

DRAFT REPORT

**Field Testing of Guidelines for Designing Data Collection and Sharing
Systems for Co-Managed Fisheries**

Prepared

by

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The Authors

ABBREVIATIONS AND ACRONYMS

AIGA	= Alternative Income Generating Activity
BELA	= Bangladesh Environmental Lawyers Association
BMC	= <i>Bee/</i> Management Committee
BRAC	= Bangladesh Rural Advancement Committee
BS	= Banchte Shekha
CNRS	= Centre for Natural Resources Studies
CRED	= Centre for Rural and Environment Development
DfID	= Department for International Development
DFO	= District Fisheries Officer
DoF	= Department of Fisheries
ERA	= Effort for Rural Advancement
GHARONI	= Grassroots Health and Rural Organization for Nutrition Initiation
IGA	= Income Generating Activity
JMC	= <i>Jalmahal/</i> Management Committee
NGO	= Non Government Organization
PAPD	= Participatory Action Plan Development
PNGO	= Partner Non Government Organization
PRA	= Participatory Rural Appraisal
RMC	= River Management Committee
SDC	= Society Development Committee
SHISUK	= Shikkha Shastha Unnyan Karzakram
SUFO	= Senior Upazila Fisheries Officer
TNA	= Training Needs Assessment
UFO	= Upazila Fisheries Officer
WB	= Water body

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Field Testing of Guidelines for Designing Data Collection and Sharing Systems for Co-Managed Fisheries in Community Based Fisheries Management in Bangladesh (CBFM)

Introduction

The document “Guidelines for Data Collection Systems for Co-managed Fisheries” is an output from project R8285 funded by DFID of the United Kingdom under the FMSP. Guidelines represent the collaborative efforts of the Marine Resources Assessment Group (MRAG); The Food and Agriculture Organisation of the United Nations (FAO); The Mekong River Commission (MRC); The WorldFish Center and several DFID funded projects including the Integrated Lake Management (ILM) project, Uganda; the Sustainable Fisheries Livelihoods Project (SELP); and the Regional Fisheries Information System (RFIS) project. In view to data needs of Government, data needs of local managers, needs met by other components of local manager’s monitoring programme, data common to needs of administrative levels of government and local management institution and remaining needs met by government’s parallel monitoring programmes the Guidelines were field tested at three CBFM-2 project sites. Major activities conducted were workshops, testing guidelines format and report preparation.

1. Background of CBFM project

The Community Based Fisheries Management (CBFM) started its activities in Bangladesh in 1994. The first phase (CBFM-1) was supported by Ford Foundation grants to government and non-government partners. The CBFM-2 started in September 2001 for a period of five years (2001-2006) to be implemented through a partnership of WorldFish Center, the Department of Fisheries (DoF) of Government of Bangladesh, and several Non-Government organizations (NGOs). The project is funded by the UK Department for International Development (DFID).

1.1 CBFM Goals

The goal of CBFM is to sustainably improve the livelihoods of poor people dependant on aquatic resources through the adoption of improved inland fisheries management policies resulting in more sustainable, equitable and participatory management of these resources. However, the specific purpose of the project is to generate a policy dialogue and agree on process for policy formulation for pro-poor sustainable fisheries management. The CBFM-2 is developing and testing a range of community based fisheries management approaches and models in *beels*, *haors*, rivers and floodplains (Anonymous, nd).

1.2 CBFM project stakeholders

The CBFM-2 project activities are executed at the field level through different partner organizations (involving GOs and NGOs). These organizations are: (1) WorldFish Center, (2) The Department of Fisheries (DoF), (3) Banchte Shekha, (4) Bangladesh Environmental Lawyers Association (BELA), (5) Bangladesh Rural Advancement Committee (BRAC), (6) CARITAS, (7) Center for Natural Resources Studies (CNRS), (8) Center for Rural and Environment Development (CRED), (9) Grassroots Health and Rural Organization for Nutrition Initiative (GHARONI), (10) FemCom Bangladesh, (11) PROSHIKA, (12) Shikkha Shastha Unnayan Karzokram (SHISUK), (13) Society Development Committee (SDC), (14) Effort for Rural Advancement (ERA), and (15) SUJON.

1.3 CBFM Project Locations and Waterbody Status

Project activities are being undertaken at 47 Upazilas in 22 administrative districts of Bangladesh. Project areas in different Upazilas and districts are shown in Table 1.1:

Table 1.1. List of working District and Upazila under CBFM-2

Sl. No.	District	Sl. No.	Upazila	Sl. No.	District	Sl. No.	Upazila
1.	Dinajpur	1.	Nawabganj	11.	Narsingdhi	29.	Monohordhi
2.	Rangpur	2.	Sadar	12.	Gazipur	30.	Kaliakoir
		3.	Kawmia	13.	B.Barria	31.	Sadar
		4.	Badarganj			32.	Nabinagar
		5.	Mithapukur			33.	Akhaura
		6.	Pirganj			34.	Nasirnagar
3.	Gaibandha	7.	Shaghata	14.	Comilla	35.	Daudkandi
4.	Bogra	8.	Sadar	15.	Magura	36.	Sadar
		9.	Gabtali			37.	Salikha
		10.	Adamdighi	16.	Jessore	38.	Bagharpara
5.	Naogaon	11.	Manda	17.	Narail	39.	Sadar
		12.	Patnitala	18.	Faridpur	40.	Boalmari
		13.	Shaghata	19.	Gopalganj	41.	Muksedpur
		14.	Damurhuda	20.	Bhola	42.	Sadar
6.	Pabna	15.	Chatmohor	21.	Moulvibazar	43.	Borolekha
7.	Tangail	16.	Kalihati	22.	Sunamganj	44.	Jamalganj
8.	Mymensingh	18.	Phulpur			45.	Sadar
9.	Netrokona	19.	Kalmakanda			46.	Biswambarpur
		20.	Purbadhala			47.	Derai
		21.	Khaliajuri				
10.	Kishoreganj	22.	Mithamoin				
		23.	Karimganj				
		24.	Tarail				
		25.	Kotiadi				
		26.	Pakundia				
		27.	Kuliarchar				
		28.	Austogram				

Types of waterbody are diverse, comprising mostly *jalmahals*: rivers, closed *beels*, open *beels*, but also significant areas of floodplains (largely private land); they include inland fisheries in all the main regions of the country. There are also many of the individual waterbodies (both seasonal floodplains and *jalmahals*) form clusters of linked wetlands that form a larger fishery.

The field based partner NGOs are responsible for organizing over 23,000 poorer fishing households around 115 specific waterbodies. These include 72 *Jalmahals* where administrative responsibilities have been transferred to the DoF. Another 45 seasonal floodplains and smaller waterbodies are included in the project.

1.4 Principles of CBFM

The CBFM has 4 main principles. These are as follows:

- a. **Partnership:** NGOs complement Department of Fisheries in fisheries management by facilitating community participation.

- b. Participation:** Among partners and with communities for planning activities, in monitoring and research.
- c. Action research:** Particularly socio-economic and institutional studies of the participant communities and sites.
- d. Networking:** Among community organizations and other stakeholders to enhance dialogue on issues and policies.

1.5 Aspects of CBFM

- 1.5.1 **Participatory planning:** Partners in the project developed a systematic planning method known as Participatory Action Plan Development (PALD). By working with stakeholder groups (fishers, farmers, landless, men and women etc.) separately and together in plenary, it is used to build a consensus among the different users on problems facing their fisheries and wetlands, solutions that they can implement, and institutions (organizations and rules) appropriate for this.
- 1.5.2 **Management committees:** The NGO partners have formed groups among poor people fishing in the project waterbodies. In each *beel* or river a management committee is established with NGO and DoF advice. By July 2004 there were committees for 113 waterbodies. Some committees have only professional fishers as members, and others have a wide range of stakeholders as members.

2. FIELD TESTING ACTIVITIES UNDERTAKEN

Different stakeholders were identified in order to test and evaluate the guidelines/Field Guide. The stakeholders were identified considering their active involvement in community based fisheries management in Bangladesh. The stakeholders considered in this study were (1) The WorldFish Center, Dhaka, (2) Department of Fisheries (DoF), (3) Partner NGOs (PNGOs), (4) Community Based Organizations (CBOs), (5) Department of Agriculture (DAE), (6) Local Government Engineering Department (LGED), (7) Bangladesh Water Development Board (BWDB), and (8) Local Government and Rural Development (LGRD). The stakeholders' need and role in connection with the cultivation of fishes in open water were assessed. For better community based fisheries management their roles and responsibilities were redefined in the workshop. The stakeholders' participation was achieved through their active role in different small group discussion, preparation and presentation of group report.

2.1 Methodology

Field guideline manuals were distributed selectively to different stakeholders such as DoF, partner NGOs, DAE, LGED and concern others for their assessment and comments on this. In order to get their feedback it was decided to hold workshops at different locations to gather wide ideas from cross section of people. The stakeholders which are directly related to the production and management of community based fisheries were given higher preferences in providing feedback on the guidelines. The participating stakeholders were very keen on this matter and provided feedback to their hearts content.

In all 4 workshops were conducted in order to field test the guidelines for Designing Data Collection and Sharing Systems for Co-Managed Fisheries. The workshops were conducted by

the active support and cooperation of the WorldFish Center and partner NGOs working the field. The list of participants in the workshop is enclosed at **Appendix – I**.

Workshop 1: Jessore

The workshop was held on 15 June 2005. In this workshop in all 54 participants attended from different organizations. Participants were mainly from CNRS, DoF and CBOs. The DFOs of Norail and Magura were also present in the workshop. Participants were divided into 5 sub-groups for intensive discussion on the field guide in a given format.



Workshop in Jessore

Workshop 2: Elenga, Tangail

This workshop was held on 19 June 2005. In all 34 participants attended in this workshop. The participants were mainly from CNRS (RM, FT, CO, FA), DoF and CBOs. The DFO, Tangail was also present in the workshop. Participants were divided into 4 sub-groups for intensive discussion on the field guide in a given format.



Workshop in Elenga, Tangail

Workshop 3: Sunamganj

In all 42 participants attended in this workshop from different organizations. Participants were mainly from ERA, SUJON, BRAC, DoF, WorldFish Center, DAE, LGED, and CBOs. The workshop was held on 22 June 2005. Participants were divided into 4 sub-groups for intensive discussion on the field guide in a given format.



Workshop in Sunamganj

Workshop 4: WorldFish Center, Dhaka

A workshop on Guidelines for designing Data Collection and Sharing System for Co-Managed Fisheries at held at the WorldFish Center, Dhaka o 14 July 2005. In all 19 participants of the WorldFish Center, Bangladesh and South-Asia Office attended in the workshop.

3. RESULTS/ FINDINGS

3.1 Findings on Information Need, Types of Information Need, and Reasons for Information Need by different Stakeholders

Several activities were performed during the workshops. The purpose of the workshop was clearly stated and explained before the workshop participants. Some selected Tables and figures contained in the guidelines were discussed with the participants for their comments. The feedback from the participants was recorded for amendment and improvement of the guideline for easy comprehension and understanding. The findings of the workshops were separately recorded for different workshops. The detailed findings are presented in **Appendix – II**. However, the consolidated findings have been presented below in Table 1.



Group discussions

Table 3.1. Results of testing of field guide on the information need, types of information need and the reasons for information need

WHO NEEDS INFORMATION?	WHAT TYPES OF INFORMATION ARE NEEDED?	WHY THE INFORMATION ARE NEEDED?
1. DoF	<ol style="list-style-type: none"> Types of fishes available in the water bodies Species diversification Types of brood fishes Existence of fisheries law Selection and use of gears (both legal and illegal) Water pollution Fish diseases Fish species about to extinct Latest research results Time of using current nets Place of current nets production, its transit points and marketing points Geographical characteristics Socio-economic conditions of the fishers and beneficiaries Availability of institutional credit 	<ol style="list-style-type: none"> For better fish production and Management Preserving fishes which are about to extinct Controlling fish diseases Abundance of species diversity Better planning for fish cultivation Providing technical guidance Enforcement and implementation of fisheries law Co-ordination among different agencies Banning the use of illegal gears Sustainable occupation of the fishers Changing the present system of leasing water bodies Introducing ecosystem for preserving fishery resources Saving fishes from the lethal effects of pesticides Long term fisheries management policies
2. DAE	<ol style="list-style-type: none"> Use of pesticides tolerable to fishes Use of IPM for reducing the use of pesticides Crop rotation and crop diversification Crops consuming less water for irrigation Sources of irrigation water Alternative ways for rotting of jute Problems of fish cultivation Rice varieties requiring minimum water for irrigation 	<ol style="list-style-type: none"> Increase production of crops Controlling fish diseases due to excess use of pesticides Conserving bio-diversity Avoidance of water pollution due to jute retting Use of less water for irrigation For maximum utilization of water Integrated development of waterbodies Judicious use of water for crop as well as fish cultivation Increased fish production For gaining knowledge on the deleterious effects of pesticides and fertilizers for fish cultivation
3. LGED	<ol style="list-style-type: none"> Water drainage Status of communication facilities Availability of rural infrastructures Resources available in the locality Status of dams, culverts, roads and sluice gates 	<ol style="list-style-type: none"> Better communication facilities Flood control Better planning Creating environment suitable for fish cultivation Integrated fisheries development
4. LGRD&C	<ol style="list-style-type: none"> Conflicts among CBOs Socio-economic conditions of the beneficiaries Law and order situation Status of health and sanitation Scope for administrative help Status of project execution Fisheries law Present status and condition of waterbodies Availability of fisheries projects Status of registration of the societies 	<ol style="list-style-type: none"> Conflicts resolution Enforcing law and order Overall development Resolving administrative barriers Providing help and cooperation to beneficiaries in implementing fisheries law Better planning and management of fisheries projects Socio-economic development of fishers Increasing commitment among the CBA members Improving transparency in decision – making
5. BWDB	<ol style="list-style-type: none"> Season-wise canals Water level of rivers Problems on the use of water Fish entering time to water bodies (<i>beels</i>) Availability of sluice gates 	<ol style="list-style-type: none"> Excavation of canals re-excavation of canals Better utilization of water Easy entrance of fishes in the <i>beel</i>s Creating facilities for fish breeding
6. NGO	<ol style="list-style-type: none"> Identification of stakeholders Livelihood status of the Beneficiaries Problems of fish cultivation Ways of awareness among different clan, caste and groups of people Availability of local resources Awareness among beneficiaries Number and types of waterbodies 	<ol style="list-style-type: none"> Improvement of socio-economic conditions of the beneficiaries Fish shelters For easy motivation of fishers Preparation of projects Project implementation Better cooperation to fishers Restriction of catching brood fish Establishing rights of the fishers Sustainable <i>beel</i> management
7. BMC	<ol style="list-style-type: none"> Fish production Fish catching Use of suitable gears 	<ol style="list-style-type: none"> Better management of BMC Increased fish production

WHO NEEDS INFORMATION?	WHAT TYPES OF INFORMATION ARE NEEDED?	WHY THE INFORMATION ARE NEEDED?
	4. Water pollution 5. Tides	
8. Fisheries co-operative Societies	1. Fish production 2. Fisheries law 3. Use legal and illegal gears 4. Registration of the societies 5. Cost-benefit analysis 6. Marketing 7. Conduction of meetings and distribution of duties and responsibilities	1. Better management 2. Identifying weaknesses of management 3. Socio-economic development of fishers
9. DLS	1. Cattle and poultry birds of the beneficiaries 2. Number of poultry birds and poultry birds	1. Increasing the production animal proteins 2. Socio-economic improvement 3. Integrated poultry-cum-fish production
10. Social Welfare Dept.	1. Information on society registration 2. Status of the registration of the societies	1. For registration and strengthening of societies 2. Increased facilities of the societies 3. Sustainability of the societies
11. CBO	1. Fish production technologies 2. Species diversity 3. Socio-economic conditions of the beneficiaries 4. Occupational change 5. Knowledge about the influential persons near the water bodies 6. Types of gears to be used for catching fish in fish sanctuary 7. Types of fishes enter into <i>beels</i> during rainy season 8. Ways of gaining strength 9. Awareness raising 10. Fishes about to extinct 11. Fish sanctuary 12. Appropriate time for catching fish 13. Alternative IGAs in the locality 14. Fisheries law 15. Rights and privileges of the fishers 16. Organizational benefits 17. Conditions of waterbodies 18. Selling of fish 19. Cost-benefit accounts 20. Preserving fisheries resources	1. Awareness of the fishers about their rights and privileges 2. Strengthening the organizations of fishers 3. Improving socio-economic conditions of fishers 4. Executing fisheries law 5. Increasing fisheries resources 6. Preserving species diversity 7. For understanding the livelihood status of the beneficiaries 8. Motivation of local influential elites 9. Knowledge about the species diversity in the <i>beels</i> 10. Increased fishes in the fish sanctuary 11. Improving skills in undertaking planning, execution and evaluation of projects by the CBOs 12. Availability of water throughout the year 13. Ceasing the use of illegal gears 14. Judicious use of resources for better planning 15. Reducing pressures on waterbodies 16. Creating opportunities for AIGAs 17. Determining lease value 18. <i>Good beel management</i>
12. Research Organizations	1. Availability of fish technologies 2. Prevalence of fish diseases 3. Water pollution 4. Fish species diversity 5. Fish sanctuary	1. Developing appropriate fish technologies 2. Planning for development of new technologies 3. Controlling fish diseases
13. Lease Holders	1. Fish production 2. Cost-benefit 3. Internal conflict 4. Fisheries law 5. Identification of fishers	1. Resolution of internal conflict among beneficiaries 2. Implementation of fisheries law 3. Increasing fish production
14. Fish Stockiest	1. Production of fish	1. Buying of fish
15. Gear traders	1. Use of gear	1. Selling of gears
16. Local influential	1. Internal conflict among societies 2. Purposes of the project 3. Fish theft 4. Construction of sluice gates 5. Retting of jute 6. Use of illegal gears 7. Physical condition of the waterbodies	1. Conflict resolution 2. Helping to implement fisheries projects 3. Good interpersonal relationships with the CBO members 4. Helping the CBOs for better management of <i>beels</i>
17. Directorate of Health and Family Planning	1. Nutrition status of the beneficiaries	1. Meeting protein deficiencies from fish
18. Directorate of Education	1. Students' knowledge on fish nutrition	1. Knowing protein content in fish 2. Occurrence of diseases due to lack of fish protein
19. Commercial Banks	1. Financial help needed to beneficiaries	1. Solving financial problems
20. Land Settlement Office	1. Khash waterbodies in the locality	1. Enforcement of fisheries law 2. Giving benefits to fishers
21. Religious institutions	1. Preservation of fish sanctuaries 2. Fish breeding season 3. Fisheries law	1. Awareness building among people 2. Restriction of catching fishes in breeding season
22. Directorate Youth Development	1. Status and present conditions of rural youth	1. Organizing rural youth for fish cultivation
23. Department of	1. Identification of water loving trees	1. Integrated fish-cum-forest development

WHO NEEDS INFORMATION?	WHAT TYPES OF INFORMATION ARE NEEDED?	WHY THE INFORMATION ARE NEEDED?
Forestry	2. Agencies involved in utilizing water resources 3. Species diversity	2. Balancing environment
24. Bangladesh Rural Dev. Board	1. Problems of the fishers and their solutions 2. Local resources for fish production	1. Increasing fish production 2. Improving socio-economic conditions of the fishers
25. Union Parishad	1. Number of waterbodies, its nature and conditions 2. Species diversity 3. Identification of actual local fishers 4. Identifying the occupational status of the fishers, their problems and conflicts 5. Use of legal and illegal gears	1. Better management of waterbodies 2. Fish species conservation 3. Knowing livelihoods status of the fishers
26. Upazila Parishad	1. Number of waterbodies, its nature and conditions 2. Organizations of the fishers 3. Implementation of fisheries law 4. Identifying waterbodies having size less than 20 acres	1. Increasing co-operation and coordination among different agencies 2. Increasing fish production 3. Executing fisheries law at local level
27. DC Office	1. Location of waterbodies 2. Leasing waterbodies 3. Fisheries law	1. Execution of fisheries law 2. Good management of waterbodies
28. Member of Parliament (MP)	1. Fisheries law 2. Species conservation 3. Fishers' rights 4. Socio-economic conditions of the fishers	1. Implementation of fisheries law 2. Improving socio-economic conditions of the fishers 3. Increasing fish production
29. International Agencies	1. Fisheries resources and management of aquaculture 2. Status and conditions of fishers and beneficiaries 3. Fisheries resources and its protection 4. Fish catch monitoring 5. Fish consumption	1. Integrated management for fisheries resource development 2. Analysis of the progress of the projects 3. Conserving species diversity 4. Taking measures for preserving fisheries resources Steps for improving the socio-economic conditions of the beneficiaries
30. Fish Traders	1. Location of fish catching, time and gears used 2. Communication and transport facilities 3. Cost-benefit analysis	1. Reduces the damage losses of fishes 2. Improving the socio-economic conditions of the fishers

3.2 Findings of the Workshop on Guidelines for Designing Data Collection and Sharing System for Co-Managed Fisheries at held at the WorldFish Center, Dhaka

A workshop on Guidelines for designing Data Collection and Sharing System for Co-Managed Fisheries at held at the WorldFish Center, Dhaka o 14 July 2005. In all 19 participants of the WorldFish Center, Bangladesh and South-Asia Office attended in the workshop. The list of participants is enclosed at **Appendix – I**. At the onset of the workshop Dr. Mohammed A. Rab, Project Scientist, WorldFish Center explained the background of the guidelines for designing data collection and sharing system for co-managed fisheries as well as explained the purpose of the workshop. Dr. M. G. Mustafa, Fisheries Co-ordinator, WorldFish Center elaborated the findings of the field workshops on guidelines for designing data collection and sharing system for co-managed fisheries. Dr. M. Abul Kashem, Consultant, WorldFish Center discussed about the Tables and Figures used in the guidelines. Especially the Table 1: Typical roles of co-managers and intermediary organizations and Annex 2: Example of Hypothesis Matrix for Guiding Multivariate Empirical Model Development were elaborately discussed. The participants were asked fill up the blank format (Table 1 and Annex 2). It took almost two hours (from 11.30 a.m. to 1.30 p.m.) to fill up the format; especially Annex 2 took much more time than Table. Dr. M. G. Mustafa and Dr. M. Abul Kashem worked as the facilitators during this time. The participants were asked to fill up the Table 1 of the guideline by putting tick marks against each of the management roles, whereas for Annex 2 they were asked either to put Y for yes and any of the numerical values ranging from 1 to 12. The participants faced considerable problems to fill up Annex 2 of the guideline and almost all of them opined that the format must be simplified.

Sixteen and 14 participants returned Table 1 and Annex 2 respectively. The findings of Table 1 and Annex 2 are presented in **Table 3.2** and **Table 3.3** respectively.

Table 3.2 Typical roles of co-managers and intermediary organisations (N=16)

Key Co-Management Activities	Management roles	Who?				
		Government	NGO	Facilitators	LMI (CBO)	Fishers' Association
Help make / help define national fisheries policy & development plans	Help make fisheries policy and development plans.	16	11	14	13	8
	Assign financial and human resources to policy and development plans.	14	14	14	4	2
	Help make co-management policy.	15	15	13	13	10
Make local management plans	Set objectives.	14	12	5	13	8
	Make sure objectives are consistent with national policy and development goals.	15	11	7	6	5
	Agree on rules and regulations/decide on interventions, for example, stocking.	14	15	7	13	6
	Make sure rules and regulations do not conflict with national legislation.	16	12	7	9	7
	Give technical advice and information.	15	11	6	9	4
	Share local knowledge and advice.	10	13	5	15	9
Carry out local management plans	Enforce rules and regulations including access restrictions and licensing agreements.	15	9	4	12	7
	Monitor how well local management plans are achieving objectives.	9	12	9	12	3
	Share local knowledge and experiences.	12	12	4	16	10
	Encourage people to share local knowledge and experiences.	12	14	4	13	12
	Monitor the performance of co-management policy (process and outcomes).	13	13	8	10	4
	Monitor local management activities and coordinate local plans.	13	14	5	10	4
	Watch out for and help solve conflicts	13	14	4	13	12
Evaluate local management plans	Evaluate the performance of local management plans to see if they are achieving agreed objectives.	14	12	13	5	3
	Encourage information sharing and learning.	13	15	6	8	4
Evaluate national fisheries policy and development plans	Evaluate the performance of fisheries policy and development plans.	14	11	10	6	4
	Evaluate the performance of co-management policy.	16	14	13	6	3

Table 3.3 Example of a Hypothesis Matrix for Guiding Multivariate Empirical Model Development (N=14) (slightly incomplete)

Outcome Variables

Variable Group	Explanatory Variable	Annual production per unit area	Sustainability (Resource)	Biodiversity	Average household income	Assets	Savings and investments	Food security	Empowerment	Equity	Compliance with rules and regulations	Conflicts
Resource (Group I)	Production potential	Y (14) *	Y(10) 6(2)	Y(6) 2(3)	Y(10) 2(1) 5(1) 8(1)	Y(5) 5(3)	Y(5) 3(1) 5(2) 8(1)	Y(5) 2(1) 5(4) 7(1)	Y(4) 1(2) 6(4) 7(2) 11(1) 12(1)	Y(1) 1(1) 3(1) 7(1) 10(1) 11(1)	Y(3) 1(3) 12(1)	Y(1) 3(1) 7(1)
	Abundance/Biomass	Y(8) 1(1) 2(1)	Y(6) 1(2) 2(2) 3(1)	Y(7) 2(1)	Y(4) 1(1) 3(1) 5(2) 9(1)	Y(2) 1(1) 2(1) 5(3)	Y(1) 1(1) 5(3) 8(1)	Y(3) 1(1) 2(1) 5(1) 8(1)	Y(1) 1(1) 6(2) 7(1) 9(1) 11(1) 12(1)	Y(1) 2(1) 7(1) 8(1) 11(1)	Y(4) 1(1) 2(1) 7(1)	-
	Rule enforcement potential	1(4) 3(1)	Y(7) 1(2) 3(1) 8(1)	Y(4) 1(2) 2(1) 7(1)	Y(1) 2(1) 5(1) 11(1)	Y(1) 2(1) 5(1) 11(1)	Y(1) 3(1) 5(3)	1(1) 2(1) 3(1) 5(1) 7(1) 8(1)	Y(3) 1(1) 8(1)	Y(2) 1(1)8	Y(7) 1(1) 7(1) 10(1)	Y(1) 1(1)

Environment (Group I)	Environmental health of habitat	Y(5)	Y(4)	Y(5)	Y(2) 3(1) 5(2)	Y(1) 1(1) 3(1) 5(1) 8(1)	Y(2) 5(2)	Y(2) 2(2) 5(1)	Y(1) 2(1) 5(1) 11(1)	Y(1) 7(1)	1(1)	3(1)
	Nutrient recycling	Y(2) 1(1) 2(1)	Y(3) 2(1)	Y(1) 1(1)	Y(1)			Y(1)	Y(1)	7(1)		
	Habitat descriptors / factors	Y(2) 1(1) 8(1)	Y(2) 5(1) 6(1)	Y(1) 8(1)	Y(1) 6(1)				6(1)	7(1)		
Technological (Group I)	Exploitation intensity	Y(4)	Y(4) 6(1)	Y(3)	Y(3) 5(1)	Y(1) 4(1) 5(1)	Y(1) 5(1)	Y(1) 5(1)	1(1) 11(1)	1(1) 7(1)	Y(1)	
	Stocking density	Y(3)	Y(2)	Y(3)	1(1) 8(1)	1(1) 8(1)	8(1) 11(1)	5(1)		7(1)		
	Habitat alteration activities	2(1)	1(1)	Y(2)								1(1)
Market Attributes (Group II)	Economic value of resource	Y(1) 5(1) 11(1)	Y(1)	Y(1)	Y(2) 5(2)	Y(2)	Y(3)	7(1) 8(1)	7(1) 9(1)	7(1)		
	Market facilities/infrastructure	Y(1) 5(1)	Y(2) 6(1) 8(1)		Y(5) 5(2) 8(1)	5(2) 11(1)	Y(3) 5(1) 8(1)	Y(1) 1(1) 5(1)			Y(2)	12(1)
	Cost of marketing (market fees)	Y(2)	1(1) 3(1)	Y(1)	Y(5) 1(1) 5(2)	Y(2) 5(2)	Y(2) 5(1) 11(1)	5(1)				Y(1)
	Price control mechanism	Y(2) 2(1)	Y(4) 2(1) 9(1)	2(1)	Y(4) 1(1) 5(1)	5(1)	Y(4) 1(1) 5(1)	Y(1) 5(2)		5(1)	Y(2) 1(1)	
Fisher/Stakeholder/ Community Characteristics	Social cohesion	Y(2)	Y(6)	Y(1)	Y(1) 1(1) 5(2)	Y(2)	Y(1) 5(1)		Y(3) 1(1)	Y(4) 1(1)	Y(3) 1(1)	Y(3)

(Group III)	Dependence on fishery for livelihood	Y(4) 3(1)	Y(4) 1(1)	Y(4)	Y(10)	Y(3) 1(1) 5(1)	Y(1) 1(1) 5(1)	Y(3) 5(1)	1(1) 6(1) 12(1)	5(1) 6(1)	Y(2)	Y(1)
	Level of local (ecological) knowledge	9(1)	Y(1) 9(1)	Y(2)	Y(1)	Y(1)	Y(1)	Y(2)	Y(2)	Y(2) 1(1)	Y(2)	Y(1)
Decision-making Arrangements & Management strategy (Group IV)	Legitimacy / widely accepted	Y(2)	Y(2)	Y(2)	5(1)	Y(1)	Y(1) 1(2)	1(3)	Y(5)	Y(5)	Y(5) 1(2)	Y(3) 1(2)
	Respectability	Y(1)	Y(2)		Y(2)	Y(3)	Y(2)	1(1)	Y(9)	Y(6)	Y(4) 1(1)	Y(2)
	Traditional decision-making body?							6(1)	Y(2) 6(1)	Y(4)	Y(2)	
	Stability of decision-making body	Y(1) 9(1)	Y(1) 2(1)	2(1)	Y(1) 5(2)	1(1) 5(2)	5(1)	Y(3) 1(1) 9(1)	Y(9) 1(1) 6(1)	Y(8) 1(1) 6(1)	Y(8)	Y(3) 1(1)
	Membership to decision-making body					5(1)			Y(5)	Y(4)	Y(3) 6(1)	Y(1)
	Clear access (property) rights	Y(1) 5(1) 8(1)	Y(3) 6(1)	Y(1)	Y(2)	Y(2) 1(1) 5(1)	Y(1) 5(1) 11(1)	Y(2)	Y(5) 6(1) 9(1)	Y(4) 7(1)	Y(5)	Y(2)
	Management measures (operational rules)	Y(1)	Y(2)	(Y)	Y(1)				Y(1)		Y(1)	
	Reserve area as a % of total management area	Y(1) 1(1)		Y(2)		Y(1)						
	Representation in rule making	Y(1)	Y(1)	Y(1)					Y(2)	Y(4)	Y(3)	
	Level of transparency in rule making (general)								Y(2)	Y(4)	Y(3)	Y(1)

	Formal performance monitoring by community?								Y(1) 6(1)	Y(3)	Y(1) 6(1)	
	Sanctions for non compliance								Y(4)	Y(4)	Y(4)	Y(2) 1(1)
External Decision-Making Arrangements (Group V)	Enabling legislation for co-management	Y(4)	Y(6) 1(1)	Y(3) 3(1) 5(1)	Y(1) 5(2)	Y(1) 5(1) 6(1)	Y(2)	Y(1) 5(1)	Y(5)	Y(4)	Y(3)	Y(3) 1(1)
	Local political support for co-management	Y(1)	Y(5)	Y(2)	5(2)	5(2)	5(1)	Y(1)	Y(6)	Y(3)	Y(4)	Y(2)
	Effective coordinating body			Y(1)					Y(2)	Y(2)	Y(2)	Y(2)
Exogenous Factors (Group VI)	External financial assistance	2(1)	1(1) 6(1)	11(1)	Y(1)	Y(1)	Y(2)	Y(1)	Y(2)	Y(1)		
	Capacity building support from NGO's	Y(1) 7(1)	Y(4) 8(1)	Y(1) 12(1)	Y(1) 10(1)	Y(1) 1(1)	Y(1) 9(1)	9(1)	Y(3) 1(1)	Y(2) 1(1)	Y(3) 6(1)	Y91

* The figures within parentheses indicate the number participants indicating the dependency of outcome variables on the explanatory variables

Key

Y - Direct dependence

1 - Indirectly through compliance

2 - Indirectly through abundance/biomass

3 - Indirectly through production potential

4 - Indirectly through CPUA

5 - Indirectly through income

6 - Indirectly through institutional sustainability

7 - Indirectly through empowerment

8 - Indirectly through improved management

9 - Indirectly through exploitation intensity

10 - Indirectly through conflict

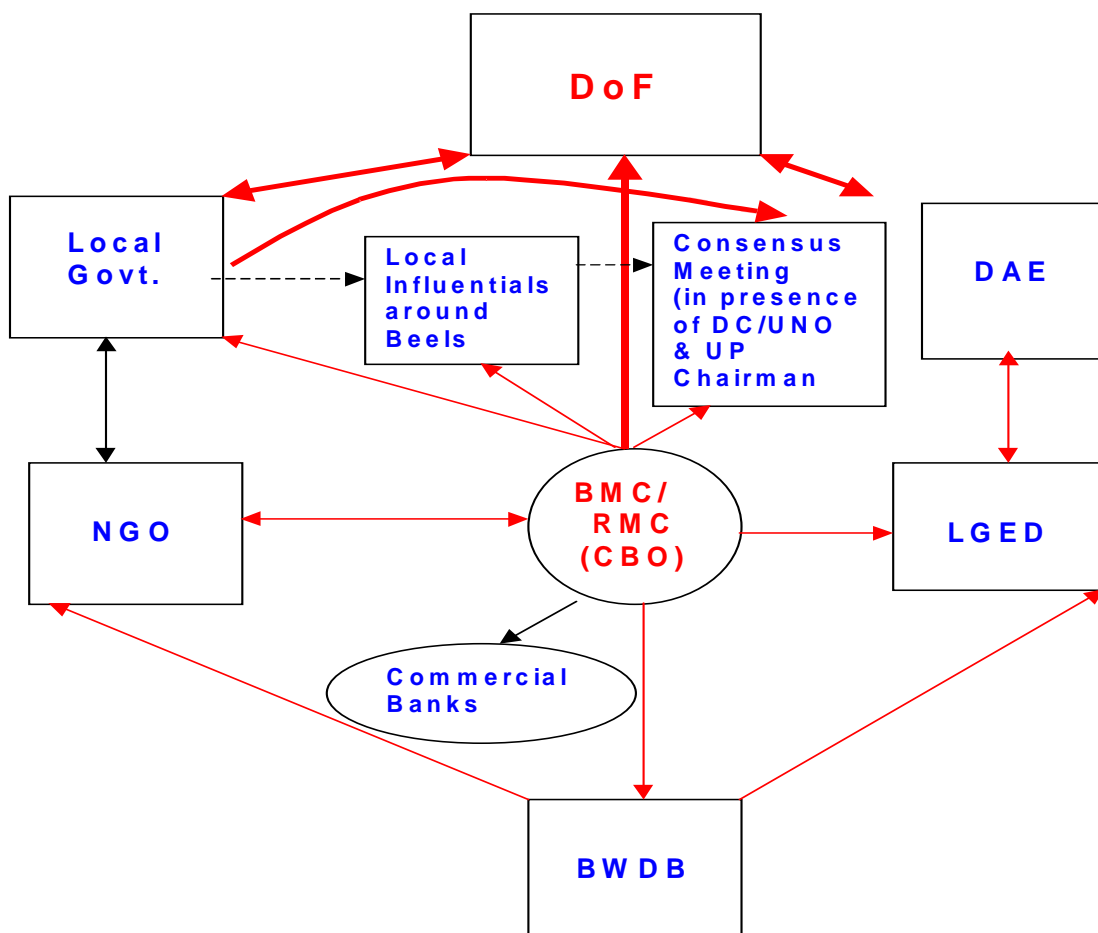
11 - Indirectly through economic value

12 - Indirectly through legitimacy

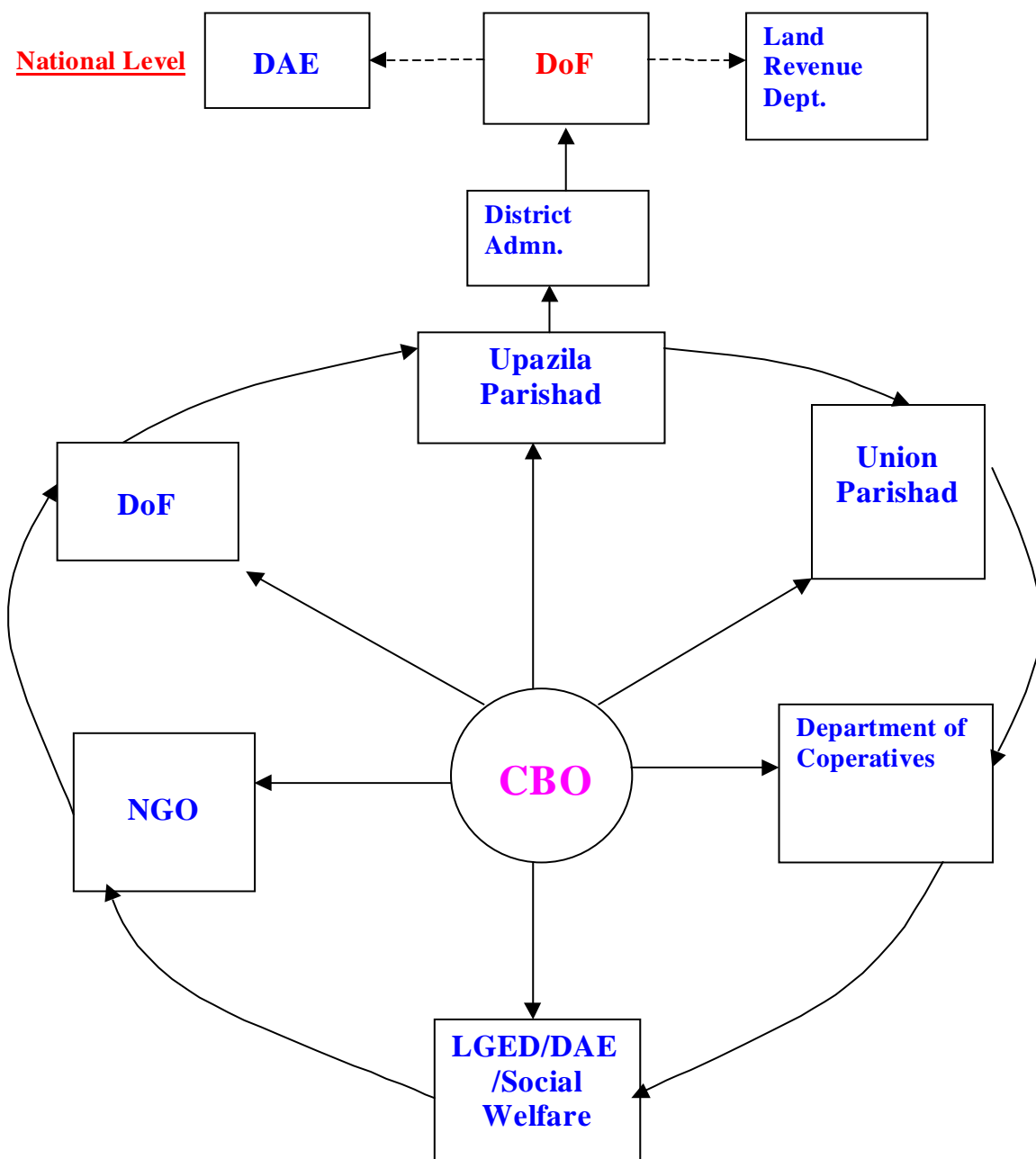
3.3 How co-managers and Facilitators can get the Information they need by Involving other people in the Design of Suitable Data Collection and Sharing System

The workshop participants were divided into small sub-groups (from 8 to 10 depending on number on the whole group). A chairperson and a secretary headed each of the groups for smooth functioning of discussion and active participation by each of the participants. Each of the groups was asked to discuss among themselves and come to consensus on how co-managers and facilitators can get the information they need by involving other people in the design of suitable data collection and sharing system. They were also asked to present their sub-group reports in the plenary session. The site-wise findings are presented below in three sections.

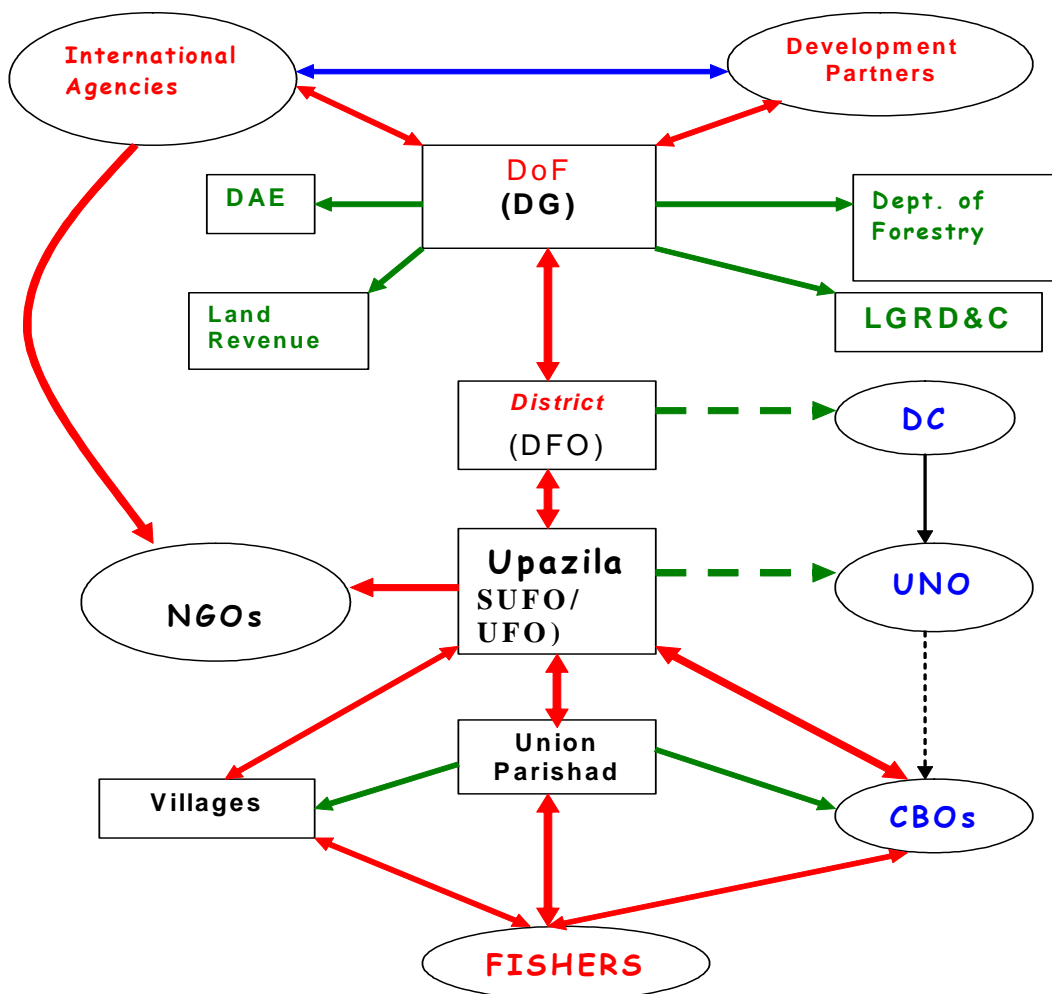
3.3.1. The Case of Jessore



3.3.2. The Case of Elenga, Tangail



3.3.3. The Case of Sunamganj



Group work presentation in Sunamganj

3.4 Figures of Field Manual Tested in the Workshop

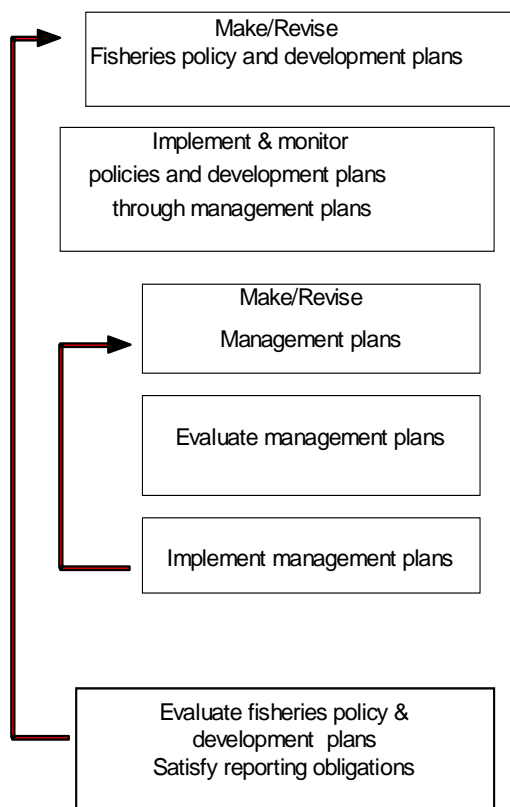


Figure 1: The Management Process

The workshop participants were asked to make comments about **Figure 1** above. The participants' opined that the figure seems to alright and amendment and changes are advocated. Regarding **Figure 2** the participants viewed that the numbering of arrows has to be sequential and maintain chronology. In **Figure 3**, there is also a minor correction. There are two captions for "Data needs of government". The caption on the right side should be written as "Data needs of LMIs". As per comments of the workshop participants the proposed eight-stage process for designing data collection and sharing systems for co-managed fisheries (**Figure 4**) is perfectly all right; no change is suggested. In **Figure 5** addition of Upazila (Sub-district) and division is suggested for Bangladesh context.

Figure 2: Information requirements and opportunities for sharing to support the co-management process

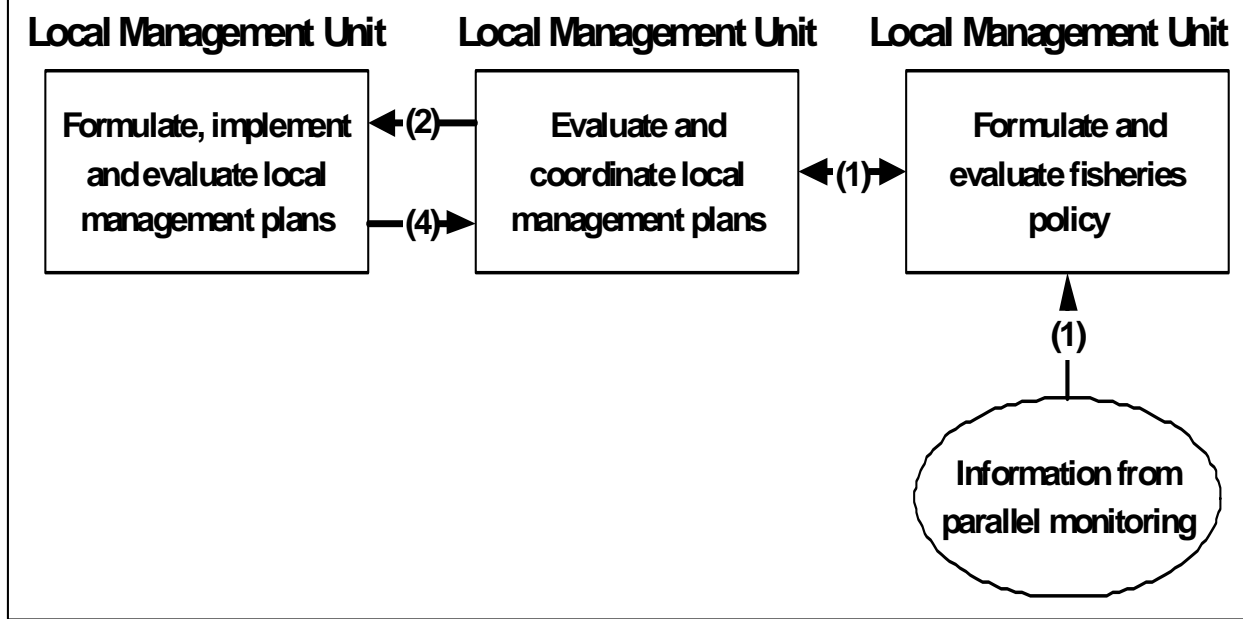


Figure 3: Common data needs of co-managers

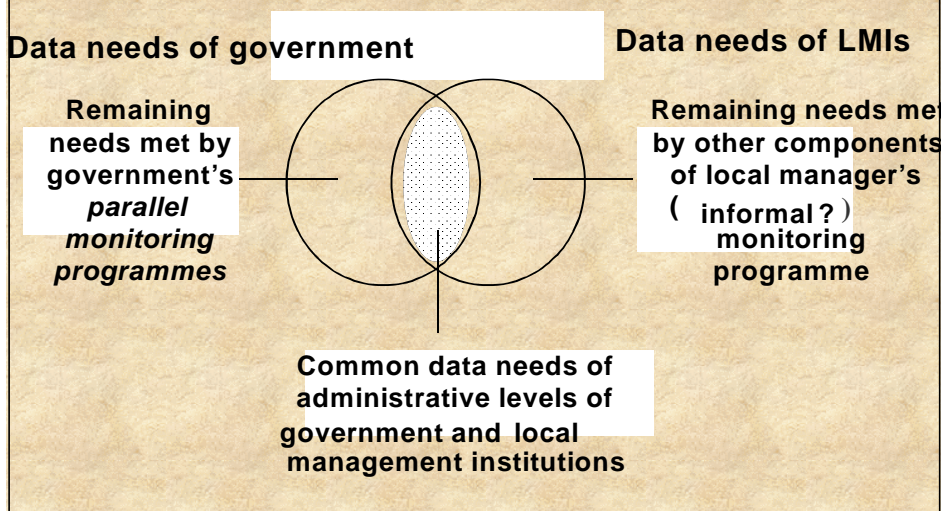
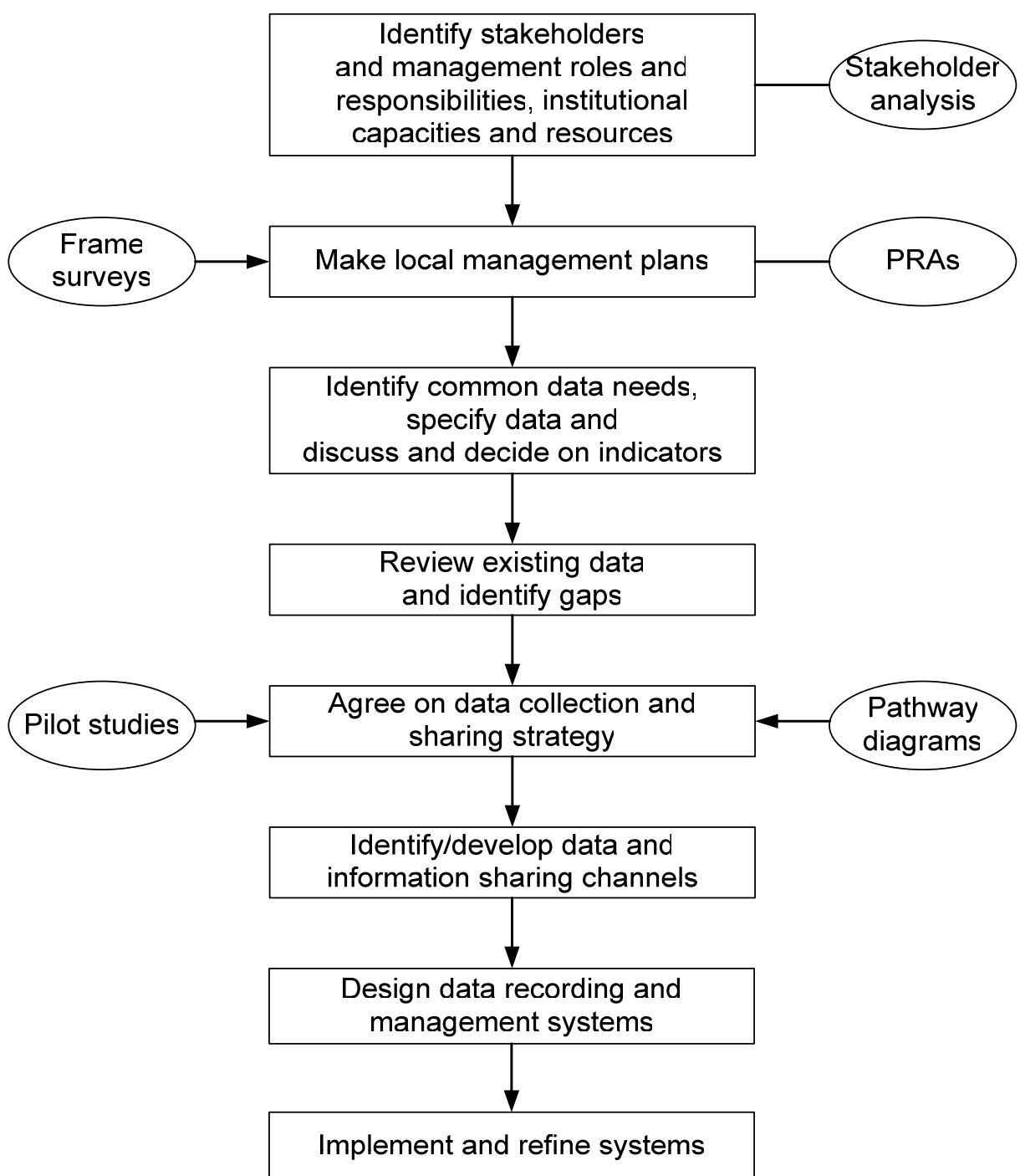


Figure 4: A proposed eight-stage process for designing data collection and sharing systems for co-managed fisheries



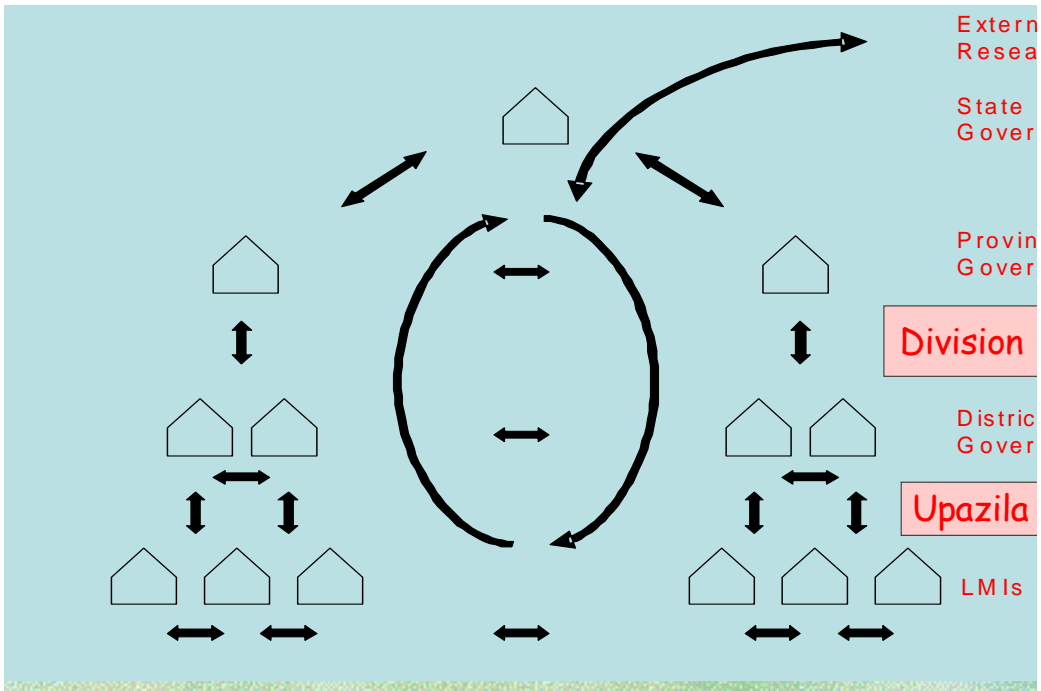


Figure 5: Illustration of the potential information flows that might exist (Modified from Garaway & Arthur (2002)).

3.5 Tables of Field Manual Tested in the Field Workshop

Similar to Figures some tables from the guidelines were also tested during field workshops at Jessore, Elenga and Sunamganj. **Table 1** of the guideline was handed over to all the workshop participants for filling it up by putting tick marks against each of the management roles under the key co-managed activities. Among 140 participants in all the three workshops, 114 participants (47 from Jessore, 32 from Elenga and 35 from Sunamganj) filled up the Table returned the same. The frequency distribution of the workshop participants in each of the sites has been shown in the Table 1 below. The participants did not face any remarkable problems in putting tick mark against the selected management roles under the key co-management activities. Especially, the participants very easily identified the management roles of GOs and NGOs many of them were to some extent confused for the management roles facilitators, LMIs and fisheries associations. The participants were asked to make an evaluation and make comments on **Table 2** of the guideline. Due to complexity the participants faced considerable problems in grasping the idea in **Table 2**. They suggested reducing the number columns, which in effect, repetitive in nature.

Lastly, the participants were asked to fill the **Annex 2** of the guideline form individually. But due to conceptual problems they failed to do the job. Then they were asked to fill the form in groups. Even in groups, the participants faced very problems in performing the job. Especially, they faced problems in putting the different numerical values ranging from 1 to 12, which is in fact each one is quite different from others. The opined that if it were in chronological order, either ascending or descending, that could be easily handled. The participants' alternative suggestion is to reduce the numbers, maximum up to 5. The consolidated finding of three sites on Annex 2 has been presented in this section.

Table 1: Typical roles of co-managers and intermediary organisations (47+32+35 = 114) (Findings of Jessore, Elenga and Sunamganj)

Key Co-Management Activities	Management roles	Who?				
		Government	NGO	Facilitators	LMI (CBO)	Fishers' Association
Help make / help define national fisheries policy & development plans	Help make fisheries policy and development plans.	43+27+33 = 103	20+14+26 = 60	8+6+17 =31	15+27+23 = 65	5+7+16 = 28
	Assign financial and human resources to policy and development plans.	37+25+31 =93	28+22+18 =68	4+5+6 = 15	5+10+9 = 24	2+5+8 = 13
	Help make co-management policy.	31+20+27 =78	34+16+25 = 75	15+4+12 = 31	29+21+15 = 65	13+6+9 = 28
Make local management plans	Set objectives.	30+13+11 =54	23+12+11 = 36	9+5+9 = 23	20+21+13 = 54	4+8+6 = 18
	Make sure objectives are consistent with national policy and development goals.	27+20+28 = 75	20+14+16 = 50	12+6+9 = 27	23+16+13 = 52	10+4+3 = 17
	Agree on rules and regulations/decide on interventions, for example, stocking.	31+18+30 = 79	21+17+27 = 65	16+6+8 = 30	25+23+19 =67	18+11+10 = 39
	Make sure rules and regulations do not conflict with national legislation.	24+21+32 = 77	15+9+16 = 40	8+3+6 =17	9+11+7 = 27	11+5+10 =26
	Give technical advice and information.	27+19+30 =76	28+12+19 =59	17+8+3 =28	9+19+11 =39	4+1+5 =10
	Share local knowledge and advice.	19+10+18 =47	21+6+17 =44	11+5+10 =26	18+22+16 =56	16+6+11 =33

Carry out local management plans	Enforce rules and regulations including access restrictions and licensing agreements.	40+23+32 =95	11+11+9 =31	6+5+4 =15	11+20+11 =42	7+5+5 =17
	Monitor how well local management plans are achieving objectives.	25+14+23 =52	25+14+19 = 58	8+4+8 =20	9+15+12 =36	10+1+5 =16
	Share local knowledge and experiences.	18+5+13 =36	25+12+17 =54	12+7+9 =28	21+19+15 =55	10+7+13 =30
	Encourage people to share local knowledge and experiences.	22+8+25 =55	27+13+25 =65	13+6+11 =30	16+15+11 =42	12+5+15 =32
	Monitor the performance of co-management policy (process and outcomes).	24+20+26 =70	29+15+17 =61	14+4+5 =23	13+13+8 =34	7+0+6 =13
	Monitor local management activities and coordinate local plans.	24+13+26 =63	25+13+17 =55	14+4+7 =25	16+17+10 =43	12+5+3 =20
	Watch out for and help solve conflicts	21+10+24 =55	19+9+11 =39	11+7+11 =29	22+22+11 =55	21+16+20 =57
Evaluate local management plans	Evaluate the performance of local management plans to see if they are achieving agreed objectives.	24+14+29 =57	29+14+17 =50	14+3+4 =21	15+17+6 =38	6+4+5 =15
	Encourage information sharing and learning.	23+10+18 =41	25+17+13 =55	13+3+9 =25	10+18+13 =41	5+6+6 =17
Evaluate national fisheries policy and development plans	Evaluate the performance of fisheries policy and development plans.	34+20+31 =85	16+12+23 =51	11+4+2 =17	9+14+12 =35	4+2+3 =9
	Evaluate the performance of co-management policy.	24+17+26 =67	28+12+22 =62	12+4+1 = 17	11+14+10 = 35	5+2+3 =10

Annex 2: Example of a Hypothesis Matrix for Guiding Multivariate Empirical Model Development (findings of Jessore, Elenga, and Sunamganj sites)		Outcome Variables										
A. Jessore Site:		Annual production per unit area	Sustainability (Resource)	Biodiversity	Average household income	Assets	Savings and investments	Food security	Empowerment	Equity	Compliance with rules and regulations	Conflicts
Variable Group	Explanatory Variable											
Resource (Group I)	Production potential	Y	Y	N			Y					
	Abundance/Biomass		N	Y								
	Rule enforcement potential										Y	Y
Environment (Group I)	Environmental health of habitat		Y	Y								
	Nutrient recycling											
	Habitat descriptors / factors											
Technological (Group I)	Exploitation intensity	Y					Y					
	Stocking density											
	Habitat alteration activities											
Market Attributes (Group II)	Economic value of resource											
	Market facilities/infrastructure				Y			Y				
	Cost of marketing (market fees)							Y				
	Price control mechanism								Y			
Fisher/Stakeholder/Community Characteristics (Group III)	Social cohesion											Y
	Dependence on fishery for livelihood				Y							
	Level of local (ecological) knowledge											
Decision-making Arrangements & Management strategy	Legitimacy / widely accepted										Y	Y
	Respectability								Y			
	Traditional decision-making body?											

(Group IV)	Stability of decision-making body									Y			
	Membership to decision-making body												
	Clear access (property) rights						Y						
	Management measures (operational rules)												
	Reserve area as a % of total management area												
	Representation in rule making												
	Level of transparency in rule making (general)												
	Formal performance monitoring by community?												
External Decision-Making Arrangements (Group V)	Sanctions for non compliance										Y		
	Enabling legislation for co-management						Y						
	Local political support for co-management										Y		
Exogenous Factors (Group VI)	Effective coordinating body												
	External financial assistance												
	Capacity building support from NGO's												

B. Elenka Site:		Outcome Variables										
Variable Group	Explanatory Variable	Annual production per unit area	Sustainability (Resource)	Biodiversity	Average household income	Assets	Savings and investments	Food security	Empowerment	Equity	Compliance with rules and regulations	Conflicts
Resource (Group I)	Production potential	Y	Y	Y	Y	1	1	Y	1	Y	Y	
	Abundance/Biomass	2	5	Y			Y	4	2		5	
	Rule enforcement potential					Y	1	3		2		
Environment (Group I)	Environmental health of habitat	1	5	3	11				4		7	
	Nutrient recycling											
	Habitat descriptors / factors											
Technological	Exploitation intensity	11				3	3					

	Reserve area as a % of total management area											
	Representation in rule making											
	Level of transparency in rule making (general)											
	Formal performance monitoring by community?											
	Sanctions for non compliance											Y
External Decision-Making Arrangements (Group V)	Enabling legislation for co-management								Y	Y		
	Local political support for co-management									Y	Y	
	Effective coordinating body											
Exogenous Factors (Group VI)	External financial assistance											
	Capacity building support from NGO's											

Key

- Y - Direct dependence
- 1 - Indirectly through compliance
- 2 - Indirectly through abundance/biomass
- 3 - Indirectly through production potential
- 4 - Indirectly through CPUA
- 5 - Indirectly through income
- 6 - Indirectly through institutional sustainability
- 7 - Indirectly through empowerment
- 8 - Indirectly through improved management
- 9 - Indirectly through exploitation intensity
- 10 - Indirectly through conflict
- 11 - Indirectly through economic value
- 12 - Indirectly through legitimacy

Table 2: Example of a tabular format to help identify common needs among key stakeholders and possible data collection and sharing strategies. Arrows indicate how variables might be shared to meet the requirements of other stakeholders. S- Sampling; CE- Complete enumeration.

Stakeholder	Indicator	Required Indicator Frequency	Required Accuracy	Required Precision	Data Types	Acceptable Data Variables	Sampling Unit	Coverage S or CE	Sample size and Frequency	Strata	Possible sources for data type Section Error/Reference source not found.	Possible Methods Section Error/ Reference source not found.
LMI and local resource users	CPUE by species	Monthly	90%	20% MDD	Catch	<ul style="list-style-type: none"> Weight Number Number of baskets (all by species) 	Fishers represented by LMI	S	500/month	<ul style="list-style-type: none"> Week Gear type 	<ul style="list-style-type: none"> Harvest Post harvest 	<ul style="list-style-type: none"> Questionnaire Structured Interview Direct Obs (DoF) Direct Obs (LMI) Reporting (LMI)
					Effort	<ul style="list-style-type: none"> Hours fishing Numbers of traps set 	Fishers represented by LMI	S	500/month	<ul style="list-style-type: none"> Week Gear type 	<ul style="list-style-type: none"> Harvest 	<ul style="list-style-type: none"> Questionnaire Structured Interview Direct Obs (DoF) Direct Obs (LMI) Reporting (LMI)
						<ul style="list-style-type: none"> Numbers of active full time and part-time fisherman 	Villages represented by LMI	CE	4 /month	<ul style="list-style-type: none"> Week 	<ul style="list-style-type: none"> Harvest 	<ul style="list-style-type: none"> Questionnaire Structured Interview Direct Obs (DoF) Direct Obs (LMI) Reporting (LMI)
	Income (Profit)	Monthly	90%	20% MDD	Costs and Earnings	<ul style="list-style-type: none"> Fixed and variable cost variables. 	HHs represented by LMI	S	100/month	<ul style="list-style-type: none"> Demographic sub-groups 	<ul style="list-style-type: none"> Harvest Post harvest 	<ul style="list-style-type: none"> Questionnaire Interview methods
Provincial Fisheries Management Institution	Poverty	Annually	80%	10% MDD	Costs and Earnings	<ul style="list-style-type: none"> Fixed and variable cost and earnings variables 	HHs in province	S	1000 / Month	<ul style="list-style-type: none"> District Village Demographic sub-groups 	<ul style="list-style-type: none"> Harvest Post harvest 	<ul style="list-style-type: none"> Questionnaire Interview methods
					Living costs	<ul style="list-style-type: none"> Living costs 	HHs in province	S	1000/year	<ul style="list-style-type: none"> District 	<ul style="list-style-type: none"> Harvest Markets Other agencies 	<ul style="list-style-type: none"> Questionnaire Interview methods
	Employment	Annually	80%	20% MDD	Employment in fisheries sector	<ul style="list-style-type: none"> Number of full time and fishers by category eg full-time, part-time. 	Fisheries Sector	CE	NA	<ul style="list-style-type: none"> Management Sector (ie co and non-co-managed) 	<ul style="list-style-type: none"> Harvest Post harvest Support Industry Gov. Agencies 	<ul style="list-style-type: none"> Questionnaire Structured Interview Direct Obs (LMI)
Department of Fisheries	GVP in co-management sector	Annually	80%	20% MDD	Production (catch)	<ul style="list-style-type: none"> Landed weight of species from co- and non-co-managed sectors. 	Fisheries Sector	CE	NA	<ul style="list-style-type: none"> Management Sector (ie co and non-co-managed) 	<ul style="list-style-type: none"> Harvest Other Gov Depts 	<ul style="list-style-type: none"> Questionnaire Direct Obs (DoF) Direct Obs (LMI) Reporting (LMI)
					Price	<ul style="list-style-type: none"> Unit price of species 	Fisheries Sector	S	NA	<ul style="list-style-type: none"> Management Sector (ie co and non-co-managed) 	<ul style="list-style-type: none"> Market Post Harvest Gov. Agencies 	<ul style="list-style-type: none"> Questionnaire Interview methods Direct Obs (DoF) Direct Obs (LMI)

3.6 Comments of the Workshop Participants on the Field Manual

During the workshops the participants were requested to make their generous and fair comments about the applicability of the guidelines in actual field situations. They rendered some comments which are enlisted below:

1. Language of the manual should be simple and easily understandable.
2. Data should be collected on animals also along with fish species.
3. Since data collection on fisheries is a difficult task. There should be in-built mechanism to record data by the fishers as well as CBOs.
4. Every aspects of data collection are important; none is less important than others.
5. During the last 15-20 years the production of fishes in open water has been significantly reduced, use of illegal gears has been increased. However, authentic and reliable data is necessary.
6. Due to CBFM, fish production has been increased. Proper data and documentation are urgently needed.
7. Data should be collected in simplest way and format.
8. Stakeholders should be correctly identified.
9. Data needs to be collected on the conflicts between the National Fishers' Association and local CBOs.
10. Yearly monitoring of data collection on fisheries is necessary; data should be shared with other stakeholders including DCs for better management.

4. CONCLUSIONS AND RECOMMENDATIONS

Guidelines for designing data collection and sharing systems for co-managed fisheries are, of course, a valuable document in the field of co-management of open water fisheries. Data collection and sharing of information among different stakeholders are precondition for co-management for the community based fisheries management. The draft manual prepared for publishing in the FAO Fisheries Technical Paper Series: Guidelines for Designing Data Collection and Sharing Systems for Co-management, 2005 would be of immense help to the field practitioners in collecting valid, reliable and pertinent data in the context of co-managed fisheries management.

However, there is a room for improvement of the guidelines. Some of the formats for recording field data are, in deed, complicated to understand and use by the persons who would probably use it. For making the guidelines universal and widely applicable some of the formats (as indicated) have to be simplified for easy comprehension.

The guidelines/field guide may be reproduced locally, both English (for higher/mid level officials) and Bengali (for field levels). The guidelines may be distributed on different days/weeks/fortnights e.g., World Food day, Annual Fish Fortnights etc. The guidelines will be disseminated MoLF and DoF and partners NGOs during seminars, conferences and workshops. The use and usefulness of the guidelines may be strengthened by sending the copies to concern libraries of different universities, research institutes and other relevant places.

References

Anonymous (nd). *Community Based Fisheries Management Project Phase 2*. Mimeograph. The WorldFish Center, Dhaka.

Appendix – I

LIST OF WORKSHOP PARTICIPANTS

LIST OF WORKSHOP PARTICIPANTS IN JESSORE

Date: 15 June 2005

Sl. Nr.	Name of the participants	Position and organization
1.	Jafar Sadique	Monitor, Dhanla
2.	Shukur Mollah	Monitor, Dhanla
3.	Hares Mollah	CBO, Dhanla
4.	Chanda Sen	Monitor, Guakhola Hatiara
5.	Bina Roy	Monitor, Malihat beel
6.	Tahmina Khatun	Monitor, Afra beel
7.	Basanti Adhikari	Monitor, Guakhola, Hatiara
8.	Momta Bhadra	Monitor, Shekhhati
9.	Momena Khanom	Monitor, Afra
10.	Bijoy Krishna Goshwami	CBO, Katuria beel
11.	Ganda	Monitor, Malihat beel
12.	Lakhmi Roy	Monitor, Kathuria beel

13.	Kallyan Adhikari	CBO, Kakri beel
14.	Palton Das	Monitor, Guakhola Hatiara
15.	Lutfor Rahman	CBO, Chulua beel
16.	Sujoy Sen	CBO, Guakhola Hatiara
17.	Milton Biswas	Monitor, Debbhoga beel
18.	Tapan Kumar	Monitor, Salua beel
19.	Batu Miah	Monitor, Dhanla Kumuria
20.	Shova	Monitor, Kathuria beel
21.	Momtaz Parvin	Monitor, Shekhhati
22.	Minima	Monitor, Shekhhati
23.	Jesmin	Monitor, Shekhhati
24.	Sabita Rani Biswas	Monitor, Fatki river
25.	Selina Khatun	Monitor, Fatki river
26.	Namita Mazumdar	Monitor, fatki river
27.	Liton Roy	Monitor, Fatki river
28.	Sudash Biswas	Monitor, Fatki river
29.	Shadhon Ghosh	Monitor, Fatki river
30.	Ripon Shikdar	Monitor, Fatki river
31.	Subrata Roy	Monitor, Fatki river
32.	Ruhul Amin	CBO, Afra beel
33.	Bidhan Chandra Haldar	BS, FA
34.	Shapan Kumar Roy	BS, FA
35.	Samar Haldar	BS, FA
36.	Md. Shahidul Islam	CNRS
37.	Foto Gopal Sharma	CNRS
38.	Md. Rezaul Kabir	FA, DoF
39.	Mridul Kanti Roy	BS, FA
40.	Taposh Biswas	BS, FA
41.	Matiar Rahman	CBO, Chitralli
42.	M. A. Mannan	FO, BS
43.	Kabir Uddin	BS
44.	Abu Bakr	CBO, Kumuria
45.	S.N. Shaha	DFO, Magura, DoF
46.	Bishwajit Bairagi	UFO, Shalikha
47.	Kazi Md. Nizamul Islam	UFO, Bagherpara
48.	Abdus Satter	DFO, Norail, DoF

49.	Md. Rajib Zaman	AFO, Norail Saral, DoF
50.	Md. Bazlur Rashid	DFO, Jessore, DoF
51.	Anup saha	Banche Shekha
52.	Tarun Kumar Masuddi	Banche Sheka
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55.	Md. Habibur Rahman	WorldFish Center
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LIST OF WORKSHOP PARTICIPANTS IN ELENGA, TANGAIL
Date: 19 June 2005

Sl. Nr.	Name	Position and organization
1.	Md. ShahidUllah	FA, Pakundia
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3.	Md. Hafiz Uddin	FA, Pakundia
4.	Ms Bilkis Aktar	RM, Pakundia
5.	Md. Abdul Khaleque	FA, Pakundia
6.	Ms Hosne Ara	RM, Pakundia
7.	A.S.M. Saiful Islam	FT, Pakundia
8.	Md. Eshaque Ali	FA, Kalihati
9.	Md. Shamsul Haque	CBO, Kalihati
10.	Md. Mazlu Miah	CBO, Kalihati
11.	Ms Sajeda	RM, Kalihati
12.	Md. Manzurul Kader Khan	CBO, Kalihati
13.	Khushi Mohan Das	CBO, Kalihati
14.	Md. Antaz Ali	CBO, Kalihati
15.	Md. Jashim Uddin	FA, Hamil beel
16.	Md. A. Salam Bhuiya	CBO, Kalihati
17.	Md. A. Malek Khan	FA, Kalihati
18.	Tulshi Rani Mitra	RM, Hamil beel
19.	Ms Shanaj Parvin	RM, Hamil beel
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25.	Ms Sajeda Begum	RM, Kalihati
26.	Ms Aleya Begum	RM, Kalihati
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35.	Mdo Habibur Rahman	WorldFish Center, Dhaka
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LIST OF WORKSHOP PARTICIPANTS IN SUNAMGANJ

Date: 22 June 2005

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1.	Md. Mizanur rahman	WorldFish Center, Sunamganj
2.	Md. Kamrul Islam	WorldFish Center, Sunamganj
3.	Md. Bozlur Rahman	PC, SUJON
4.	Debesh Talukdar	PC, ERA
5.	Arobindo Das	FA, SUJON
6.	Nirmal Bhattacharia	ED, SUJON
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11.	Md. Harunor Rashid	Team Leader, FFP
12.	Mamun Osmani	FO, FFP, BRAC
13.	Abdur Razzaque	SMS(Fish), CBRMP
14.	Mujahidul Islam	Biologist, CBRMP
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16.	Anzana	Resident Monitor, CBRMP
17.	Md. Borhan Uddin	ASD
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19.	Chintaharan Chowdhuri	SSAO, DAE, Sunamganj Sadar
20.	Shajahan Serij	AEO, DAE, Sunamganj Sadar

21.	Badar Uddin	VARD
22.	Ripon Talukdar	CRIS
23.	Md. Khalil	CFSD
24.	Samsul Alam	FA, CNRS
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26.	Md. Mostofa	FM, WFC, Control Site
27.	Reshina	FM, WFC, Control Site
28.	Sompa Rani Dey	FM, WFC, Control Site
29.	Md. Manik	FM, WFC, Control Site
30.	Khadija Begum	FM, WFC, Control Site
31.	Md. Kafil	FM, WFC, Control Site
32.	Protima Rani	Field Monitor
33.	Nityananda Sarkar	Field Monitor
34.	Monoranjan Das	Field Monitor
35.	Gopica Ranjan	Field Monitor
36.	Zahirul Islam	Field Monitor
37.	Md. Muslim	Field Monitor
38.	Nazma Aktar	IDEAA. Jamalganj
39.	Sokhicharan Das	IDEA
40.	Uzzal Mehodi	Journalist
41.	Md. Belal Hossain	Fisheries Officer
42.	Haye Chowdhury	CBRMP
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LIST OF WORKSHOP PARTICIPANTS IN WORLD FISH CENTER, DHAKA
Date: 14 July 2005

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1.	Mr. M. Mahbubur Rahman	Consultant, WFC
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4.	Ismat Ara	Data Analyst
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7.	Md. Khalilur Rahman	Research Assistant
8.	Esha Hussain	Communication Consultant
9.	Habib Ahmed	Research Assistant

10.	Mahadi Hassan	Research Associate
11.	Md. Muzaffar Ahmed	Sr. NGO Co-ordinator
12.	Dr. M. Ferdous Alam	Sr. Research Co-ordinator
13.	Ripa Chakma	Administrative Assistant
14.	Arif Hossain	Sr. Research Assistant
15.	Juthia Costa	Administrative Assistant
16.	Susmita Chowdhury	Research Assistant
17.	Dr. Mohammed A. Rab	Project Scientist
18.	Dr. M. Golam Mustafa	Fisheries Co-ordinator
19.	Dr. M. Abul Kashem	Consultant

Appendix – II

Detailed workshop findings of Jessore, Elenga and Sunamganj

A. Results of Testing of Field Guide on the information need at Jessore site on 15 June 2005

WHO NEEDS INFORMATION?	WHAT TYPES OF INFORMATION ARE NEEDED?	WHY THE INFORMATION ARE NEEDED?
2. DoF	<ol style="list-style-type: none"> 1. Types of fishes available in the water bodies 2. Species diversification 3. Fish catching 4. Gear selection 5. Water pollution 6. Fish diseases 7. Tides 8. Environment 9. Time of using current nets 10. Place of current nets production, its transit points and marketing points 11. Geographical characteristics 12. Socio-economic conditions of the fishers 	<ol style="list-style-type: none"> 1. For better fish production and Management 2. Discouraging the use current nets 3. Preserving fishes which are about to extinct 4. Controlling fish diseases 5. Abundance of species diversity 6. Better planning for fish cultivation 7. Providing technical guidance
2. DAE	<ol style="list-style-type: none"> 1. Use of pesticides tolerable to fishes 2. Use of IPM 3. Crop rotation 4. Crops consuming less water for irrigation 5. Alternative ways for rotting of jute 	<ol style="list-style-type: none"> 1. Increase production of crops 2. Controlling fish diseases 3. Conserving bio-diversity 4. Avoidance of water pollution due to jute retting 5. Use of less water for irrigation
3. LGED	<ol style="list-style-type: none"> 1. Construction of small infrastructure 2. Water drainage 	<ol style="list-style-type: none"> 1. Better communication 2. Flood control 3. Better planning
4. LGRD&C	<ol style="list-style-type: none"> 1. Conflict resolution 2. Socio-economic conditions of the beneficiaries 3. Law and order 4. Health and sanitation 5. Dowry 	<ol style="list-style-type: none"> 1. Coordination of activities 2. Enforcing law and order 3. Overall development 4. Resolving administrative barriers 5. Providing help and cooperation to beneficiaries

	6. Scope for administrative help 7. Status of project execution	
5. BWDB	1. Season-wise canal 2. Water level of rivers 3. Problems on the use of water 4. Fish entering time to water bodies (beels)	1. Excavation of canals 2. re-excavation of canals 3. Better utilization of water 4. Easy entrance of fishes in the beels
6. NGO	1. Identification of stakeholders 2. Livelihood status of the Beneficiaries 3. Problems of fish cultivation 4. Ways of awareness among different clan, caste and groups of people 5. Availability of local resources	1. Improvement of socio-economic conditions of the beneficiaries 2. For easy motivation 3. Preparation of projects 4. Project implementation 5. Better cooperation
7. BMC	1. Fish production 2. Fish catching 3. Use of suitable gears 4. Water pollution 5. Tides	1. Better management of BMC 2. Increased fish production
8. Fisheries co-operative Societies	1. Fish production 2. Cost-benefit 3. Marketing	1. Better management 2. Identifying weaknesses of management
9. DLS	1. Cattle and poultry birds of the beneficiaries	1. Increasing the production animal proteins 2. Socio-economic improvement
10. Social Welfare Dept.	1. Information on society registration	1. For registration and strengthening of societies
11. CBO	1. Fish production technologies 2. Species diversity 3. Socio-economic conditions of the beneficiaries 4. Occupational change 5. Knowledge about the influential persons near the water bodies 6. Types of gears to be used for catching fish in fish sanctuary 7. Types of fishes enter into beels during rainy season 8. Ways of gaining strength 9. Awareness raising 10. Fishes about to extinct	1. For understanding the livelihood status of the beneficiaries 2. Motivation of local influentials 3. Knowledge about the species diversity in the beels 4. Increased fishes in the fish sanctuary 5. Improving skills in undertaking planning, execution and evaluation of projects by the CBOs
12. Lease Holders	1. Fish production 2. cost-benefit 3. Internal conflict	1. Creation of internal conflict among beneficiaries
13. Local money lender	1. Socio-economic conditions of the beneficiaries	1. Providing loan to beneficiaries at a very high rate
14. Fish Stockiest	1. Production of fish	1. Buying of fish
15. Gear traders	1. Use of gear	1. Selling of gears
16. Local influential	1. Internal conflict among societies 2. Purposes of the project 3. Fish theft 4. Construction of sluice gates	1. Conflict resolution 2. Helping to implement fisheries projects

	5. Retting of jute 6. Use of illegal gears	
17. Commercial Banks	1. Financial help needed to beneficiaries	1. Solving financial problems

B. Results of Testing of Field Guide on the information need at Elenga site on 19 June 2005

WHO NEEDS INFORMATION?	WHAT TYPES OF INFORMATION ARE NEEDED?	WHY THE INFORMATION ARE NEEDED?
8. DoF	1. Handover of water bodies 2. Existence of Fisheries Law 3. Types of fishes available in the water bodies 4. Species diversification 5. Fish catching 6. Credit need 7. Number of water bodies, & area 8. Number of beneficiaries and their livelihood status 9. Information on industries 10. Fish species about to extinct 11. Latest research results 12. Types of gears used 13. Cultivation of crops in watershed areas 14. Use of illegal gears 15. Over catching of fish	1. Types of brood fishes 2. Conservation fishes which are about to extinct 3. Availability of fish as per demand of the people 4. Enforcement of law 5. Water pollution 6. Coordination among different agencies 7. Better management of <i>beels</i> for fish production
2. DAE	1. Alternative use of water 2. Reduced use of fertilizers 3. Reduced use of pesticides 4. Sources of water for irrigation 5. Crop diversification 6. Status quantity of fertilizer and pesticide use	1. For maximum utilization of water 2. Control of fish disease due to use of pesticide 3. Integrated development of water bodies 4. Judicious use of water for crop as well as fish cultivation.
3. LGED	1. Status of communication facilities 2. Availability of rural infrastructures	1. Increasing communication facilities as per plans 2. Creating environment suitable fish cultivation
4. LGRD&C	1. Awareness building among beneficiaries 2. Existence of Fisheries Law 3. Present status and condition of water bodies 4. Information on the existence of Fisheries Law 5. Use of gears and status of Fisheries Law execution 6. Social conflict 7. Available fisheries projects 8. Role in helping to implement fisheries projects	1. Helping people to abide by the Fisheries law 2. Execution of Fisheries Law 3. Good planning for water body management 4. Appropriate planning, implementation and evaluation of fisheries projects
5. BWDB	1. Availability of sluice gates	1. Creating facilities for fish breeding
6. NGO	1. Awareness building among	1. Fish shelters

	<ul style="list-style-type: none"> beneficiaries 2. Socio-economic condition of beneficiaries 3. Number and types of water bodies 4. Farmers' organization 	<ul style="list-style-type: none"> 2. Restricting of catching brood fish 3. Establishing rights of the beneficiaries 4. Sustainable beel management
7. DLS	<ul style="list-style-type: none"> 1. Number of poultry farms and poultry birds 	<ul style="list-style-type: none"> 1. Integrated poultry-cum-fish production
8. Social Welfare Dept.	<ul style="list-style-type: none"> 1. Status of the registration of the society 	<ul style="list-style-type: none"> 1. Strengthening the activities of the societies 2. Increasing facilities to the societies 3. Sustainability of the societies
9. CBO	<ul style="list-style-type: none"> 1. Fish sanctuary 2. Appropriate time for catching fish 3. Previous and present condition of water bodies 4. Alternative IGAs in the locality 5. Fisheries law 6. Status of fish production 7. Fish species 8. Rights and privileges of fishers 9. Organizational benefits 10. Conditions of water bodies 	<ul style="list-style-type: none"> 1. Availability of water throughout the year 2. Gear use restriction 3. Judicious of resources for better planning 4. Reducing pressure on water bodies and involving in AIGAs 5. Good beel management 6. Determining lease value
10. Local influential	<ul style="list-style-type: none"> 1. Fish cultivation in the water bodies 2. Fish species 3. Physical condition of the water bodies 4. Help and cooperation need by the fishers 	<ul style="list-style-type: none"> 1. Good interpersonal relations with the CBO members 2. Helping the CBOs for better management of beels
11. Directorate of Health and Family Planning	<ul style="list-style-type: none"> 1. Nutrition status of the beneficiaries 	<ul style="list-style-type: none"> 1. Meeting up protein deficiencies from fish
12. Directorate of Education	<ul style="list-style-type: none"> 1. Students' knowledge on fish nutrition 2. 	<ul style="list-style-type: none"> 1. Knowing protein content in fish 2. Occurrence of diseases due to lack of fish protein
13. Research Organizations	<ul style="list-style-type: none"> 1. Availability of appropriate technologies 2. Prevalence of fish diseases 3. Water pollution 4. Fish species diversity 5. Fish sanctuary 	<ul style="list-style-type: none"> 1. Developing appropriate technologies 2. Planning for developing new technologies 3. Controlling fish diseases
14. Settlement Office	<ul style="list-style-type: none"> 1. Khash water bodies in the locality 2. Area demarcation khash water bodies 	<ul style="list-style-type: none"> 1. Enforcement of Fisheries Law 2. Giving benefits to fishers 3. Catching according to need and will of the fishers
15. Religious institutions	<ul style="list-style-type: none"> 1. Preservation fish sanctuary 2. Fish breeding season 3. Fisheries Law 	<ul style="list-style-type: none"> 1. Awareness building among people 2. Restriction of catching fish in breeding season
16. UP Chairman	<ul style="list-style-type: none"> 1. Social conflict 	<ul style="list-style-type: none"> 1. Conflict resolution
17. Directorate of Youth Development	<ul style="list-style-type: none"> 1. Organization of rural youth 	<ul style="list-style-type: none"> 1. Organizing rural youth for fish production

3. Results of Testing of Field Guide on the information need at Sunamganj site on 22 June 2005

WHO NEEDS INFORMATION?	WHAT TYPES OF INFORMATION ARE NEEDED?	WHY THE INFORMATION ARE NEEDED?
1. DoF	<ol style="list-style-type: none"> 2. Number of water bodies, its nature and condition 3. Fish species, fish production and species diversity 4. Entrance rights of fishers, identifying abilities of fishers in water bodies management 5. Knowing past and present socio-economic conditions of the fishers 6. Knowing the past and present use gears 7. Use and application of fisheries law 8. Identifying the persons, groups and organizations involved in managing water bodies 9. Lease value 10. Fisheries survey 11. Fisheries law 12. Use of gears 13. Fish production 14. Fishes which are about to extinct 15. Fish hatchery and nursery 16. Number of fishers 17. Number of actual fishers 18. Eco system 19. Use of pesticides crop protection 	<ol style="list-style-type: none"> 1. Better management of water bodies 2. Increasing the production of fish and preserving species diversity 3. Preventing the extinction fish species and regenerating the extinct species 4. Making the occupation of the fishers sustainable 5. Banning the use of illegal gears 6. Long term fisheries management policies 7. Planning and management for increasing fisheries resources 8. Changing the present system of leasing water bodies 9. Introducing ecosystem for preserving fishery resources 10. Saving fish from the bad effect of pesticides 11. Executing fisheries for catching brood fishes
2. NGO	<ol style="list-style-type: none"> 1. Establishing the rights of fishers in the water bodies 2. Organization of the fishers 3. Identifying the problems of the fishers 4. Species diversity 5. Use banned gears 6. Training of fishers 7. Formation of groups and associations 8. Identifying beneficiaries around the water bodies 	<ol style="list-style-type: none"> 1. Awareness of the fishers about their rights and organizing them 2. Improving the socio-economic conditions of the fishers 3. Catch monitoring as per location of water bodies and beneficiaries
3.LGED	<ol style="list-style-type: none"> 5. Identifying local resources and involving them in using the resources 6. Status of dams, culverts, roads and sluice gates 	<ol style="list-style-type: none"> 1. Increasing fish production 2. Integrated fisheries development
4.DAE	<ol style="list-style-type: none"> 1. Identifying species diversity 2. Ascertaining the problems of fishers 	<ol style="list-style-type: none"> 1. Preserving species diversity 2. Increasing fish production 3. Knowing deleterious effects of

	<ol style="list-style-type: none"> 3. Crop rotation and its management 4. Land use planning 5. Rice varieties requiring minimum water for irrigation 6. Integrated pest management 	<p>using pesticides and chemical fertilizers</p> <ol style="list-style-type: none"> 4. Integrated pest management 5. demarcation of cultivable land and water bodies 6. Judicious utilization of water for irrigation 7. Minimum use of pesticides
5. Department of Social Welfare	1. Identifying the fishers' associations	1. Helping for the registration of societies
6. CBOs	<ol style="list-style-type: none"> 1. Rights and privileges of the fishers 2. Fisheries law 3. Organizations related to fisheries resources 4. Potentials and capabilities of the fishers 5. Number of fishers and population 6. Use of gears 7. Production of fish 8. Location fish catching 9. Time of catching fish (day/night) 10. Selling of fish 11. Cost-benefits accounts 12. Species diversity 13. Preserving fisheries resources 14. Project rules and regulations 	<ol style="list-style-type: none"> 1. Awareness of the fishers about their rights and privileges 2. Strengthening the organizations of fishers 3. Improving the socio-economic conditions of the fishers 4. Implementing fisheries law 5. Steps for preserving the species diversity 6. Increasing of fisheries resources 7. Establishing rights 8. Abiding the project rules and regulations
7. BRDB	<ol style="list-style-type: none"> 1. Identifying the problems of the fishers and their solutions 2. Identifying the local resources for fish production 	<ol style="list-style-type: none"> 1. Increasing fish production 2. Improving the socio-economic conditions of the fishers
8. Union Parishad	<ol style="list-style-type: none"> 1. Number of water bodies, its nature and condition 2. Species diversity 3. Identifying local fishers 4. Identifying the occupational status of fishers, their problems and conflicts 5. Use of gears 	<ol style="list-style-type: none"> 1. Better management of the water bodies 2. Fish species conservation 3. Knowing the livelihoods status of fishers at Union level
9. Upazila Parishad	<ol style="list-style-type: none"> 1. Number of water bodies, its nature and condition 2. Organization of the fishers 3. Implementation of fisheries law 4. Identifying water bodies having size less than 20 acres 	<ol style="list-style-type: none"> 1. Increasing co-operation and coordination among different agencies 2. Increasing the production of fish 3. Executing fisheries law at local levels
10. Lease holders	<ol style="list-style-type: none"> 1. Fisheries law 2. Identification of fishers 	<ol style="list-style-type: none"> 1. Implementation of fisheries law 2. Increasing the production of fish
11. Department of Forestry	<ol style="list-style-type: none"> 1. Identification of water loving trees 2. Identification of agencies involved in utilizing water resources 3. Species diversity 	<ol style="list-style-type: none"> 1. Integrated fish and forest development 2. Balancing environment

12. Member of Parliament (MP)	<ol style="list-style-type: none"> 1. Fisheries law 2. Species conservation 3. Fishers' rights 4. Socio-economic conditions of the fishers 	<ol style="list-style-type: none"> 1. Implementation of fisheries law 2. Improving socio-economic conditions of the fishers 3. Increasing the production of fish
13. Land Settlement Department	<ol style="list-style-type: none"> 1. Particulars of water bodies and its ownership 2. Demarcation of khash land 3. Lease of water bodies 	<ol style="list-style-type: none"> 1. Collection revenues and its management 2. Providing lease to genuine fishers 3. Easy leasing of water bodies
14. DC office	<ol style="list-style-type: none"> 1. Location of water bodies 2. Leasing of water bodies 3. Fisheries law 	<ol style="list-style-type: none"> 1. Execution of fisheries law 2. Good management of water bodies
15. International Agencies	<ol style="list-style-type: none"> 1. Fisheries resources and management aquaculture around the world 2. Listing of beneficiaries 3. Fisheries resources and its protection 4. Fish catch monitoring 5. Fish consumption 	<ol style="list-style-type: none"> 1. Integrated management for fisheries resource development 2. Analysis of progress of the projects 3. Conserving species diversity 4. Taking measures for preserving fisheries resources 5. Steps for improving the socio-economic conditions of the beneficiaries
16. Developing partners	<ol style="list-style-type: none"> 1. status and potentials of aquaculture in the water bodies in the country. 	<ol style="list-style-type: none"> 1. Financial and technical help and co-operation for the development of water bodies
17. Fish traders	<ol style="list-style-type: none"> 1. Location of fish catching, time and gears used 2. Communication and transport facilities 3. Cost-benefit analysis 	<ol style="list-style-type: none"> 1. Reducing the misuse of fishes 2. Socio-economic development of fishers
18. Fisheries Co-operative Societies	<ol style="list-style-type: none"> 1. Fisheries law 2. Registration of the societies 3. Conduction of meeting and distribution of duties and responsibilities 4. Species diversity 5. Use of legal and illegal gears 6. Cost/benefit analysis 	<ol style="list-style-type: none"> 1. Socio-economic development of fishers 2. Increasing commitment 3. Improving transparency in decision making