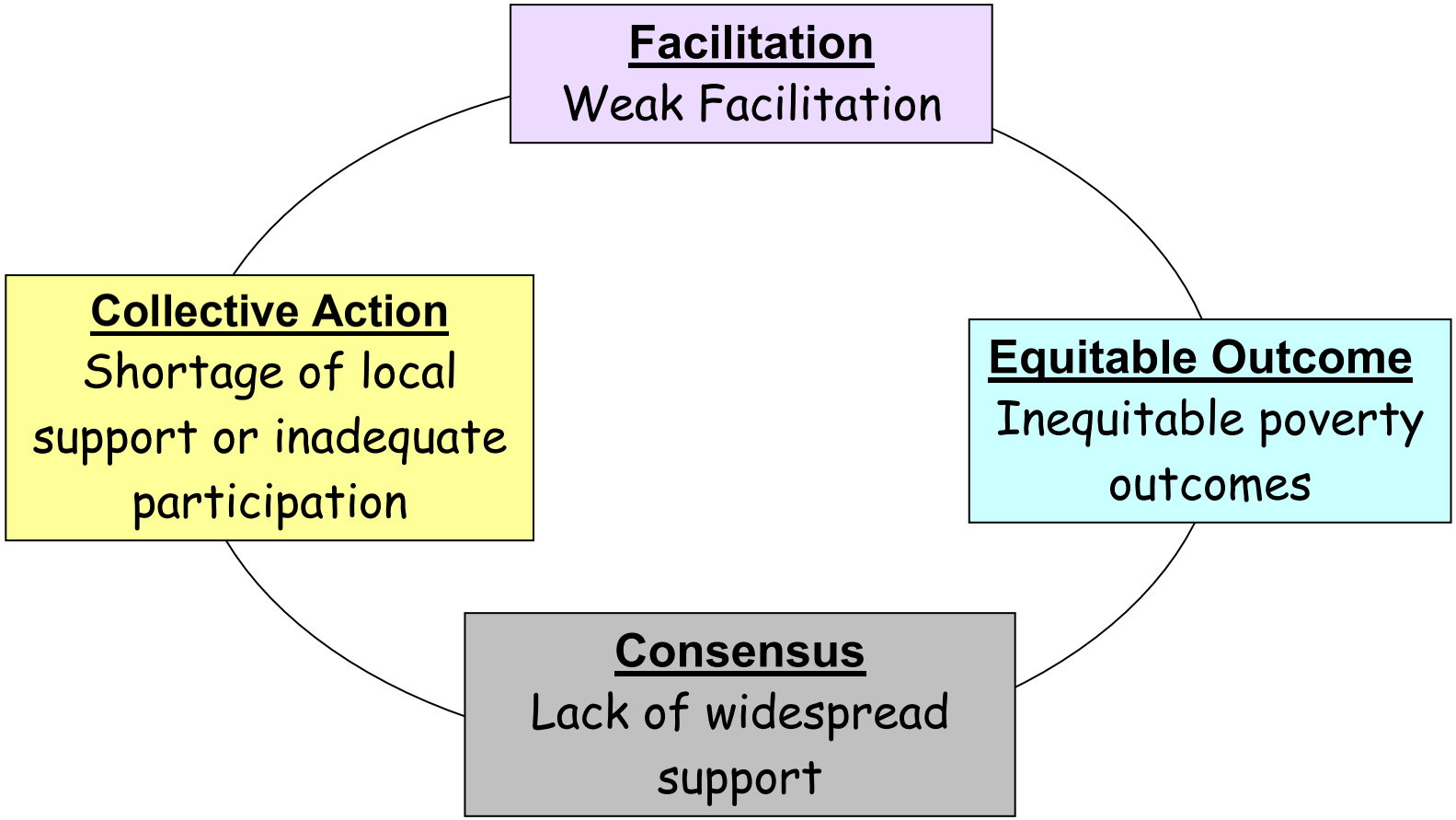
Overhead **9**

An Idealized Cycle of Pro-Poor IFM



Overhead **10**

Lessons on Barriers to IFM: Research Findings



Overhead **11**

Further elaboration of Barriers to Sustainable IFM: Research Findings

Collective Action:	**Shortage of local support or inadequate participation**

Because of:

- Pre-initiative indifference due to lack of clear understanding of project objectives
- Post initiative decline in support because of alienating certain stakeholders

Facilitation:	**Week facilitation**

Because of:

- Declining dialogue and interaction
- Gaps between objectives and understanding:
- Poor linkage
- Lack of NGO Capacity

Overhead **12**

Further elaboration of Barriers to Sustainable IFM: Research Findings

Equitable Outcome: **Inequitable outcomes**

Because of:

- Resource capture by non-targets
- Unrestricted access to RMIs
- Limited understanding of constitutional arrangements
- Influence of pre-existing power structures
- Unwillingness to challenge local elites
- Fuzzy property rights regimes
- A sectoral focus to IFM
- A structured orientation to NRM

Consensus: **Lack of widespread support**

Because of:

- Intervention induced conflict
- Lack of strategic communication and policy influencing

Overhead **13**

Challenges in Sustainable IFM: Research Findings

Challenges in Collective Actions

- Project staff should maintain dialogue and disseminate the project's messages throughout its life-span.
- Cooperation among government agencies and NGOs is crucial. Forging links between RMIs, local government and the local administration is critical for sustainability of new RMIs.
- The experience of NGOs recruited to develop and support RMIs should be assessed carefully. Training needs of NGOs and their staff should be assessed at the time of recruitment.
- Local NGOs should be backed up by close support and mentoring from experienced field based technical assistance staff, or a more experienced NGO team.

Overhead **14**

Challenges in Facilitation

- Project staff should maintain dialogue and disseminate the project's messages throughout its life-span.
- Cooperation among government agencies and NGOs is crucial. Forging links between RMIs, local government and the local administration is critical for sustainability of new RMIs.
- The experience of NGOs recruited to develop and support RMIs should be assessed carefully. Training needs of NGOs and their staff should be assessed at the time of recruitment.
- Local NGOs should be backed up by close support and mentoring from experienced field based technical assistance staff, or a more experienced NGO team.

Overhead **15**

Challenges to Equitable Outcomes

- Ensure early inclusive planning and increase staff awareness of power issues.
- Avoid strongly subsidized inputs for production and access rights; instead start with low cost smaller actions.
- Formalizing (registration with social services or cooperative) RMIs can help improve the prospects of sustainability but is not sufficient to ensure appropriate institutions.
- The needs and proper representation of fishers/resource users should be incorporated in all IFM projects.
- A full understanding of the role of the key informal institutions should be achieved prior to any intervention.
- Inclusive and participatory decision making (PAPD) can provide a role for the elite in supporting IFM initiatives.
- Facilitators need to adapt to existing local access arrangements and fully understand them in relation to the livelihoods of the poor, particularly the opportunities they provide at certain times of the year.
- Some form of social reconnaissance should attempt to map informal NRM mechanisms.
- By adopting a more integrated approach including different livelihoods groups, new IFM can build relationships and linkage among those groups.
- Project design should incorporate elements of empowerment and awareness of rights and entitlements.

Overhead **16**

Challenges ahead relating to Consensus

- A process approach can build capacity through flexibility and adaptability of project activities.
- Implementing agencies should be aware of the bottlenecks that tend to appear and of strategies to avoid them.
- Dispute or conflict resolution should be seen as an integral part of RMIs.
- The capacity of each project to consider these issues is limited. National policies are starting to stress cross-sectoral links, with calls for integration at ministerial level.
- A structured approach to communication for policy influence should be incorporated in new IFM initiatives.
- Because floodplain management performance (outcomes and impacts) relate very closely to approach and objective, IFM agencies should carefully consider their future role and approach in the light of lessons learnt from past experience.

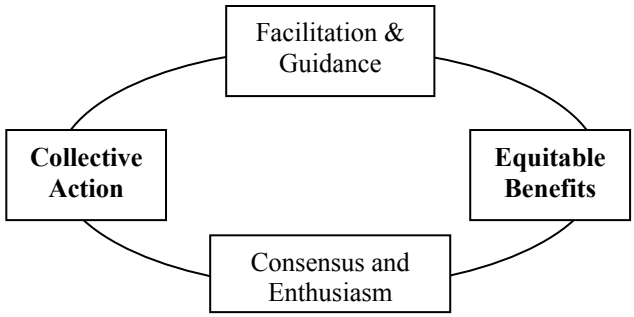
Handout - 3

Integrated Floodplain Management: Barriers and Challenges for (Institutional) Sustainability

These lessons on barriers to inclusive and pro-poor Integrated Floodplain Management[1] (IFM), and prospects and challenges for the future are drawn from a recent DFID research project "Integrated floodplain management-institutional environments and participatory methods (R8195)." Lessons have been drawn from various recent and ongoing fisheries, water and environment projects, which are here termed IFM projects. The emphasis is on *what not to do*: "replicating past approaches will replicate past mistakes".

Introduction (Background or rational or context)

Many recent Natural Resources Management (NRM) projects have emphasized **increased local participation**, mainly through Community Based Management (CBM). They have established community based organizations and committees for resource management, here termed "Resource Management Institutions (RMI)'. But evidence suggests that most of them could not make much progress (have failed) largely on two counts: **pro-poor outcomes** and **sustainability**. The process and institutions need to be more inclusive and focus on achieving equitable benefits through collective actions. Relevant lessons are presented in the form of "problems to be overcome".



Lessons on Barriers

Collective Action: *shortage of local support* (or inadequate participation?)

1. *Pre-initiative indifference* can be due to lack of clear understanding of project objectives among community members (found generally but more so in environmental projects with diverse activities), and through real exclusion of the poor (as in some fisheries projects).
2. *Post initiative decline in support* for institutions can arise if certain stakeholders are disenfranchised or alienated (for example, in Fourth Fisheries Project Executive Committees held too much power discouraging wider participation) and if the opportunity cost for participation is too high.

Facilitation: weak facilitation

1. *Declining dialogue and interaction:* participation tends to be an early focus (for example as an early stage of the project cycle in water sector projects or to sensitize residents in CBFM2, MACH) but later interaction between primary stakeholders and facilitating/supporting agencies (e.g. project staff, DoF, WMA, LGED) becomes less frequent.
2. *Gaps between objectives and understanding*: the level of support for new initiatives aimed at benefiting the wider communities for the long term depends on residents clear understanding of project objectives, institutions and activities, but process documentation revealed gaps.

"**Institutions**" are defined here as "regular patterns of behaviour" or "ways of getting things done". They include formal institutions (e.g. organizations or committees) and informal institutions (e.g. culture, power relations and religious norms).

3. *Poor linkages* and ineffective coordination between government agencies and partner NGOs at national and local levels give rise to conflicts (or confusion) and result in poor participation. Government agencies tend to focus on technical aspects and production, while NGOs are seen as responsible for livelihoods and equity. For example, Local Government has not been formally involved in most project activities, and this is a missed opportunity. MACH experience suggests establishing a strong link with a suitable (or appropriate) local government committee for community-based management of wetland resources produces positive results.
4. *Lack of NGO Capacity*: poor skills of NGOs and their staff in facilitating local RMIs have failed to maximize participation and develop effective organizations. FFP evidence suggests that smaller NGOs were less effective (by late 2004, 74% of sites where small NGOs started work were unsuccessful in establishing community based fisheries management).

Equitable Outcome: inequitable poverty outcomes

1. *Resource capture by non-targets*: 'resource capture' by elites and the workings of local power structures can result in benefits being channelled (or siphoned) away from the poor. New opportunities that arise from IFM interventions are most readily accessed by the wealthier who can afford investment in time and money. The problem is more acute where interventions, such as fisheries management in several projects, are based on subsidy (provision of access rights and inputs) without due concern for mechanisms to assure preferential access to (or by?) the poor.
2. *Unrestricted access to RMIs*: community organizations open to all create an opportunity for the powerful to join committees, influence decision making and take control of resources (as in the early stages of FFP). Approaches that limit elite capture, while including some elites who can help influence opinion positively need to be found.
3. *Limited understanding of constitutional arrangements*: constitutional arrangements (voting rights, eligibility for different posts, etc.) governing the operation of the RMIs need to be established early or there is space for elite dominance as in several fisheries where there is a past history of cooperatives that lacked transparency.
4. *Influence of pre-existing power structures*: often the distribution of benefits is influenced by pre-existing power structures (e.g. UP Chairman, mosque committee members, samaj), for example OLP and Jalmohal project identified mastaans (was mastaans pre-existed?) or previous leaseholders and their associates as a major problem. However, MACH has invested in building linkages to local, formal institutions. UP Chairmen may act as arbitrators when conflicts or discrepancies occur.
5. *Unwillingness to challenge local elites*: NGOs have generally been unwilling to challenge local elites in fear of post project adverse reaction. NGO skills and commitment to helping the rights of poor people, challenge local elites and overcome conflicts cannot be assumed. In general, most projects lack focus (lack of provision) on grass roots advocacy aspect and thus the RMIs are week in systematically raising their voices to challenges local elites and other anomalies??
6. *Fuzzy property rights regimes*: this problem arises when the local reality does not correspond with pre-defined IFM objectives. In some cases this can be incorporated for the benefit of sustainable and equitable IFM, for example local access arrangements are sometimes found to operate on behalf of a broad range of stakeholders which may be equitable by giving seasonal open access to local poor in beels and encourage agreement on and compliance with conservation measures.
7. *A sectoral focus to IFM* can introduce (or induce or give rise) conflict and polarize the positions of different user groups, for example in some CBFM sites only fishers have been supported when there are multiple stakeholders. **Participatory Action Plan**

Development (PAPD) has been successfully used to develop mutual awareness and consensus between farmers, fishers and other interest groups.

8. *A structured orientation to NRM*: should move away from a focus on technical service provisions. So far IFM has not empowered the beneficiaries on awareness of rights and entitlements, which would enable them to counteract 'exploitation' or 'exclusion' by powerful interests. For example, in CBFM1 the needs of fishers were interpreted as rights to fisheries (leases), the supply of inputs (fish stocking, credit), and mitigation measures (sanctuaries). Several projects use production increases as their success indicator but the poor may be excluded in the process of raising production.

Key Message on Barriers to IFM

A greater awareness of **informal institutions** (e.g. *samaj, salish*) and an understanding of how they may hinder or help objectives is required by implementing agencies, donors and local facilitating staff. Many informal institutions influence access to floodplain resources and distribution of benefits. In fact, these institutions interact so closely with formal intuitions (e.g. Department of Fisheries, Bangladesh Water Development Board, NGOs) that it is difficult to discuss the function of one without the other.

Consensus: Lack of Widespread Support

1. *Intervention induced conflict*: Unfortunately, IFM interventions have tended in several cases to alienate some groups, widen differences in interests and create conflicts. This probably relates to the difficulty in achieving collective benefits available to a wide range of stakeholders. Conflict has been less in some sites where PAPD was used.
2. *Lack of strategic communication and policy influencing*: lesson learning and policy influence have been ad-hoc and unstructured. There was no uptake of research findings and lessons learnt from projects to create widespread support or scale up IFM neither in the policy arena nor for transferring this for new programmes. Donors and projects are increasingly aware of this and projects such as CBFM2 and MACH include communications for policy influence but that still lacking of effective strategy and actions.

Challenges Ahead

Collective Action

Stage 1:

1. The purpose of IFM institutions must be clearly explained before interventions, and project messages must be easy to understand.
2. Activities and objectives should impact a range of groups in a range of ways so that benefits can be realized by all stakeholder groups.
3. Cost-effectiveness for participants must be ensured, and the wider community and members of RMIs should expect transparency and accountability from their representatives.

Facilitation

4. Project staff should maintain dialogue and disseminate the project's messages throughout its life-span.
5. Cooperation among government agencies and NGOs is crucial. Forging links between RMIs, local government and the local administration is critical for sustainability of new RMIs.

6. The experience of NGOs recruited to develop and support RMIs should be assessed carefully. Training needs of NGOs and their staff should be assessed at the time of recruitment.
7. Local NGOs should be backed up by close support and mentoring from experienced field based technical assistance staff, or a more experienced NGO team.

Projects should try to identify **local champions** (elites, opinion leaders and local representatives that are less exploitative and are sympathetic to the interests of poor user groups). Such people can provide a valuable link with existing local institutions and troubleshoot for the RMIs when NGO support is withdrawn.

Equitable Outcome

8. Ensure early inclusive planning and increase staff awareness of power issues.
9. Avoid strongly subsidized inputs for production and access rights, instead start with low cost smaller actions.
10. Formalizing (registration with social services or cooperative) RMIs can help improve the prospects of sustainability but is not sufficient to ensure appropriate institutions.
11. The needs and proper representation of fishers/resource users should be incorporated in all IFM projects.
12. A full understanding of the role of the key informal institutions should be achieved prior to any intervention.
13. Inclusive and participatory decision making (PAPD) can provide a role for the elite in supporting IFM initiatives.
14. Facilitators need to adapt to existing local access arrangements and fully understand them in relation to the livelihoods of the poor, particularly the opportunities they provide at certain times of the year.
15. Some form of social reconnaissance should attempt to map informal NRM mechanisms.
16. By adopting a more integrated approach including different livelihoods groups, new IFM can build relationships and linkage among those groups.
17. Project design should incorporate elements of empowerment and awareness of rights and entitlements.

Consensus

It is important that progress and problems are reported and discussed as projects are implemented and that lessons continue to be learned during and after project support. In this regard, the study developed **process documentation** methods for IFM institutions. Implementing agencies should consider training and adoption of such methods.

18. A process approach can build capacity through flexibility and adaptability of project activities.
19. Implementing agencies should be aware of the bottlenecks that tend to appear and of strategies to avoid them.
20. Dispute or conflict resolution should be seen as an integral part of RMIs.
21. The capacity of each project to consider these issues is limited. National policies are starting to stress cross-sectoral links, with calls for integration at ministerial level.
22. A structured approach to communication for policy influence should be incorporated in new IFM initiatives.

23. Because floodplain management performance (outcomes and impacts) relate very closely to approach and objective, IFM agencies should carefully consider their future role and approach in the light of lessons learnt from past experience.

Detailed findings are available in the Final Technical Report for “Integrated Floodplain Management-Institutional Environment and Participatory Methods” (R8195)

This document is an outcome from a project funded by the UK Department for International Development for the benefit of ‘developing countries’. The views expressed are not necessarily those of DFID.

Session 4

Identifying Resources and Stakeholders of different Forms of Floodplain Resource Systems

Objectives:	Upon completion of this session, participants will be able to: • Explain the term 'stakeholder' and 'institution'. • Identify the various resources of the different form of floodplains and correspond to that identify the different stakeholders and institutions of the floodplain resource systems.
Time:	2 hours
Method:	Large group discussion, Small group works and presentation
Resource Materials:	Overhead/slides: 17 – 20 Handout – 3 : Present Status of the Floodplain Resources, Use Pattern and Need for Integrated Management.
Equipment & Logistics:	White board/Easel, OHP/Multi-media projector, Flipchart paper, Marker, Glue stick/Scotch tap, etc.
Notes for Facilitators:	This session aims to provide a wider view to the participants about stakeholders/institutions that are directly or indirectly linked with different forms of floodplain resource systems. To mean 'institution', we normally refer to the formal institutions and we often forget to consider the informal institutions like individual, their groups; such as: fishers, farmers, and their behaviors, values, etc. We need to update our participants with the evolving concept of institutions and helped them to identify various formal and informal institutions that are directly or indirectly linked with different forms of floodplain resource systems. To enhance the participants knowledge and understating of the diversity in the resources and stakeholder groups of a floodplain resource system, they will work in small groups in this session to identity different stakeholder institutions correspond to different forms of floodplain resource systems. Please select some floodplain resource systems that have diversity of resources and stakeholders to give to the participants to work on in small groups.

Process:

Step 1: Start the discussion of the session asking participants what they mean and how they define 'stakeholder' and 'institution'. Let some of them to explain their ideas with some examples. Listen to the ideas of the participants.

Step 2: Show the overhead/slides 17, 18 and 19 and explain further the meaning of 'stakeholder' and 'institution' with some examples.

Regarding 'institution', explain that when people hard the word institution, they immediately mean to some formal institutions like club, school, college, mosque, temple, etc., which are correct. But 'institution' also includes individual and their community like fishermen, farmers, etc., and their behavior pattern, norms, practices, etc. that we do not normally consider. These are also institutions but informal. Informal institutions also have great influences on IFM projects to make those successful.

Explain that all institutions, formal and informal, that have direct or indirect interests in a natural resource system are considered as the stakeholders of that resource system.

Step 3: Invite participants to join in a discussion in small groups to identify resources of a floodplain resource system and identify the stakeholders of the floodplain resource system considering its resources base.

Before dividing the participants into small groups, show them overhead/slides 20 to make them clear what they are going to do in small group. Here with the help of overhead 20, explain the resources of a *Beel*, and the stakeholder institutions are directly and indirectly related to this resource system.

Step 4: Divide the participants into 4 small groups. Assign each small group any one of the following floodplain resource systems to identify their resources and the stakeholder groups linked with the resource system:

- Group 1: Open and Semi-Closed Beels,
- Group 2: Haor, Baor and Oxbow lakes,
- Group 3: Wet and Marshland
- Group 4: Rivers and Channels

Instruct clearly that in small groups the participants will:

- Identify resources of the given floodplain resource system
- Identify stakeholder institutions directly or indirectly linked with the resource system
- Present their finding in the plenary.

Step 5: Give the small groups sufficient flipchart papers and markers.

Allow them 30 minutes to work in small groups to identify resources and the stakeholders of the floodplain resource systems and prepare the flipcharts to present the finding in the plenary.

Step 6: At the end of given time, ask the small groups to reconvene in the large group and present their findings.

Instruct participants, when participants of one small group will be the presenting their findings, the remaining groups will listen to their presentation minutely and make necessary quires and questions if they have any.

After presentation by all small groups, conclude the session with thanks to the participants. Distribute the handout 3: ‘Present Status of the Floodplain Resources, Use Pattern and Need for Integrated Management’ to the participants before conclude the session.

Overhead **17**

Define Stakeholders

Stakeholders:

"Stakeholders" are the individuals, organizations and/or institutions who are effected positively or negative out of an event, activity, project or programs, etc.

Primary Stakeholders:

Who are influenced or affected directly out of an event or activity or project they are the primary stakeholders,

Secondary Stakeholders:

Who are influenced and affected indirectly out of an event or activity or project they are the secondary stakeholders.

Overhead **18**

Define Institutions

"Institutions" are defined here as "regular patterns of behavior" or "ways of getting things done". They include formal institutions (e.g. organizations or communities) and informal institutions (e.g. culture, power relations and religious norms.

Formal Institutions:

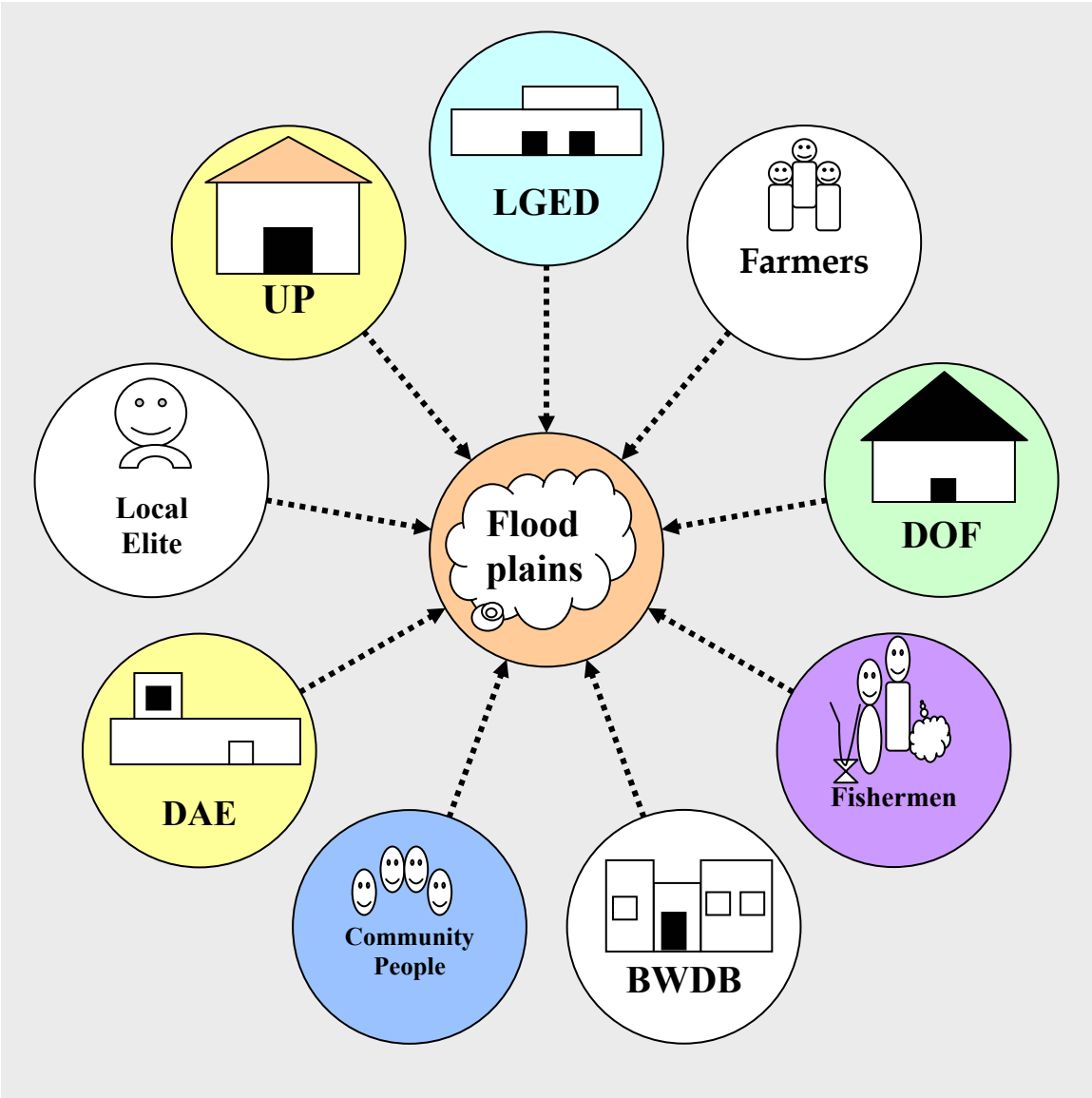
- NGO,
- CBO,
- DoF, etc.

Informal Institutions:

- Community leader,
- Fisherman,
- Farmer,
- Lease holder, etc.

Overhead **19**

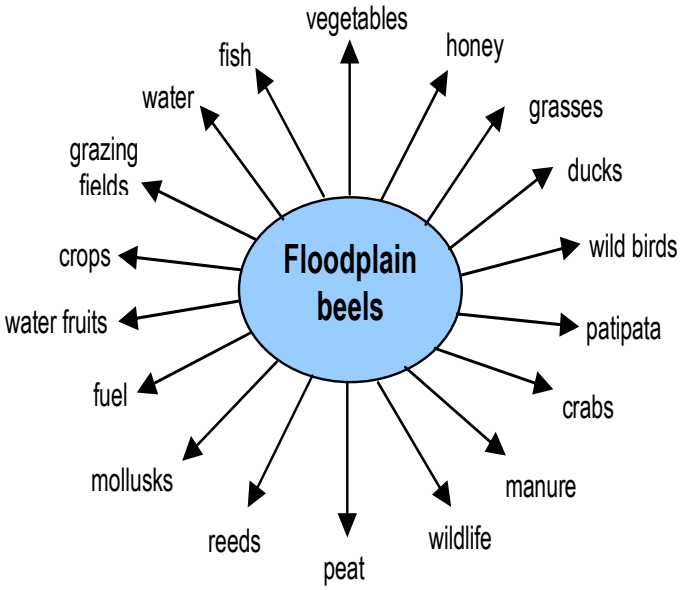
Example of some Stakeholder/Institutions of a Floodplain Resource System



Overhead **20**

Resources and Stakeholders of the Floodplain: Beels

Stakeholders
Fishers
Farmers
Women
Children
Cattle keepers
Craftsmen
Boatman
Landless
Grass collectors
Aquatic fruit collectors
Poor
Machine operators
Leaseholders
Hunters
Traders
UP
GO
NGO



Handout – 4

Present Status of the Floodplain Resources, Use Pattern and Need for Integrated Management

From our experiences and observations we know that the floodplain habitats are degrading, production of fisheries has declined in quantity, species diversity and big size fish in catch over a period of time. DoF information shows a rapid increase in culture fisheries; in relation present official status of the open water capture fisheries is declining.

Present status of the floodplain production systems

Biological and productivity

Overall 30-40% fish catch declined during 1975 – '76 to '89 – '90 period (DoF) (Tk50-100 Crore lost annually)

Overall fish consumption declined 15% per capita, for the poorest the decline is 38% during '95 to 2000 period (BBS)

Major carp and large catfish catch declined 50%. Healthy open water body production is 250 to 300 kg/ha, but some places found 51 to 160 kg/ha (MACH baseline). CBFM Project baseline is 45 – 125 Kg/ha.

More than 20% of all fresh water fish species are in danger of extinction (IUCN).

Recent fisheries sector review predicts 0.9 – 2.1% fall per year in inland capture fishery production.

Flow reduction in major river systems is about 50% during the last 20 years (Water Board) due to barrages (in India), local extraction and other reasons leaving millions of ha open water area impacted.

FCDI projects also damaged many open water bodies in the country, mainly converting wetlands into rice fields, disrupting connectivity and siltation, and ultimately producing drastically changed ecosystems. Impacts on wetlands can be caused by both human activities within them and because of the interconnectedness of the hydrological cycle, by activities take place within the wider catchments.

Issues related to floodplain resources

Issues related to physical and biological resources

1. Lack of dry season water in river, beel, khals (flow reduction, siltation, FCDI structures.
2. Boro rice cultivation during winter, its influence on the critical dry season aquatic habitats.
3. Loss of connectivity between beel-khal-river (roads, FCDI structure, siltation).
4. Sedimentation of beels, rivers and khals (loss of forest cover, lack of soil conservation measures).
5. Pollution (industrial, agricultural, domestic).
6. Destructive fishing practice and over fishing.

7. Due to overexploitation slow growing, late maturing species are being replaced by quick growing fast maturing ones.
8. Conversion of aquatic habitat (agriculture, urbanization, roads, industry).

Policy issues related to open water resources

1. Present leasing policy of the Jalmohals;
2. Lack of any national sanctuary policy;
3. Land use planning;
4. Difficulty to implement the Fish Act and need for review;
5. Lack of national and local resource planning and management – agriculture, water, industry, pollution.
6. Fisherman and wetland is not properly defined.

Watershed degradation

- Unsustainable cultivation in hill slopes
- Cutting of hills
- Loss of riparian vegetation cover
- Increased HYV boro cultivation
- Water abstraction/diversion

Results in a serious siltation down in the open water bodies.

Consequences of wetland degradation

1. Imbalance in nature;
2. Loss of habitat of many animals and plants thus loss of biodiversity;
3. Onset of desertification;
4. Low-lying areas will be inundated;
5. Water pollution – loss of natural recycling system;
6. Loss of common property renewable natural resource – reduced food and fodder, reduced livelihood security/safety net for the poor specially.

Why integrated management floodplains is important

- More than two-thirds of Bangladesh is wetlands
- Wetlands are rich in biodiversity, both plants and animals
- Over 80% of rural people depends on various wetland resources at varying degrees
- Poor receive about 50% of the direct benefits and share in many of the remaining benefits

Why community based management

1. Resource users, who get the benefit, whose livelihood is dependent, should manage the resources.
2. Local people can use their knowledge and information about the resource.
3. Local people, users will be more interested in sustainable management and long-term use of resources if they have right over resources.

What are the problems of floodplain production system?

In Bangladesh floodplains are predominantly converted into rice fields, more over Water Development Board every year constructing embankments and other structures so that farmers can bring perennial part of a beel under rice cultivation and they can use the water from the residual day-by-day shrinking water body, making the habitat pristine for original aquatic life thus reducing resources production and other goods and services of wetlands. Excessive pressure on fisheries resources, destructive fishing methods are another set of problem of the production system. These are coupled with upper watershed issues has created a threatened situation for the floodplains and wetlands benefits and even their existence. These are the main problems or conflicting issues within floodplain production system in Bangladesh. Bellow the dimension of the problem and their impacts are discussed.

Understanding of an integrated view of the management problem related to Floodplain Resources

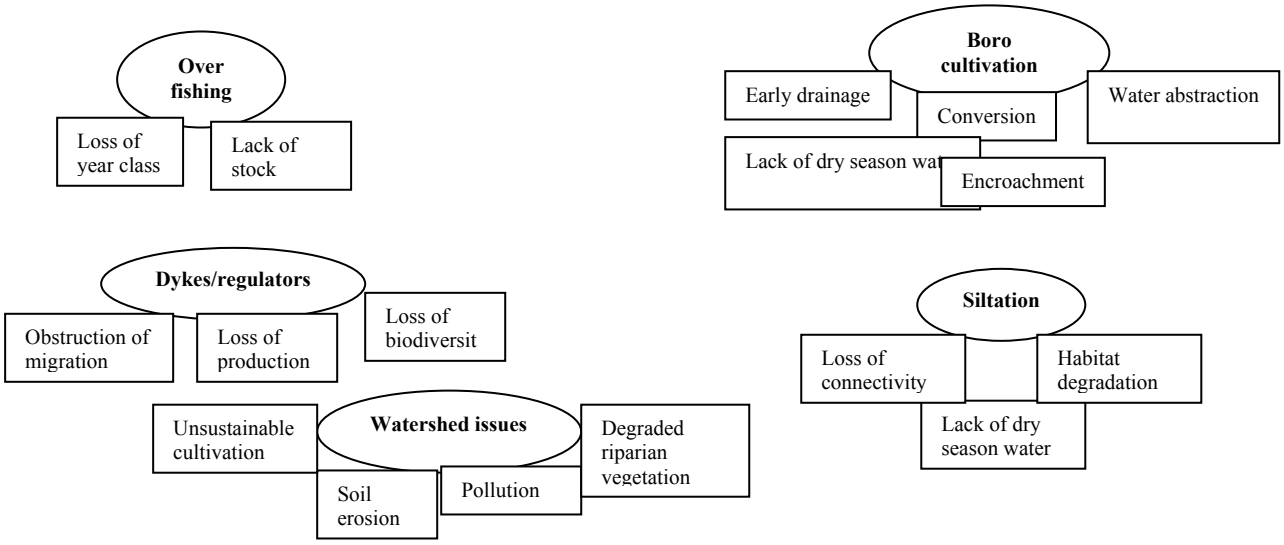
The broad constraints to improved floodplain resource in Bangladesh investigated were:

(i) Excessive effort levels in fishing leading to reduced fish productivity,

(ii) Reduced water levels (due to sluice gate management, both during the flood season and ahead of the dry season, and water abstraction for dry-season rice irrigation) leading to reduced fish productivity, and

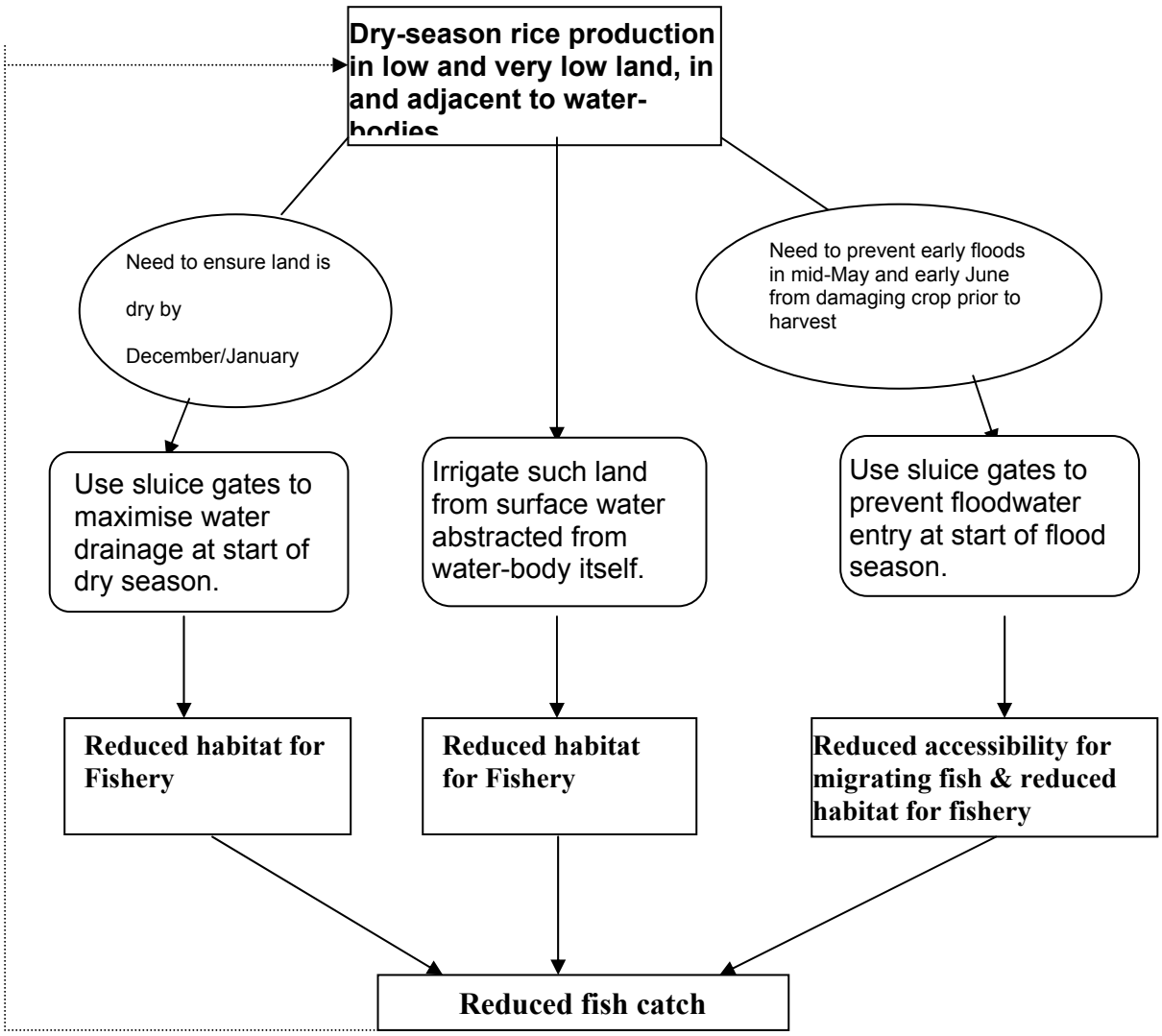
(iii) Early flood arrival events damaging dry-season rice crops prior to harvest.

Figure: systems problems: Floodplain management



Collectively, these represent some of the major NR-related constraints in hydrologically modified floodplain sites. There are strong systems linkages binding at least some of these constraints. Understanding these linkages also provides a key to integrated floodplain management. This linkage is outlined in the diagram (Figure 1)

Figure 1: The systems implications of lowland winter rice production



Dry season rice production in the beel/very low lands thus lies at the heart of the problems studied here. Firstly, sluices are opened to maximise drainage out of the floodplain at the end of the flood season, so that lowland will sufficiently dry out for rice cultivation. Secondly, proximity to the water-body encourages the subsequent irrigation of such plots from the residual water in the water-body. Thirdly, low-lying rice plots are most susceptible to damage from early flooding prior to harvest, which leads to pressure being put on sluice gate authorities to keep gates closed in the early flood season.

(Slide: CPUA – hectares irrigated relationship)

Dry season water retention is key to the floodplain fishery, *i.e.*, the 'habitat effect' is strong in the dry season, and the drainage and irrigation aspects described above rapidly desiccate the habitat available to the fishery. Research results show that this 'habitat effect' is relatively low in the early flood season – *i.e.,* floodplain water level reduction due to early flood season sluice closure does not impact the fishery excessively. However, other work (Halls, *et. al.*,1998; DeGraaf *et. al.*, 1999) shows that there is nevertheless a 'migration effect', whereby migratory species and their developing larvae are blocked from entering the floodplain by the sluice gates. The net effect is reduced fish catch, upon which the poorest disproportionately depend.

An additional point needs to be noted. Once the trend for very low land dry season rice production is established, there is an impetus for accelerated deterioration of the fishery. As the water levels and the value of the fisheries decline, there is correspondingly less incentive to protect the water-bodies and the fisheries, both for the government and local communities. Weakened protection encourages further encroachment of farming interest on the water cover (this is indicated by the broken line/arrow leading from 'reduced fish catch' to 'dry season rice production on low land' in the diagram above). Also, other trends are contributing to the perpetuation and acceleration of the interlinked chain of problems described above. For instance, cheaper and more mobile LLPs are now available, and these are able to exploit even the shallower water-bodies in an economically viable way.

Somewhat separate from the interconnected issues specified above is the problem of excessive effort in the fisheries. This is inevitably the consequence of steady population growth in a poor, land-constrained economy. Yet even this aspect has a connection to the desiccation of water-bodies due to dry season rice production. Reduced water levels improve 'catchability' for even inexpensive, labour intensive gear. This is likely to encourage further effort in the fishery, at least in the short-run, further undermining the long-run productivity of the fishery.

Existing social power structures serve to enable these trends. A small number of large landowners may have disproportionate influence on the system. As FAP 17 (1994, page 54) notes in the context of the PIRDP, '*The closure of the sluices during the period from late Baishak (early May) to late Joisthya (early July) is reportedly aimed at protecting a small amount of boro in the lowest parts of the beel. According to local people, operating schedules are dictated by the fact that most of the boro land is owned (or occupied) by large and powerful landowners who are able to influence sluice gate operation'.* In contrast, professional fishers have low social standing and are disorganised, and hence are forced to accept and adapt to changes in the system rather than help shape it.

Water resources management in Bangladesh is based on a complex set of social, legal and customary rights. Over time, these have been modified by the penetration of market forces and interventions by the state. One of the consequences has been the attribution of various forms of common property and their displacement by private property.

Session 5

Identifying the Interest and Roles of Different Stakeholders in IFM and Force Field Analysis

Objectives:	Upon completion of this session, participants will be able to: • Identify and analyze the interests and positive and negative roles and influences of different stakeholders/ institutions in floodplain resource systems. • Prepare the force field analysis of the helping and hindering forces, i.e., positive and negative roles/influences of the stakeholder institutions in context of present situation and desired goal of IFM.
Time:	3 hours
Method:	Group discussion, Small group works, Presentation
Resource Materials:	Overheads/Slides: 21
Equipment & Logistics:	White board/Easel, OHP/Multi-media projector, Flipchart paper, Large brown paper, Marker, Glue stick/Scotch tap, etc.
Notes for Facilitators:	In this session participants will be working in the same small groups in which they worked in the previous session, to identify the stakeholders' interests from a floodplain resources system and their positive and negative roles they play to attain their vested interests. Participants will then do a force filed analysis of the positive and negative roles played by stakeholders in floodplain resource systems to understand the present situation of the resource system.

Process:

Step 1: Ask participants to rejoin in the same small groups they worked in the previous session. Ask them to identify the interests of the different stakeholders that they have identified for the given resources system and to identify what positive and negative roles each of the stakeholders play to attain their interests.

Step 2: Before the participants go to small groups, show them overhead/slide 21 and explain how to analyze the force field analysis of the negative and positive roles influences of the stakeholders. Remark that negative and positives roles of the stakeholders are also know as 'helping and hindering forces'.

Also describe what is force analysis and how to do that.

Force field analysis: Regarding force field analysis explain that it will help the participants to look at the positive forces - which are helping to reach the 'goal', the sustainable IFM, and the negative forces - which are hindering or pushing us back or opposite direction and thus not allowing us to reach the 'goal'.

Also explain that force field analysis will help the participants to understand the magnitudes of positive and negative forces of the stakeholder institutions and what actions they can take at what rigor level to move forward from the 'present situation' to toward the 'goal' – i.e., to make the sustainable IFM successful.

Instruct participants to list the helping roles and influences on the left side, drawing longer or shorter arrows to indicate the strength of the forces which are pushing the present situation towards the goal. One the right hand side, write the hindering/restraining forces which prevent change or reduce its power, and use the longer or shorter arrows to indicate the strength of these restraining forces.

Explain that one can move towards the goal either by increasing the helping forces, or by weakening the hindering forces. Sometimes the more pressures come from the helping side, the more resistance develops in the restraining (hindering) sides. In such case it is often best to start by reducing the hindering forces.

Step 3: Allow the participants to rejoin in small groups and supply them markers sufficient large brown paper for drawing force field analysis diagram.

Allow the participants 50–60 minutes to work in the small groups on the given assignment and prepare the flipcharts and brown papers to present in the plenary.

Step 5: At the end of given time, ask the small groups to reconvene in the large group and present their group findings. Instruct them, while one group is making presentation, the remaining groups will listen the presentation minutely so that they can make quires and questions at the end of presentation.

Step 6: Now ask each small group to chose either one of the helping forces - which they can strengthen, or one of the hindering forces - which they can reduce or weaken.

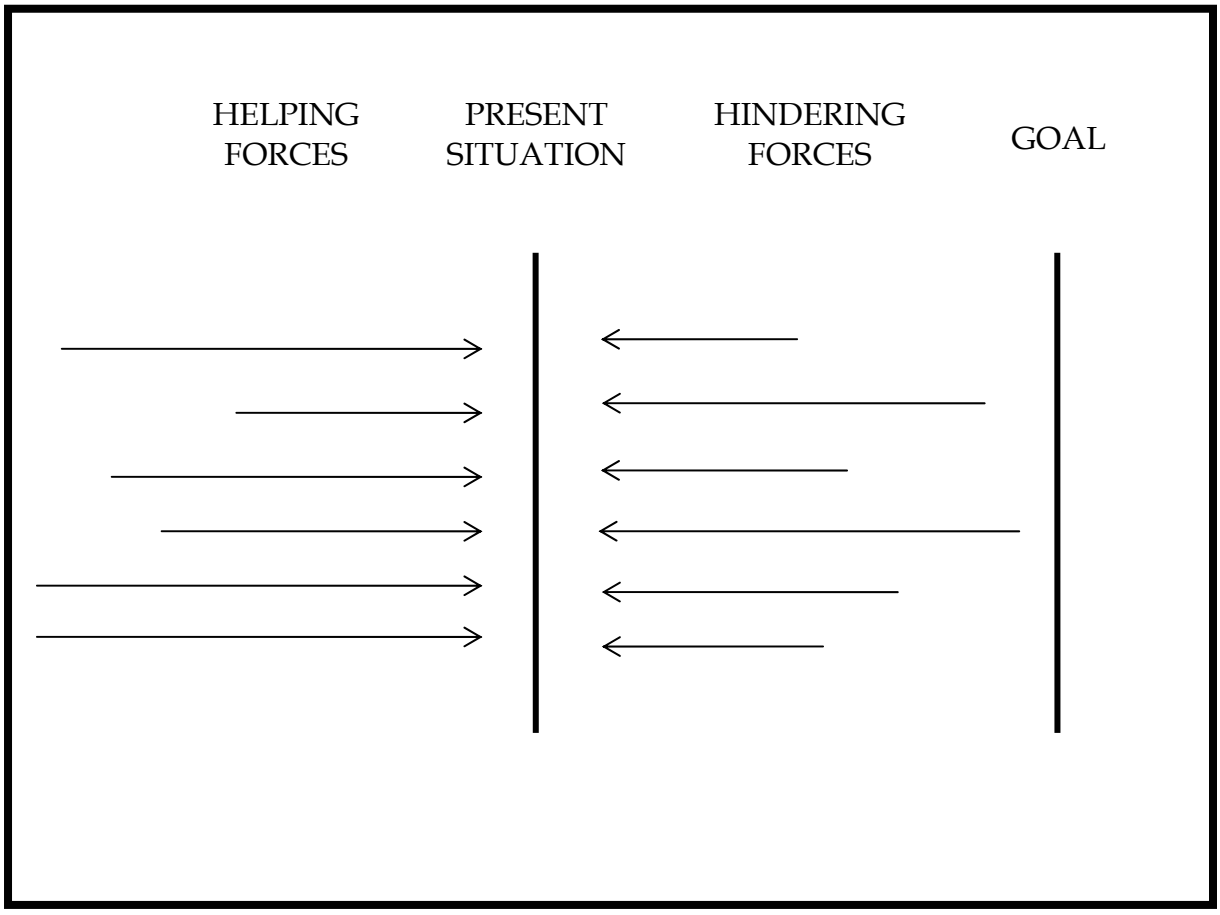
Taking this 'force' into consideration, ask them to go back again in the small groups and identify their goal in regard to working with this force and draw a new diagram on the other brown paper listing the helping and hindering forces related to this new situation and goal.

Step 7: At the end of given time, ask the small groups to reconvene into large group and present their second force field analysis. Elaborate relevant discussion on the presentation so that participants get better understanding on the subject matter of discussion.

Step 8: Finally conclude the session summarizing the discussion and highlighting the key learning points.

Overhead **21**

Force Field Analysis Diagram



Session 6

Integrating Stakeholder Institutions: Key Lessons Learned and Best Practices from IFM Projects

Objectives:	Upon completion of this session, participants will be able to: • Share their own experiences on integration of stakeholder institutions for sustainable IFM. • Describe the key lessons learned and best practices experienced on institutional integration in IFM from a research project.
Time:	2 hours
Method:	Presentation and Discussion
Resource Materials:	Overheads/Slides : 22 - 24 Handout – 4 : Integrated Floodplain Management (IFM)
Equipment & Logistics:	Multi-media projector/OHP, Flipchart paper, Marker, Glue stick/Scotch tap, board pin, etc.
Notes for Facilitators:	This session has been planned to disseminate some of the key lessons learned and best practices on sustainable IFM from previously implemented projects and programs. The lessons and the best practices are mainly on the importance and techniques of integrating stakeholder institutions. Some overheads are attached at the end of this session on the lessons learned and best practices. Facilitator will read those overheads attentively and make him or her well-prepared to give necessary explanation to the participants while presenting the overheads lessons learned and best practices.

Process:

Step 1: Start discussion on this session asking participants if they have any past experiences on integration of stakeholder institutions in IFM.

Allow some of the participants to describe their experiences, and instruct others to listen the experiences attentively.
Write the key experiences expressed by the participants in point form on a flipchart paper. Reinforce participants on the points giving more explanation and analysis, if needed and council them to remember the experiences shared by some of the experienced participants in their own context.

Step 2: Now invite participants to a presentation on key lessons learned and best practices on institutional integration in sustainable IFM from a floodplain resource system research project funded by DFID.

Show the overheads/PowerPoint slides 21-23 one by one with analysis and explanation. While presenting overheads/slides, encourage participants to ask questions if they have any.

Step 3: After presenting all the overheads/slides, summarize your presentation in a few words and conclude the session reinforcing participants to keep in mind the best practices and lessons learned discussed in this sessions.

Step 4: Finally conclude the session and course with to the participants.

Overhead **22**

Key Lessons and Best Practices in IFM

- Active participation and involvement of all stakeholders and institutions is a must for sustainable IFM.
- There has evolved *de facto* institutions. These institutions are gauging against generic and community-identified performance indicators.
- Performing a pivotal coordinating role at the local level of outmost important.
- Negotiation for a better division of benefits between all parties is a precondition to bring all the stakeholders in a common platform.
- Homogeneity and community characteristics are always important.
- Facilitation is very important and essential.
- There are shared interrelated issues that seem to influence the impact on local stakeholders. The most important are: type of interaction, level of community participation, skills and remit of the facilitators. All these should be duly emphasized.

Overhead **23**

Key Lessons and Best Practices in IFM

- Partnership is essential. It can bring complementarities and mutual benefits. But the inherent differences between the groups that make these partnerships desirable are also the basis of inequalities and tension.
- Building partners' capacity ensures greater efficiency in project implementation.
- Supporting partners and their integration in all stages of the project is an important precondition in sustainable IFM.
- Performance monitoring of project partners and various management models contribute to increase accountability and efficiency.
- Careful site and partner selection is highly important and crucial for projects' success and sustainability of impacts.
- Collaborative design process builds a coalition of actors and increases their commitment to the project.
- Participatory decision making increase motivation and ownership of the stakeholders and shared the risks and threats among the stakeholders.

Overhead **24**

Key Lessons and Best Practices in IFM

- Strong political commitment is essential at the long run to make IFM sustainable.
- Influencing policy changes is the main gateway to sustainable IFM.
- Early mobilization of political and administration support increase the possibility of smooth inception and implementation of the project.
- Adapting process monitoring allows refinement during on-going stage of the project.
- Periodic revision of project organization and project objectives increase the relevance and effectiveness of the projects.
- Process documentation and consistent learning orientations scope to detect flaws and gaps and overcome those.
- Good knowledge sharing is a must for internalizing responsibilities and demonstrating better performance.
- Property right diverse but very important.
- Direct attempt to introduce new forms of production, rather then on negotiated farming management does not work.

Handout – 5

Integrated Floodplain Management (IFM): Better Options for Sustainable Livelihood

Agriculturalists view the floodplains as rice production fields. The fisheries sector sees floodplains as fish production grounds. Overall the national emphasis has been to produce more rice ignoring other benefits and products thus converting natural wetlands into rice fields. To the community dwelling in and around a floodplain it is their livelihood not just a rice field. Floodplains provide many products and services which have been utilized by many people in rural communities for generations. Wetlands also are significant for the local and regional environment, including for biodiversity conservation.

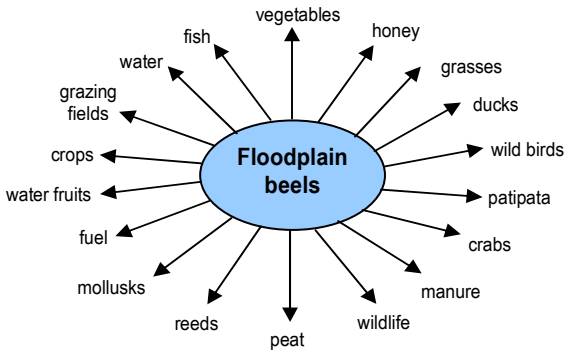
Policy conclusions

- Floodplains are multiple resource systems used by multiple stakeholders including fishers and farmers.
- Sustainable management of floodplain resources necessitates participation of all stakeholders and integration among them.
- Integrated floodplain management (IFM) must focus on balanced use of water for fish, crops and vegetation in the system to ensure sustainability of the goods and services we get from floodplain wetlands.
- Based on experience gained over the last 8 years from various projects and studies, fishing effort control, cropping pattern management (crop diversification to reduce the area of water hungry *boro* rice cultivation and dry season water conservation), fish friendly sluice gate management, and land retirement are concluded as successful options for integrated floodplain management. They result in environmental benefits and overall higher returns from floodplains.
- A new professionalism involving changes in development agency and personnel values to recognize the need for peoples' participation and a systems approach is required to motivate the user communities. Government and NGOs should come forward and work together along with the user communities.
- Land use planning for the country is urgently needed to protect floodplain resources. Concerned government agencies should internalize IFM as guiding principle for all development interventions in floodplains.

The livelihoods of Bangladeshi people, especially the rural poor living around floodplain beels, are largely dependent on floodplain resources. Their nutrition, incomes and other day-to-day needs are fulfilled by the nearby floodplain *beels*. Semi-natural diverse floodplains are highly productive ecosystems providing important benefits that exceed the productivity of intensive agricultural systems. These benefits, sometimes described as 'goods and services', include the functions of

Diversity of floodplain resources upon which livelihoods of rural people largely depend

Stakeholders
Fishers
Farmers
Women
Children
Cattle keepers
Craftsmen
Boatman
Landless
Grass collectors
Aquatic fruit collectors
Poor
Machine operators
Leaseholders
Hunters
Traders
UP
GO
NGO



groundwater recharge, pollution abetment, soil fertility. Wetland products include fish, fuel wood, wild plants for food, and fodder. Wetlands are also an important aesthetic component of the landscape. Floodplains have many other uses and benefits that are essential to communities, and to industrial and agricultural activities.

Thus floodplains are multiple resource systems with many different types of users and multiple stakeholders.

Integrated floodplain management (IFM) options can be a better solution for sustainable production and secured rural livelihood in Bangladesh. IFM options better address the production systems, peoples' access and use of resources as well as ecological features of floodplains.

What are the System Problems in Floodplain Management?

Present human practices concerning harvesting and utilizing floodplain resource system result in:

Over Fishing: Over and destructive fishing causes loss of brood fish and limits natural recruitment, as a result fish stocks and production declines in the open water bodies.

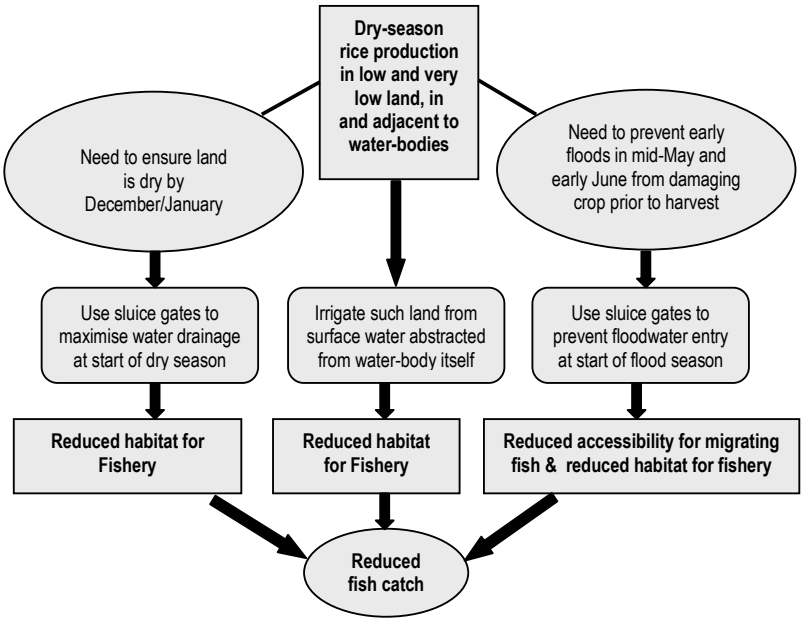
Embankments and Regulators: Construction of embankments and regulators cuts off wetlands from the larger floodplain-river system to produce rice safely. They convert wetlands to farmland, obstruct fish migration, destroy biodiversity and finally reduce fisheries productivity.

Boro Rice Cultivation: Irrigated dry season rice cultivation in the floodplains has many effects. Firstly, a tendency to drain out water as early as possible; secondly, it uses remaining surface water for irrigation; finally, farmers delay the entry of river water in *beels* to protect rice before harvest. All these activities make the wetland more vulnerable, its products and benefits reduced, and ultimately encroachment and loss of wetlands and floodplains takes place.

Siltation: Due to high rates of siltation every year many water bodies have been losing their depth - decreasing dry season water retention, connectivity and ultimately the whole system is being degraded. The causes are largely human activities beyond the wetlands.

Watershed Issues: Though outside the wetlands, still unsustainable activities in the hills create a catastrophic impact on wetlands. The issues are inappropriate and unsustainable cultivation in the hill slopes, degraded riparian and hilly vegetation resulting in landslides, soil erosion and pollution.

The systems implications of lowland winter rice (*boro* rice) production



Why Cropping Pattern Management?

Recommended system solutions

Cropping pattern management: Reduce dry season water use, ensure required water for fish.

Modified sluice gate management: Allow required flows for fish.

Land retirement: Leave very low lands for fishery.

Fishing effort control: Reduce fishing pressure and stop destructive fishing.

- *o* rice is a water hungry crop – it requires 10,000 cubic meters of water to irrigate a one hectare *boro* field;
- It requires early drainage of wetlands in the post-monsoon and to prevent early flooding in the pre-monsoon, both negatively affect fisheries;
- In many places potato, garlic, maize, wheat, onion, and other *rabi* crops with less water needs are attractive alternatives for medium and medium-high land instead of *boro* rice;
- Dry season water coverage can be substantially increased by adopting alternative *rabi* crops;
- Fisheries gain is substantial from increased dry season water extent.

What are the possible Alternative Crops?

Rabi crop	Irrigation water demand (mm)
HYV *Boro*	**835**
Wheat	200
Maize	240
Brinjal	320
Onion	175
Potato	190
Garlic	150

Source: Biswas and Mandal (1993)

What are the Systems Benefits of Rabi Crop Diversification?

- Alternative *rabi* crops require less water than rice, this leaves more surface water and so a better dry season habitat for fish;
- Alternative *rabi* crops are harvested several weeks prior to *boro* rice so the risk of crop damage due to early flood/rains is reduced;
- Early harvest of crops reduces the pressure to keep sluice gates closed during the early flood season and so facilitates natural recruitment of fish;
- *Rabi* crop diversification permits planting of deep water *aman* rice in the wet season which can improve the habitat conditions for fish.

Why Modified Sluice Gate Management?

- Allowing entry of water in the early monsoon to facilitate fish migration.
- Late monsoon retention of more water to facilitate fish growth.

To be effective this requires:

- Agreements not to catch fish migrating through sluice gates.
- Adoption of short duration dry season *boro* rice varieties.

Growth duration and yield of some important *boro* varieties

Variety	Growth duration (days)	Grain yield (t/ha)
BR 28	140	5.8
BR 36	140	5.5
BR 26**	145	5.8
BR 14	160	6
BR 29	160	6.5
BR 11*	165	6
BR16	165	6
IR8	170	5.5

*Originally released as *aman* variety, but also grown as *boro*.
**Originally released as *aus* variety, but also grown as *boro*.
Sources: Jashim and Chowdhury (2001); Salam (1992), FAP20 (2000), BRRI (1997)

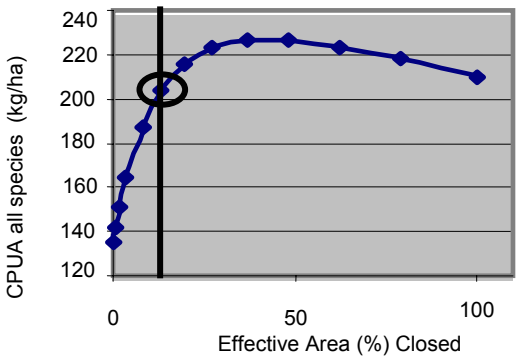
Why Land Retirement?

- *Boro* crops in very low land (*beel* bottoms) are at high risk of flood damage due to early rains/flash flood.
- Rice yield is poor in very low land compared to low and medium-high lands.
- Rice in very low land also demands irrigation water which often comes from surface sources, further reducing dry season fish habitat.
- Instead of rice, very low land can be left for fish and to maintain a minimum water extent.

barriers that block completely migration routes.

What are Fishing Effort Controls?

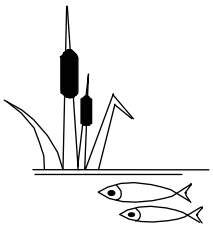
- Closed area: declare certain areas that retain water year round as no fishing zones - fish sanctuary.
- Closed period: declare a certain period (days, weeks, months) for no fishing. Usually 1-2 months in the early monsoon is enough for fish to breed.
- Selective gear restriction: identify and restrict certain gears (e.g., *moshari jal*, *current jal*) which are harmful – can be for a certain period or in certain locations.
- Ban destructive fishing: stop or reduce fishing by complete dewatering and



30- 40% best results: modeling result, Pabna Irrigation project, MRAG. 10% dry season area is sufficient to sustain fisheries production.

(Source: PIRDP, MRAG)

Environment friendly agriculture: diversified cropping in place of water hungry boro



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