

**Report (Technical and Financial) on
CapNet Bangladesh**

March 2008

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Pretoria, South Africa***

**Submitted by
Secretariat, CapNet-Bangladesh**



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Introduction

CapNet is a global initiative towards building capacity on "Sustainable Water Resource Management" supported by UNDP and also an associated programme of Global Water Partnership. CapNet brought the international, regional, national and even local institutions together to build up individual and institutional capacity in the water resource management through integrated way. CapNet-Bangladesh as a part of South Asia and Global CapNet was launched on 20 March 2004. Since then Bangladesh Centre for Advanced Studies (BCAS) is working as secretariat of Bangladesh network. BCAS and the networks members are working together to facilitate and promote interdisciplinary approaches to conceptualizing, planning and implementing water resource development in the country through different types of capacity building initiatives.

Members of CapNet –Bangladesh

Core Group Members of CapNet – Bangladesh

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CapNet Bangladesh's Work Plan 2007

This report comprises two components a. technical statement and b. financial statement

A. Technical Statement

Activity- 1. Workshop (Division Level) for capacity strengthening of the water professionals (e.g. project managers including key government officials, NGO, academic and research institutions workers etc) on IWRM in six divisions

Brief of the workshop

The workshop focused on capacity building and awareness raising of the participants on IWRM issues. The water professionals (water manager, researchers, academicians, water project personnel etc) were trained on the various issues of IWRM, the challenges and need for research and integrated approach to water resource management at all levels. So far IWRM training was remained at the central level with water sector practitioners in Dhaka. These programmes focused on capacity building and IWRM opportunities at the National and community level as well. In addition, water professionals at the divisional level had the opportunity to be trained on scientific methodology and development of grant applications for IFS. All the participants were expected to share this research opportunity within their own institutional system for facilitating sustainable water resources management.

Organizer and supporters

BCAS as the secretariat of CapNet Bangladesh organized these workshops with support from International Foundation for Science (IFS) and CapNet (Capacity Building International Network for Sustainable Water Resources Management).

Workshop participants

In each of the divisional workshops the participants were more than 30. As mentioned above, most of them were water managers, water related project personnel of both government and non-government organizations, researchers and academicians etc. However, division wise list of participants are given in annex-1

Resource Persons

The workshop resource persons were basically from the Core Group member organizations of CapNet Bangladesh, especially Institute of Water and Flood Management, Bangladesh University of Engineering and Technology; Centre for Environment and Geographic Information Services (CEGIS); Institute of Water Modeling; Bangladesh Unnayan Parishad (BUP), Local Government and Engineering Development (LGED) and Bangladesh Centre for Advanced Studies (BCAS) itself.

Objectives of the Workshop

The main objective of the workshops was to strengthen capacity of the water professionals at the divisional levels through training on IWRM related issues and scientific methodology to facilitate research on water issues in Bangladesh, especially for development of research proposals for IFS.

Specific objectives:

- To analyze and discuss the IWRM principles and processes, within the context of problems faced in water resources management, social, economic and environmental issues.
- To train participants in the approaches, techniques and instruments for negotiation considering its reach, potential and limitations.
- To train and facilitate young researchers on water issues for IFS research grant

Contents and methodology of the workshops

The Integrated Water Resources Management (IWRM) workshops were designed especially for professionals already working in or involved with the Water Sector or management of water resources.

The 2 day workshop was divided into two major components:

• Training on Concepts, Practices and Opportunities of IWRM;

The first half of the workshop gave an overview of IWRM, its concepts, principles, approaches and techniques etc used in the implementation of IWRM. Four papers were prepared for facilitating IWRM related sessions. These were basically based on the following points:

Paper-1. Conceptual framework

- Introduction to IWRM and its objectives
 - Origins and IWRM approach.
 - IWRM concepts and principles.
- Implications of water use, impacts and benefits
- Water management and water efficiency plans
 - Notion of plan.
 - Efficiency, indicators, macroeconomic policies.

Paper-2. Approaches, techniques and negotiation instruments

- Approaches used to implement IWRM
- Techniques applicable
- Negotiating approaches: 5 basic approaches
- Negotiating fields: multi-user management, water conflicts, planning and intervention processes, policy design.
- Platforms / discussion: Group Exercise: Role playing, designing project that reflects IWRM principles
- Information management and analytical instruments (technologies).

Paper 3 and 4. IWRM practices and experiences (one from government organization (LGED) and another from non-government organization (IWM))

Practical Examples and case studies:

- In Water policies formulation.

- In Water resources planning processes.
 - In Intervention processes.
 - In Conflict resolution.
- **Training on Scientific Methodology and Development of research proposals or Grant Application for IFS**

The training of the second component was carried out by the International Foundation for Science (IFS) through BCAS on appropriate methods of formulation of scientific methodology and procedures for IFS grant application. This helped the young researchers and academicians identify IWRM needs and opportunities in Bangladesh. It helped younger researchers to take initiatives to work with important issues of water management. The second half of the workshop focused on the following issues among others:

1. Introduction to Scientific Methodology

- How to carry out scientific research
- Methodologies used in scientific research

2. How to write a Research Proposal

- Formulation of research statement, hypothesis, objectives and needs for the research
- Designing a budget for the research.

3. How to apply for IFS Grant

- Step by Step approach for applying for grants

4. Exercise: Formulation of Research Proposal

- Design research
- Formulate research statement, Hypothesis
- Presentation of research ideas

Training Mechanism:

- Power point presentations: from invited water professionals, researchers and academicians.
- Training materials: articles, project briefs etc.
- Open Discussions
- Group Exercises
- Case Study presentation

Outcome of the Workshop:

The outcome of the workshop will include:

- Training of over 180 participants on IWRM issues.
- Training of over 180 participants on scientific methodology and development of applications for IFS research grant, out of which at least 30 were expected to apply to IFS for research grant.
- Strengthened capacity of the water professionals at divisional level.
- Strengthened institutional capacities as the participants take their training and knowledge and apply it to their own projects/ institutions.
- Extension of CapNet-BD network at the divisional level
- Identification of tools of IWRM and its practical application

- Identification of research needs and opportunities of IWRM in Bangladesh
- Opportunity for young researchers to obtain research grants to carry out scientific research on water issues.
- Spread of the concept of IWRM and its principles to water professionals working at the community level.

Activity 2. Gender vulnerability at the community level due to water related natural hazards (flood, drought and salinity intrusion) and capacity building to cope with such extreme events

The full technical report of the case study is attached herewith (separate document)

Activity 3. Community Flood Management Training

Introduction

Members of CapNet-Bangladesh including Institute of Water and Flood Management (IWFM), Centre for Environment and Geographic Information System (CEGIS), Bangladesh Centre for Advanced Studies (BCAS) organized two community flood management training workshops in Sirajganj (27-28 January 2008) and Faridpur (10-11 February 2008).

Training Modules

A team consisting of four members was formed to develop training modules for the workshop purpose. The team was led by Dr. Rezaur Rahman, Institute of Water and Flood Management (IWFM), Bangladesh University of Engineering and Technology (BUET). The members were Dr. Sujit Kumar Bala (IWFM, BUET), Mr. Ahmadul Hassan, Centre for Environment and Geographic Information Services (CEGIS) and Md. Golam Rabbani, Bangladesh Centre for Advanced Studies (BCAS). The draft modules were shared with CapNet secretariat. However, the modules have been finalized after the workshops. All three modules and suggestions from the workshop are attached herewith (annex-6)

Participants

The main target participants were the members of municipal disaster management committee (MDMC) of the Ministry of Food and Disaster Management, Government of Bangladesh. It may be noted that the members of MDMC include the professionals of GOs, NGOs, CBOs etc. The total participants for each location were over 30. Please find attached the list of participants in annex-2.

Approach and Methodology

- Formation of an advisory panel consisting of senior experts from CG of CapNet-BD and also from GOs and NGOs)
- Development of training materials
 - Review of APFM and other existing materials (GOs/NGOs, International organizations) to develop training materials
 - Discussion with relevant GOs/NGOs (both national and community level)
 - Preparation of draft materials
 - Field testing

- Preparation of final materials for training of trainers
- Identification of municipal areas that are mostly exposed to flood
- Identification and communication with the target groups to ensure participation

B. Financial Statement:

Activity 1. Six Divisional Workshops

IFS and CapNet provided funding support to organize these events. The financial support was made available for the overall management of the workshops. The major expenses include organizations management, DSA of the participants, honorarium for the resource persons/facilitators, logistic support including training materials, long (Dhaka to other division) and local transport (within the division) etc. The financial statement of the workshop is attached with the report (**annex-3**).

Activity 2. Gender vulnerability at the community level due to water related natural hazards (flood, drought and salinity intrusion) and capacity building to cope with such extreme events

The financial statement for the case study is given in annex-4

Activity 3. Community Flood Management Training (CFMT)

The financial statement for CFMT is attached in annex-5

Annex-1

Divisional Workshop on IWRM with Training on Scientific Methodology and Development of Grant Applications

Division : Chittagong

Venue : Hotel Saint Martins, Chittagong

Date : 02-03 September

SL No	Name	Designation	Department and Organization
1	Mr. Syed Hasan Imam	Sub Divisional Engineer	BWDB, Kaptai, O & M division
2	Mst. Farzana Rahman Zuthi	Lecturer	Chittagong University of Engineering and Technology
3	Md. Ansarul Islam	Project Manager	Tarana Trust
4	Mr. M. Shahadat Hossain	Assistant Professor	Chittagong University
5	Partha Sarathi Barua	–	PSTC
6	Ms. Arefatul Jannat	Unit Manager	Protyashi
7	Dr. M. Shah Alam	Professor	Department of Zoology,
8	Mr. Asiful Hoque	Assistant Professor	Chittagong University of Engineering and Technology
9	Mr. Atul Kumar Paul	Inspector	Fish Inspection & Quality control
10	Mr. Dilip Kumar Barua	–	DPHE
11	Md. Kamrul Hassan	–	DPHE
12	Mr. Pinaki Das	–	BITA
13	Mr. Mohammed Maniruzzaman	Field Engineer	NGO Forum Chittagong
14	Md. Moksedur Rahman	Assistant Regional Officer.	NGO Forum Chittagong
15	Mr. Shiplob Chakma	Field Officer	NGO Forum Chittagong
16	Mr. Mohammed Shahidul Islam	–	YPSA
17	Mr. Mohammad Shahjahan	–	YPSA
18	Mr. Mohammad Asad Hussain	Assistant Professor	IWFM
19	Mr. Tofazzal Ahmed	Assistant Engineer	LGED
20	Engr.Md.Mahbubur Rahman	Assistant Engineer	LGED
21	Mr. Mohammad Jamal Uddin	Assistant Engineer	LGED SSW-2 Chittagong
22	Mr. Md. Khayeruzzaman	Monitoring Officer	PSTC
23	Dr. Abdul Maleque	Professor	Chittagong University

SL No	Name	Designation	Department and Organization
	Bhouyain		
24	Mr. Abdul Hamid	Unit Manager	DSK
25	Ms. Aysha Akhtar	Lecturer	IMSF, Chittagong University
26	Mr. Md. Tajminur Rahman	Assistant Director (Technical)	Department of Environment Chittagong
27	Mr. M. Abdur Rahman Rana	Research Officer	BARNALY
28	Mr. Swapan Kumar Barua	SDE	BWDB
29	Md. Kador Ahmed	Quality Control Officer	FIOC Chittagong
30	Dr. Abu Hena Mustafa Kamal	Assistant Professor	Chittagong University
31	Mr. Jahangir Alam	—	ISDE Bangladesh
32	Md. Mostafa Monwar	—	Department of Marine Science Chittagong University
33	Mr. Md Idris	—	Chattagram Nagoeik Uddogh

Division:Rajshahi
Venue : Parjatan Motel, Rajshahi
Date: 10-11 September,

SL No	Name	Designation	Department and Organization
1	Mr. IqbqI Matin	Associate Professor Civil Engg.	RUET, Rajshahi
2	Mr. Dipak Chandra Sarker	Assistant Professor Civil Engg.	RUET, Rajshahi
3	Mr. Dalim Kumar Paul	Lecturer Civil Engg.	RUET, Rajshahi
4	Kh. A.A. Sorwar Hossain	Upazila Engr. PABA	LGED Rajshahi
5	Md Rafiqul Islam	Assistant Engineer	LGED Rajshahi
6	Mr. Shyamal Kumar Roy	–	CARITAS
7	Md. Sultan Mahmud	Assistant Engineer	LGED Rajshahi
8	Mr. Ariful Islam	Research Officer	BELA, Rajshahi
9	Md. Alimur Rahman	Senior Scientific Officer	BARI, Rajshahi
10	Md. Faruque Hossain	Scientific Officer	OFRD
11	Md. Shakhawat Hossain	Scientific Officer	OFRD, BARI, Rajshahi
12	Mst. Sabina Yeasmin	Trainer	DAE, Godagari, Rajshahi
13	Mr. S.M.Zillur Rahman	–	CARITAS
14	Dr. Ferdowsi Mahal	Assistant Professor	Department of Geography and Environment, Rajshahi University

SL No	Name	Designation	Department and Organization
15	Md. Nur-E-Alam Siddique	Scientific Officer	BARI, Rajshahi
16	Dr. M. Anisuzzaman	Associate Professor	Rajshahi University
17	Dr. Md. Golam Mostafa	Assistant Professor	IES, Rajshahi University
18	Md. Masud Parves Rana	Assistant Professor	GES Rajshahi University
19	Md. Moniruzzaman	Asst. Professor	Department of Geography and Environment Rajshahi University
20	Ms. Lubna Sharmin	Asst. Area Coordinator	VERC
21	Md. Moshir Rahman (Sujon)	Asst. Area Coordinator	VERC
22	Ms. Zakiya Yasmin	Assistant Professor	Institute of Environmental Studies (IES) Rajshahi University
23	Md. Nazrul Islam	Asst. Engineer	BMDA
24	Md. Nazirul Islam	Executive Engineer	BMDA
25	Md. Abdul Latif	Executive Engineer	BMDA
26	Md. Abdus Salam	Sr. Upazila Fisheries Officer	Directorate of Fisheries (DoF)
27	Md. Sultan Mahmud Sarker	Superintending Engineer	BHDA
28	Md. Firoz Kabir Mahmud	Deputy Assistant Director	Department of Fisheries (DoF)
29	Md. Rashedul Kabir Mondol	Lecturer	Department of Fisheries, Rajshahi University

SL No	Name	Designation	Department and Organization
30	Md. Mahabubur Rahman	Lecturer	Department of Fisheries, Rajshahi University
31	Md. Habibur Rahman	Executive Engineer	BWDB
32	Ms. Fahmida Chowdhury	Assistant Professor	Department of Geography, Rajshahi University
33	Dr. A.S.M.Motaharul Haque	Dist. Fisheries Officer	Department of Fisheries (DoF)
34	Md. Mukhlasur Rahman	Sub-Divisional Engineer	Bangladesh Water Development Board (BWDB)

Division: Khulna
Venue: Hotel Castle Sulam, Khulna
Date: 19-20 September 2007.

SL No	Name	Designation	Department and Organization
1	Mr. A.K.M Ashadullah	Agril. Engr.	DAE, Khulna
2	Mr. Abul Kalam Azad	Hygiene Promotion Officer	Prodipon
3	Mr. Samiron Biswas	Supervisor (WB)	CSS
4	Mr. Mujibar Rahman	Coordinator (SMED)	CSS
5	Mr. Abed Golam Rabbani	Lecturer	Khulna University
6	Md. Moniruzzaman Patwary	Zonal Manager	IPSWAM Khulna
7	Mr. A.H.M Rezaul Huq	Executive Director	Wetland Resource Development Society (WRDS)
8	Mr. Dhananjay Ray	Technical Officer	WRDS, Khulna
9	Md. Abdullah Yousuf Al Harun	Assistant Professor	Khulna University
10	Mr. Nazmul Huda	Manager – GHR	VVS , Khulna
11	Mr. Safiul Alam	Project Coordinator	Prodipon, Khulna
12	Mr. Zaved Khalid	Associate coordinator	CDP, Khulna
13	Md. Hasan Ali		DoE, Khulna
14	Mr. Sharif Md. Ismail Hossain	Agricultural Ex. Officer	DAE, Khulna
15	Eng. Md. Forhad Hossain	Assistant Engineer	DPHE, Khulna
16	Mst. Nasrin Akhtar	Assistant Engineer	DPHE
17	Ms. Meher Un Nesa	Assistant Professor	Khulna University
18	Md. Anwarul Islam	Uz. Engr	LGED
19	Dr. Md. Salequzzaman	Professor	Environmental Science Khulna University
20	Engr. A.K.Azad	XEN	LGED
21	Abu Taher Md. Obydur Rahman	Asst. Engineer	LGED
22	Mr. Shah Md. Nur Alam	Asst. Extension Officer	District Fisheries Office
23	Md. Saifuddin	Upzilla Engineer	LGED
24	Md. Nashir Uddin	Sponsorship Officer	VVS
25	Ms. Nasira Sultana	Socio Economist	BWDB-IPSWAN, Khulna
26	Mr. S K MD. Towheed	Junior Programme Officer	CARITAS, Khulna
27	Md. Sydur Rahman	A.DC (Publicity)	DoE , Khulna
28	Ms. Marina Jothi	Project Coordinator	Coastal Development

SL No	Name	Designation	Department and Organization
			Partnership
29	Md. Shahidul Hasan Swapan	Lecturer	Khulna University
30	Mr. Gazi Nowsher	-	Pani and Poribesh, Phultala
31	Mr. Mamunur Rashid	Divisional Officer	BELA, Khulna
32	Mr. K M Julfikar Tareq	-	BWBD, Khulna
33	Mr. Apurbo Kumar Bhowmich	-	BWDB, Khulna
34	Md. Atikul Islam	Assistant Professor	Khulna University
35	Md. Ashiq-Ur- Rahman	Lecturer	Khulna University
36	Mr. Molla Mohammad Shafiqur Rahman	Assistant Professor	Khulna University
37	Md. Babul Howlader	-	BELA, Khulna
38	Mr. Karar Didarul Hannan	AEO	DoF, Khulna
39	Md. Maksudur Rahman	Program Coordinator	CCEC , Khulna
40	Mr. Goutam Mondal	C & P	CCEC , khulna

Division: Dhaka
Venue: Hotel Rigs Inn, Dhaka
Date: 28-29 October 2007.

SL No	Name	Designation	Department and Organization
1	Mr. Md. Golam Rabbane	Lecturer	Dept. of Fisheries University of Dhaka
2	Md. Hasan Hasibur Rahman	Research Officer	Department of Environment (DoE)
3	Ms. Bushra Nishat	Junior Specialist	Institute of Water Modeling (IWM)
4	Mr. Md. Rostom Ali	Assistant Professor	Dept. of Farm Power and Machinery Bangladesh Agricultural University
5	Mr. Chayan Kumer Saha	Assistant Professor	Dept. of Farm Power and Machinery Bangladesh Agricultural University
6	Mr. Md. Mizanur Rahman	Assistant Professor	Dept. of Geography and Environment Jahangirnagar University
7	Mr. Md. Ariful Islam	Assistant Professor	Dept. of Agricultural Chemistry Sher-e-Bangla Agricultural University
8	Mr. Md. Obaidul Islam	Assistant Professor	Dept. of Agronomy Sher-e-Bangla Agricultural University
9	Mr. Mirza Hasanuzzaman	Lecturer	Dept. of Agronomy Sher-e-Bangla Agricultural University
10	Mr. A.K.M Rashidul Alam	Assistant Professor	Dept. of Environmental Sciences Jahangirnagar University
11	Ms. Razia Sultana	Project Engineer	BCAS
12	Mr. Amah Klutse		CREPA
13	Ms. Farzana Hossain	Program Coordinator	Earth Foundation
14	Mr. Md. Mahboob Hassan	Assistant Engineer	LGED
15	Mr. Md. Abdul Based	Executive Engineer	LGED
16	Mr.Md. Humayun Kabir	Assistant Professor	Dept. of Geography and Environment University of Dhaka
17	Mr. Benozir Ahmed	Associate Training Officer	NGO Forum for DWSS
18	Dr. M. Aminul Haque	Senior Scientific Officer	WARPO
19	Mr. Md. Kausar Hossain	Assistant Professor and Chairman	Dept. of Agroforestry and Environmental Science Sher-e-Bangla Agricultural University
20	Mr. S.M.Humayan Kabir	Program Officer	CARITAS Fisheries Project
21	Mr. Md. Abdul Basit	Associate Specialist	Institute of Water Modeling (IWM)

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22	Mr. Md. Zafar Iqbal	Executive Engineer	Bangladesh Water Development Board (BWDB)
23	Mr. Md. Abdul Kausar	Executive Engineer	BWDB
24	Dr. Shafi Mohammad Tareq	Assistant Professor	Dept. of Environmental Sciences Jahangirnagar University
25	Mr. Md. Roknuzzaman	Assistant Professor	Dept. of Fisheries University of Dhaka
26	Mr. Razibul Alam	Communication Officer	Bangladesh Water Partnership (BWP)
27	Mr. Md. Forhad Hossain	Assistant Professor	Dept. of Agroforestry and Environmental Science Sher-e-Bangla Agricultural University
28	Mr. Anil Chandra Barman	Executive Engineer	LGED
29	Dr. M. Niamul Naser	Associate Professor	Dept. of Zoology University of Dhaka
30	Ms. Naima Ansar Khan	Research Officer	BCAS
31	Dr. K.M. S Huda	Professor	Dept. of Geography and Environment Jahangirnagar University
32	Dr. Syed Hafizur Rahman	Assistant Professor and Chairman	Dept. of Environmental Sciences Jahangirnagar University
33	Ms. Alizeh Hannan	Research Officer	BCAS
34	Ms. Naima Rahman	Assistant Research Officer	NGO Forum for DWSS
35	Mr. Md. Hasan Shahriar	Scientific Officer	WARPO
36	Ms. Nahid Rezwana	Lecturer	Dept. of Geography and Environment University of Dhaka
37	Mr. Zahir Raihan	Senior Teacher	European Standard School (ESS)
38	Dr. Md. Sirajul Islam	Assistant Professor	Department of Environmental Science and Management North South University
39	Dr. Reza Md. Shahjahan	Associate Professor	Dept. of Zoology University of Dhaka
40	Mr. Shamimul Alam	Lecturer	Dept. of Zoology University of Dhaka

Division: Sylhet
Venue: Hotel Supreme, Mirabazar, Sylhet
Date: 14-15 November 2007.

SL No	Name	Designation	Department and Organization
1.	Mr. Md. Abdus Sobhan	Assistant Engineer	Sylhet City Corporation
2.	Mr. Md. Jahangir Kabir	Assistant Engineer	LGED, Sylhet
3.	Mr. Anamul Haque Tapader	Sub Assistant Engineer	Sylhet City Corporation
4.	Dr. Md. Muniruzzaman	Senior Upzila Fisheries Officer	Department of Fisheries (DoF)
5.	Mr. A.K.M Lutfur Rahman Siddique	Senior Upzila Fisheries Officer	Department of Fisheries (DoF)
6.	Mr. Md. Helal Uddin	Field Operation Coordinator	IDEA, Sylhet
7.	Mr. Mohammad Azizur Rahman	APM	IDEA, Sylhet
8.	Ms. Farzana Raihan	Lecturer	Dept. of Forestry and Environment Shahjalal University of Science and Technology
9.	K.M.A.K Azad	Executive Director	AWARD
10.	Mr. Md. Monirul Islam Sarker	Regional Manager	NGO Forum
11.	Mr. Md. Nizam Uddin	Senior Upzila Fisheries Officer	Department of Fisheries (DoF)
12.	Mr. Md. Abdul Mumin Shamim	Assistant Professor	Shahjalal University of Science and Technology
13.	Mr. Mohammad Redowan	Assistant Professor	Dept. of Forestry and Environment Shahjalal University of Science and Technology
14.	Mr. H.M.A Mahzuz	Lecturer	Dept. of CEE Shahjalal University of Science and Technology
15.	Mr. Golam Monir Khan	–	Shahjalal University of Science and Technology
16.	Mr. Md. Misbah Uddin	Assistant Professor	Dept. of CEE Shahjalal University of Science and Technology
17.	Mr. Md. Shahidur Rahman	–	Dept. of CEE Shahjalal University of Science and Technology
18.	Dr. Md. Jahir Bin Alam	–	Shahjalal University of Science and Technology
19.	Mr. Md. Ruhul Amin Chowdhury	Program Manager	AWARD
20.	Mr. Md. Mizanur Rahman	ACF	Forest Division, Sylhet
21.	Mr. Mohammad Ali	Forest Ranger	Forest Division, Sylhet
22.	Mr. Mohammad Shafi Ullah	Field Officer	NGO Forum , Sylhet
23.	Mr. Sadeque Hossain	Executive Engineer	DPHE , Sylhet

SL No	Name	Designation	Department and Organization
24	Mr. Md. Nazrul Hakim	Assistant Engineer	E.E.D , Sylhet
25	Mr. Mohammad Saiful Islam	Lecturer	Dept. of CEE Shahjalal University of Science and Technology
26	Dr. Md. Nizam Uddin	–	Dept. of Chemistry Shahjalal University of Science and Technology
27	Dr. Md. Abdus Subhan	–	Dept. of Chemistry Shahjalal University of Science and Technology
28	Mr. Muhammad Muzahidul Islam	–	Department of Environment (DoE), Sylhet
29	Mr. Golam Rosul Khan	–	Department of Environment (DoE) , Sylhet
30	Mr. Jasimuddin Ahmed	Sub Assitant Engineer	DPHE, Sylhet
31	Mr. Solomon Kueda		RWDO
32	Mr. Harun-Ur-Rashid	Project Engineer	EPCT
33	Mr. Ashok Kumar Dash	Assistant Engineer	EPCT
34	Ms. Forhat Afja Lubna	Chairman	CERD
35	Mr. Md. Ashraful Hasan	General Secretary	CERD
36	Ms. Shah Shahella	-	BELA
37	Ms. Syeda Rowshan Afroz	Executive Director	Mothers Society

Division: Barisal

Venue: SAINT-Bangladesh, Barisal

Date: 12-13 December 2007.

SL No	Name	Designation	Department and Organization
1.	Mr. Azizul Haque	Senior Upzila Fisheries Officer	Department of Fisheries
2.	Mr. Md Rezaul Karim	Senior Upzila Fisheries Officer	Department of Fisheries
3.	Mr. Md. Abdul Azim	Agricultural Facilitator	LGED, Barisal
4.	Mr. Jalal Ahmed	Executive Engineer	BWDB , Barisal
5.	Mr. A.K.M Abul Bashar	Sub-Assistant Engineer	BWDB , Barisal
6.	Mr. Md. Mazibul Haque	Assistant Director	BWDB , Barisal
7.	Mr. Md. Ikhtiar Uddin	Senior Scientific Officer	SRDI
8.	Mr. Md. Sabbir Hossain	Scientific Officer	SRDI
9.	Mr. Tarun Kumar Das Munsi	Project Officer	ICDA
10	Mr. S.M Saifur Rahman	Coordinator	Bikalpa Unnayan Karmashuchi (BUK)
11	Mr. G.M Soyseb Sakir	Assistnat Coordinator	Bikalpa Unnayan Karmashuchi (BUK)
12	Mr. Mohammad Ali Jibon	Chief Coordinator	Chandradip Development Society
13	Mr. Basudeb Guha	Program Coordinator	Chandradip Development Society
14	Mr. Md. Abu Saleh	Project Engineer	SAINT-Bangladesh
15	Mr. Mohammad Shohel	Program Officer	SPEED Trust
16	Mr. Md. Fazlul Haque	Assistant Professor	Dept. of Soil Science, Patuakhali Science and Technology University
17	Mr. Mohammad Nizam Uddin	Associate Professor	Dept. of Soil Science, Patuakhali Science and Technology University
18	Mr. Md. Asadul Haque	Lecturer	Dept. of Soil Science, Patuakhali Science and Technology University
19	Mr. Swadesh Chandra Samanta	Associate Professor	Dept. of Agronomy, Patuakhali Science and Technology University
20	Mr. Purnendu Biswas	Assistant Professor	Dept. of Agronomy, Patuakhali Science and Technology University
21	Mr. Md. Alamgir Kabir	Lecturer	Dept. of Agroforestry, Patuakhali Science and Technology University
22	Mr. Abdus Salam Talukder	Executive Director	SAINT-Bangladesh
23	Mr. Badal Chandra Ghosh	Field Officer	CARITAS

24	Mr. Debbrata Chandra Pandit	Fisheries Facilitator	LGED , Barisal
25	Mr. Md. Abul Bashar	Socio-Economist	LGED , Barisal
26	Mr. Md. Zakir Hossain Mian	Assistant Engineer	LGED , Barisal
27	Mr.Md.Masudur Rahman	Chairman (In Charge)	Dept. of Agroforestry, Patuakhali Science and Technology University
28	Mr. Md. Hemayet Uddin	Senior Program Officer	SPEED Trust
29	Mr. Ratan Kumar Adhikary	-	SJK-Pirujpur
30	Mr. Md. Sultan Mahmud Suman	Field Officer	NGO Forum

Annex-2. Training Workshop on Community Flood Management

Venue: Sirajganj Municipal

Date: 27-28 January 2008.

SL No	Name	Designation	Department and Organization
1	Ms. Shirin Mahmuda	Commissioner (Reserve)	Sirajganj Municipal
2	Mr. Abdur Rahman	Commissioner	Sirajganj Municipal
3	Md. Rashedul Hasan	Inspector	Sirajganj Municipal
4	Mr. Harun-Ur-Rashid	Commissioner	Sirajganj Municipal
5	Mr. Akther Hossain Khan	Commissioner	Sirajganj Municipal
6	Mr. Ashraful Islam	GAE & W/S	Sirajganj Municipal
7	Ms. Yasmin Nahar Roji	Commissioner (Reserve)	Sirajganj Municipal
8	Ms. Nazma Begum	Commissioner (Reserve)	Sirajganj Municipal
9	Mr. Sirajul Islam	Commissioner	Sirajganj Municipal
10	Mr. Bellal Hossain (Hira)	Commissioner	Sirajganj Municipal
11	Dr. Md. Safiqul Islam	Medical Officer	Civil Surgeon Office, Sirajganj
12	Mr. Muhammad Sahin	Commissioner	Sirajganj Municipal
13	Ms. Mazedda Akhand	Commissioner	Sirajganj Municipal
14	Mr. Abdul Kuddus Khan	Commissioner	Sirajganj Municipal
15	Mr. Ariful Islam	Commissioner	Sirajganj Municipal
16	Md. Musa	Professor and Rtd. Principle	DUPAK , Sadar Upazila
17	Mr. S.M. Gazim Rahman	Principal	Sirajganj Govt. College
18	Mr. Imtiaz Chowdhury	Commissioner	Sirajganj Municipal
19	Md. Monowarul Islam	SAAO	Sirajganj
20	Mr. Ravendra Nath Mondol	SUMS	
21	Mr. Masud Ahmed	-	Sirajganj
22	Md. Abdul Hamid Khan	Family Planning Inspector	Upazila Family Planning Office, Sirajganj Sadar
23	Mr. Saiful Islam	Technical Officer	NDP –Shouhardo Program
24	Ms. Farjana Mustahid	-	NDP- Shouhardo program
25	Mr. Abdus Sattar	Commissioner	Sirajganj Municipal
26	Mr. Nazrul Islam	Commissioner	Sirajganj Municipal
27	Mr. Ear Ali	Commissioner	Sirajganj Municipal
28	Md. Salim Reza	SHARP	
29	Mr. Md. Abdur Rahim	Chief Executive Officer	Sirajganj Municipal
30	Mr. Golam Rahim Khan	Chairman (In Charge)	Sirajganj Municipal
31	Mr. Md. Lutfar Rahman	Secretary	Sirajganj Municipal
32	Mr. Nazir Ahmed	Executive Engineer	Sirajganj Municipal
33	Mr. Golam Sarwar Mostafa	Upazila Rural Development Officer	BRDB, Sirajganj
34	Mr. Sheikh Keramat Ali	Commissioner	Sirajganj Municipal

35	Mr. Alauddin Ahmed	Commissioner	Sirajganj Municipal
36	Ms. Sabina Yasmin (Hasi)	Commissioner (Reserve)	Sirajganj Municipal

Training Workshop on Community Flood Management

Venue: Hotel Raffles-Inn, Faridpur

Date: 10-11 February 2008.

SL No	Name	Designation	Department and Organization
1	Mr. Nazrul Islam Jamal	Deputy Commander	Freedom Fighter Sangsad
2	Mr. Md. Ziaur Rahman Sentu	Service Promotion Officer	VFWA, Faridpur
3	Mr. Proshanto Saha	Coordinator	Shapla Mohila Sangtha
4	Mr. A B M Murad	Member	
5	Mr. Bhabesh Chandra Das	Assistant Engineer	PDB, S & D-II Faridpur
6	Md. Hasanuzzaman	Sub-Divisional Engineer	DPHE, Faridpur
7	Ms. Kakoti Datti	Program Officer	Women Affairs Office
8	Dr. Suttam Kumar Biswas	Medical Officer	Municipality, Faridpur
9	Mr. Khandaker Manjur Ali	Commissioner	Faridpur Pourashava
10	Mr. Sheikh Nuruddin Ahmed	Commissioner	Faridpur Pourashava
11	Mr. M A Mannan	Upazila Social Service Officer	Faridpur Sadar Upzila
12	Ms. Sahana Begum	Commissioner (Reserve)	Faridpur Pourashava
13	Mr. Badal Sheikh	Commissioner	Faridpur Pourashava
14	Mr. Abdur Rab	Assistant Director	Red Crescent Society, Faridpur
15	Mr. Sazzad Hossain	President	Press Club
16	Ms. Hasna Jahan	Commissioner (Reserve)	Faridpur Pourashava
17	Ms. Shahna Begum	Commissioner (Reserve)	Faridpur Pourashava
18	Mr. Main Uddin Ahmed Manu	Commissioner	Faridpur Pourashava
19	Mr. Bachchu Mia Ali	Commissioner	Faridpur Pourashava
20	Md. Al Ahsan Kollol	Chairman (In Charge)	Faridpur Pourashava
21	Dr. Dilara Haque	Deputy Civil Surgeon	Office of Civil Surgeon
22	Mr. Md. Nazrul Islam	Commissioner	Faridpur Pourashava
23	Mr. Md. Nurul Islam	Project Implementation Officer	Faridpur Sadar Upzila
24	Mr. Manowar Hossain	Upzila Agricultural Officer	Faridpur Sadar Upzila

25	Mr. Md. Habibur Rahman	Secretary	Faridpur Pourashava
26	Mr. M.A.Shishir	CANSA	

**Annex-3. Financial Statement for Six Divisional Workshops
IFS-CapNet-BCAS Activities
Divisional Workshop in Dhaka during 28 - 29
October 2007**

SL	Particulars	Expenditures
1	Organizational and Management Costs	1500
2	Logistics (Bag, Banner, Stationeries, Photocopies, etc.)	2138
3	Workshop Venue Charge (for 2 Days)	1470
4	DSA for participants to cover foods and refreshments and local transport	2147
5	Workshop Facilitators Honorarium (4 persons @ US\$ 300)	1200
6	Training Materials Development (4 authors @ US\$ 250 for each workshop)	1000
7	Transports costs (Rented for Dhaka to Workshop Venue, Local Movement and protocol)	1500
Total Expenditures for Dhaka Divisional Workshop		10955

**Divisional Workshop in Chittagong during 2-3
September 2007**

SL	Particulars	Expenditures
1	Organizational and Management Costs	1500
2	Logistics (Bag, Banner, Stationeries, Photocopies, etc.)	2054
3	Workshop Venue Charge (for 2 Days)	1360
4	DSA for participants to cover foods and refreshments and transport	1975
5	Workshop Facilitators Honorarium (4 persons @ US\$ 300)	1200
6	Training Materials Development (4 authors @ US\$ 250 for each workshop)	1000
7	Transports costs (Rented for Dhaka to Workshop Venue, Local Movement and protocol)	2000
Total Expenditures for Chittagong Divisional Workshop		11089

**Divisional Workshop in Rajshahi during 10-11
September 2007**

SL	Particulars	Expenditures
1	Organizational and Management Costs	1500
2	Logistics (Bag, Banner, Stationeries, Photocopies, etc.)	2015
3	Workshop Venue Charge (for 2 Days)	1150
4	DSA for participants to cover foods and refreshments and local transport	1882
5	Workshop Facilitators Honorarium (4 persons @ US\$ 300)	1200
6	Training Materials Development (4 authors @ US\$ 250 for each workshop)	1000
7	Transports costs (Rented for Dhaka to Workshop Venue, Local Movement and protocol)	2000
	Total Expenditures for Rajshahi Divisional Workshop	10747

**Divisional Workshop in Khulna during 19-20
September 2007**

SL	Particulars	Expenditures
1	Organizational and Management Costs	1500
2	Logistics (Bag, Banner, Stationeries, Photocopies, etc.)	2032
3	Workshop Venue Charge (for 2 Days)	1200
4	DSA for participants to cover foods and refreshments and local transport	1900
5	Workshop Facilitators Honorarium (4 persons @ US\$ 300)	1200
6	Training Materials Development (4 authors @ US\$ 250 for each workshop)	1000
7	Transports costs (Rented for Dhaka to Workshop Venue, Local Movement and protocol)	2072
	Total Expenditures for Khulna Divisional Workshop	10904

**Divisional Workshop in Sylhet during 14-15
November 2007**

SL	Particulars	Expenditures
1	Organizational and Management Costs	1500
2	Logistics (Bag, Banner, Stationeries, Photocopies, etc.)	2092
3	Workshop Venue Charge (for 2 Days)	1040
4	DSA for participants to cover foods and refreshments and local transport	1987
5	Workshop Facilitators Honorarium (4 persons @ US\$ 300)	1200
6	Training Materials Development (4 authors @ US\$ 250 for each workshop)	1000
7	Transports costs (Rented for Dhaka to Workshop Venue, Local Movement and protocol)	2000
	Total Expenditures for Sylhet Divisional Workshop	10819

**Divisional Workshop in Barisal during 12-13
December 2007**

SL	Particulars	Expenditures
1	Organizational and Management Costs	1500
2	Logistics (Bag, Banner, Stationeries, Photocopies, etc.)	2017
3	Workshop Venue Charge (for 2 Days)	950
4	DSA for participants to cover foods and refreshments and local transport	1800
5	Workshop Facilitators Honorarium (4 persons @ US\$ 300)	1200
6	Training Materials Development (4 authors @ US\$ 250 for each workshop)	1000
7	Transports costs (Rented for Dhaka to Workshop Venue, Local Movement and protocol)	2083
	Total Expenditures for Barisal Divisional Workshop	10550

Annex-4
CapNet-BCAS Activities in 2007

Expenditures Statement for Research/Case Study on Gender Vulnerability to Water Hazards

SL	Particulars	Expenditures (US\$)
1	Project Management Costs	2,000.00
2	Logistics (Folders, Stationeries, Photocopies & Printing etc.)	2,985.00
3	Primary Data Collection Costs	4,000.00
4	Travel and Conveyance	2,412.00
5	Consultation workshop	7,126.00
5.1	<i>Workshop Venue Charge</i>	1,000.00
5.2	<i>DSA for participants to cover foods and refreshments and local transport</i>	2,400.00
5.3	<i>Experts' (2) honorarium \$500 x 2</i>	1,000.00
5.4	<i>Workshop Associates for 3 weeks</i>	600.00
5.5	<i>Workshop materials Preparation and Logistics (stationeries, photocopies, banner and bags)</i>	1,256.00
5.6	Transport for local movements	870.00
	Total Expenditures for Research/Case Study Development	18,523.00

Annex-5

Summary Expenditures for the Training Workshops in Sirajgonj and Faridpur on Community Flood Management Training during 27-28 January and 10-11 February 2008

SL	Particulars	Expenditures
1	Organizational and Management Costs	2,000.00
2	Logistics (Workshop Bags, Banner, Stationeries, Photocopies, Multimeida rental, video documentation, etc.)	3,430.00
3	Workshop Venue Charge (for 2x2=4 Days)	2,050.00
4	DSA for participants to cover foods and refreshments (40x2x\$10) Foods (Tea/Coffee, Lunch, Water)	1,600.00
5	Workshop Facilitators Honorarium (3 persons @ US\$ 300 for 2 trainings)	1,767.00
6	Transports costs (Rented for Dhaka to Workshop Venue, Local Movement and protocol)	1,800.00
7	Training Materials Development (5 authors @ US\$ 500 for workshop)	2,525.00
	Total Expenditure	17,672.00

Annex-6

Modules (1, 2 and 3) of Community Flood Management Training

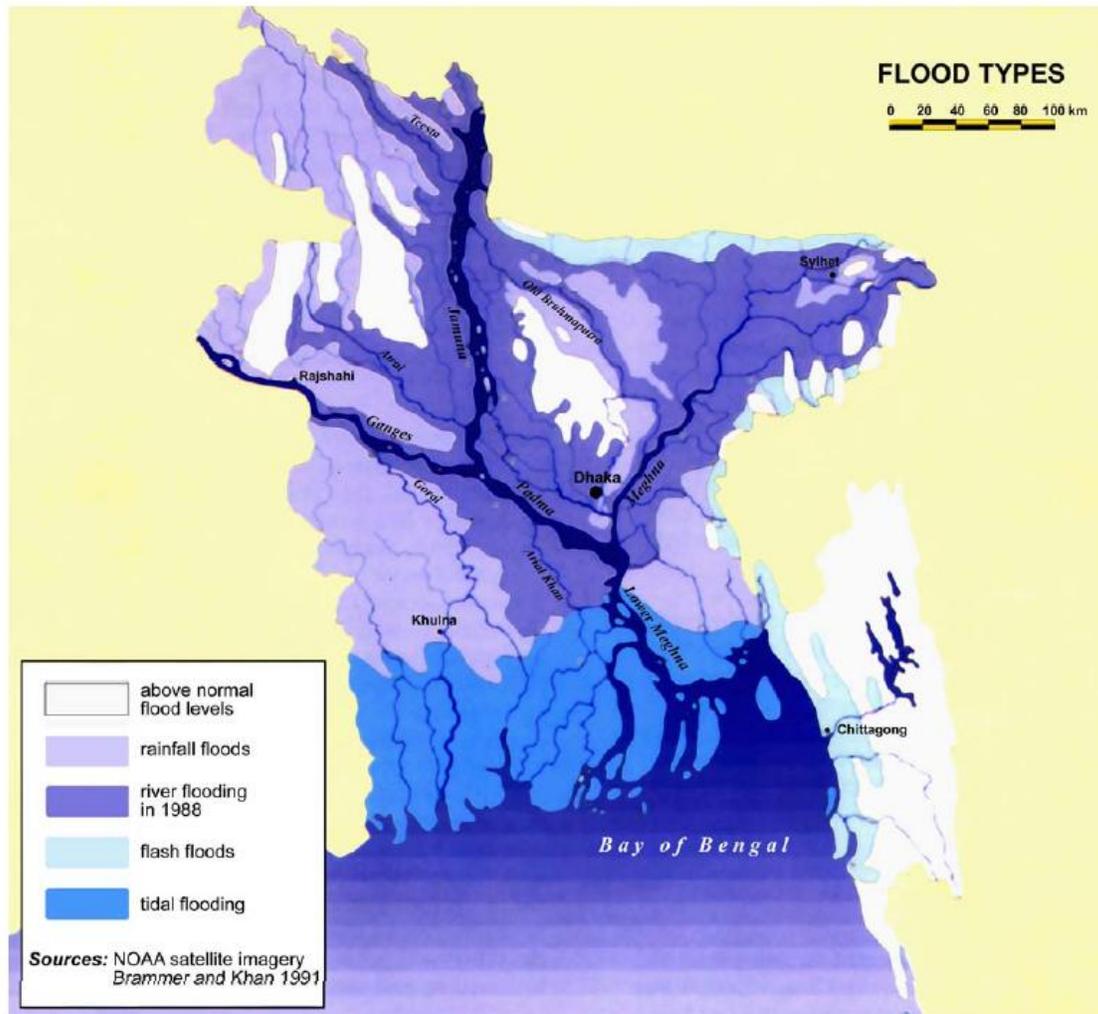
Module 1: Flood risk

Objective of the module:

- To discuss hydrological aspects of different types of floods in Bangladesh
- To discuss the vulnerability of different sectors to floods
- To discuss flood damages that have occurred in recent past
- To discuss expected impact of climate change on flood

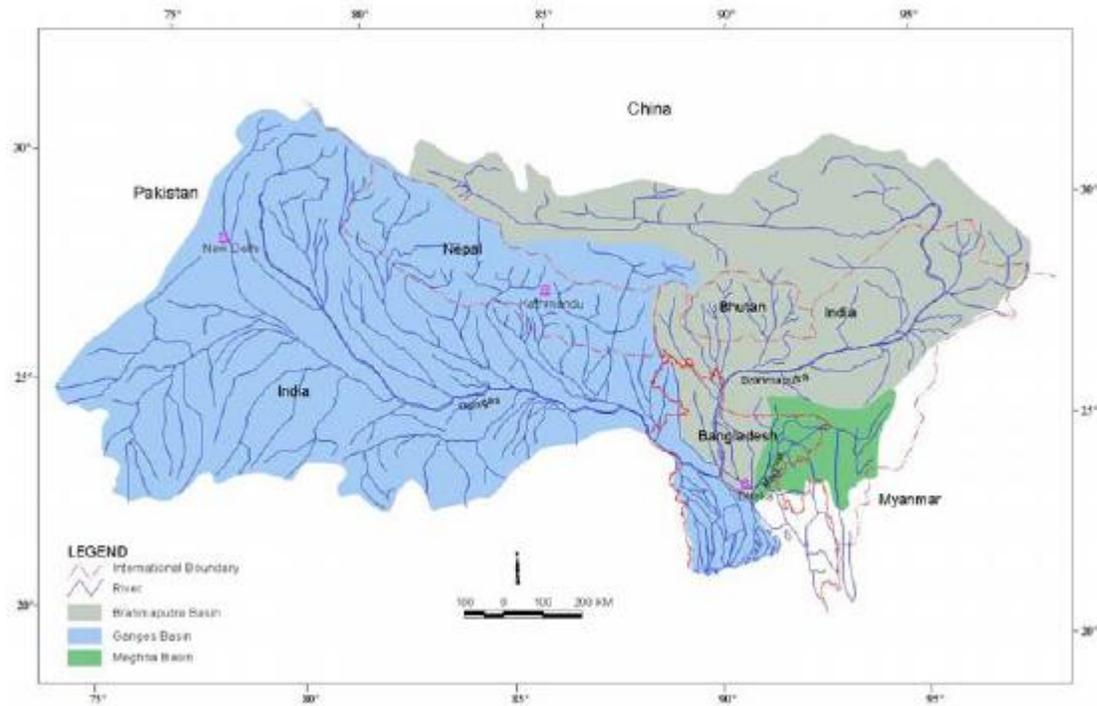
Flood in Bangladesh

- Types
 - Riverine flood
 - Flash flood
 - Rainfall flood
 - Tidal flood



Riverine flood

- Bangladesh is a land of rivers
- It is part of GBM basin
- Flood season starts in June/July and ends in September/October
- Flood peaks gradually and recedes gradually
- Flood arrive in three major rivers at different times
- When they synchronize then severe flood occurs such as in 1998



Flash flood

- Occurs in hilly region
- During April/May
- Flood peaks sharply and recedes quickly
- Damage potential is very high

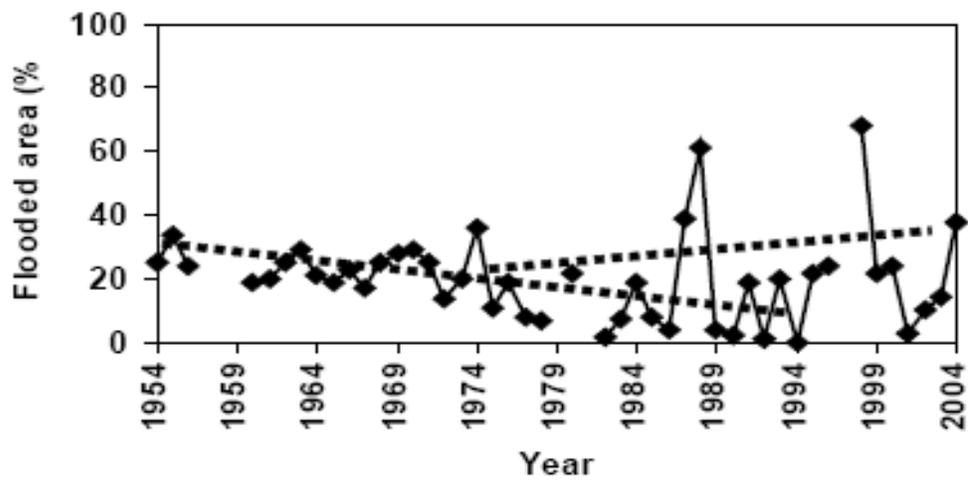
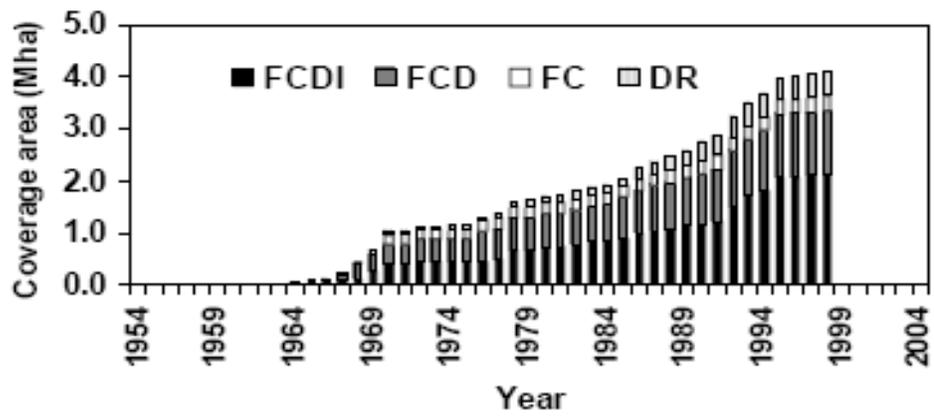
Rainfall flood

- Occurs during monsoon
- When there is heavy rainfall drainage congestion occurs
- Rainfall flood has become very common in recent times
- Roads are causing rainfall flood in the rural area
- Loss of lowlands in urban area are causing drainage congestion in urban area

Tidal flood

- Coastal area is vulnerable to tidal flood
- Flood occurs during high tide
- Salinity is the major problem of tidal flood

History of floods



Damage potential of different floods

Riverine flood causes damage through long duration of flood
It causes undermining of foundations of embankments and households
It also causes water quality problem by mixing sewage in urban area and chemicals in industrial area.

Flash flood causes damage due to high velocity
It causes significant crop damage
It brings lot of debris and causes damage by battering
It damages crop fields by sand carpeting

Tidal flood causes damage to crops through salinity

Rainfall flood causes damage due to sudden high flood.

Benefits of flood

- Soil fertility
- Soil moisture
- Aquatic ecosystem
- Livelihoods (e.g. fishing)
- Social bonding

Vulnerability

Social

- Loss of employment
- Loss of income
- Burden of debt
- Diseases
- Safety of women and children
- Increase in poverty

Agriculture

- Aman
 - Vulnerable to riverine flood and tidal flood
 - Critical time is September/October
- Aus
 - Vulnerable to riverine flood
 - Critical time is June/July
- Boro
 - Vulnerable to flash flood
 - Critical time is April/May
- Vegetables
 - Vulnerable to rainfall flooding
 - Critical time is June/July for summer vegetable and October for winter vegetables

Livestock

- Loss/damage to animal sheds
- Lack of shelter
- Lack of fodder
- Diseases from malnutrition
- Inundation of market facility

Fisheries

- Inundation of ponds/ghers
- Damage to hatcheries/ nurseries

Health

- Damage to water supply and sanitation
- Malnutrition (lack of food, unhealthy cooking)
- Diseases (lack of safe water)
- Damage to health centers

Education

- Damage to buildings due to inundation and its use as shelter
- Damage to furniture
- Loss of school days

Human life

- drowning,
- snake bites,
- electrocution

Human safety

- Safety of the marooned people
- Safety in the shelters

Road

- Damage to pavement due to inundation
- Damage due to wave action
- Damage due to erosion

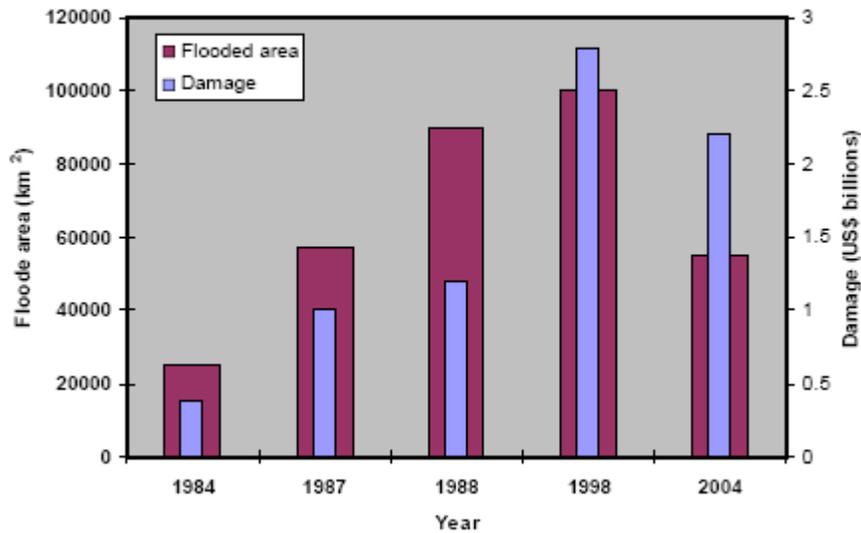
Trade and industry

- Loss/damage to capital machinery
- Production loss/damage
- Damage to raw material
- Loss/damage from cancellation of Orders
- Loss/damage due to late shipment

Power

- Submergence of electric installations/ distribution lines
- Submergence of household meters
- Theft of electrical materials and equipments

Flood damages in recent past



▪ **Extent of damages in different sectors**

Loss	1988	1998	2004
Livestock killed	172,000	26,564	8,318
Deaths	2,300	1,100	747
No. of people affected	45 million	31 million	36 million
Roads damaged *km(13,000	15,927	27,970
No. of homes damaged/destroyed	7.2 million	980,000	4 million

▪ **Trends**

1. Loss of lives and livestock is becoming less indicating improved disaster management
2. Property damage is increasing indicating increasing economic activities

Climate change

- What is climate change
- What are possible impacts
- How it is going to impact flood

Impact of climate change

- climate change
 - Temperature
 - Rainfall
 - Snowmelt
 - Sea level rise
- Impacts
 - Flood
 - Drought
 - Salinity intrusion
 - Cyclone
- Impacts of climate change on flood (due to snowmelt, rainfall, sea level rise)
 - Riverine flood
 - Flash flood
 - Rainfall flood (more frequent)
 - Tidal flood (higher level)

Community Flood Management Training Module 2: Flood Management

1. Module Objectives:

- Discussion on different types of flood management options for different types of floods.
- Analysis of the merits, demerits and appropriateness of different flood management options.
- Description of the roles of flood forecasting and its limitations.

2. Flood Management Infrastructures:

2.1. Embankments

Embankments have been recognized all over the world as one of the effective means of flood protection. It provides quick and visible results to localized areas particularly against moderate floods which come quite frequently. The main objective of embankments is to confine the flow within a designated width and allow safe passage of the flow downstream, ensuring no spillage or flooding up to design flood level. Different types of embankments are constructed for different purposes. Usually for protecting pre monsoon *Boro* crops a special kind of dwarf embankment allowed to be overtopped during the monsoon is usually constructed in flash flood zones in

north-central and north-eastern parts of the country. For protecting lands from salinity and storm surges in coastal and estuarine areas, ring embankment usually known as polders are constructed. Spurs and revetments which are needed for anti-erosion works are used mainly for protecting urban areas and often form part of town protection schemes. Table 2.1 presents an overall scenario of structural measures undertaken in Bangladesh for flood management.

Table 2.1: Structural Measures for Flood Management in Bangladesh

Item	Quantity
Embankment	10,000 km
Drainage channel	3,500 km
Drainage Structure	5,000 km
Dam	1 no.
Barrage	4 nos.
Pump House	100 nos.
River closure	1,250 nos.
River Bank Revetment	468 km
Spur/Groyane	220 nos.

Source: Hossain, A., 2006

2.2. Regulators

Regulators are control structures which are built to regulate the flow of river water. These structures are widely used in irrigation and drainage canals. Regulators offer protection against intrusion of floodwater in protected area. Regulators also offer protection against silt intrusion in the irrigation and drainage canals.

2.3. Pump houses

Pump houses offer important functions to mitigate flood disaster, there are about 100 nos. of pump houses in Bangladesh which have played a vital role in flood mitigation. The pumping system has made significant contribution in alleviation of flood disasters in this area where natural drainage is impossible in flood season due to high water level.

2.4. Shelters

Shelters are normally special buildings which have a greater capability to withstand natural disasters. Different types of structures like cyclone shelters, buildings on high grounds, schools and other educational institution buildings etc. are used as flood shelters. These shelters perform different functions like:

- Provide shelter for flood affected population
- Provide cattle shed facility
- Provide different functions like school, health centre, community centre etc. throughout the year when flood is not present
- Provide storage facility for food, medicine, fuel or fuelwood and other essential goods for emergency needs.

3. Flood Forecasting:

3.1 Existing System

Bangladesh government has established a Flood Forecasting and Warning Center for forecasting of flood events. This centre was established in 1972 and the flood forecasting and warning services were established in a systematic way during the FAP10 Project – *Expansion of Flood Forecasting and Warning Services* and

Consolidation and Strengthening of Flood Forecasting and Warning Services (CSFFWS) Project, financed by Danida 1995-1999 and 2000-2006 respectively.

Forecasting of river water levels in Bangladesh is undertaken by FFWC between June and October each year. This period corresponds to the main monsoon season in the country. Forecasts are issued for 52 stations covering most flood prone areas of the country.

In the pre-monsoon season, typically from April to June, serious flooding can occur due to flash flooding in the northeast region. During this period, a specially developed North East regional flood forecast model is utilized to produce local flood forecasts for this region.

The FFWC flood forecasting system is based around the Flood Watch software product developed by DHI. Flood Watch is based on Arc View GIS, which allows for highly visual map-based displays of flood status and extent. Flood Watch includes a range of functions to ease the tasks of data preparation, modelling and results processing. These include:

- Map based displays of observed and forecast flood levels and rainfall
- Data entry forms and quality assurance
- Plotting of observed and forecast data
- Automated tidal boundary estimation
- Data conversion for model input
- Automation of model simulations and results extraction
- Generation of bulletins of current and forecast flood levels
- Flood inundation mapping
- Thana status mapping

The sequence of operations in the development and dissemination of flood forecasts are:

- a) Data collection and Transmission
- b) Data processing
- c) Generation of flood forecasts
- d) Dissemination of flood forecasts and warnings

3.1.1. Data collection and Transmission

3.1.1.1. BWDB Gauge Data

The real time monitoring system consists of stations in the well-defined hydro-meteorological network set up by Surface Water Hydrology of BWDB and stations set up by the CSFFWS Project. The monitoring at all stations takes place every year from 1 April to 31 October. The monitoring continues in the major rivers during the dry season (November to March).

Water level and rainfall data are collected respectively from 86 and 56 stations. Rainfall is measured by manual readings once every 24 hours at 9.00 AM each morning, whilst water levels are measured typically at 3 hourly intervals, 5 times day, between 6.00 am and 6.00 pm. Water levels at coastal boundary stations are subjected to tidal fluctuations and measurements are obtained at hourly intervals, 24 hours a day.

The measurements are transmitted by either radio or mobile phone to FFWC, who receive all measurements between 9.00-10.00 AM. The data are then processed and entered into the database.

3.1.1.2. Additional Data

Apart from the real time data network within Bangladesh, water level and rainfall data are available through a number of official and unofficial channels (For example, Indian data are available via the Joint Rivers Commission, Indian Meteorological Department etc.).

3.1.1.3. Remote Sensing Data

Satellite image sources include those from SPARRSO and Indian Meteorological Department (IMD). SPARRSO provide Monitoring Network satellite cloud-cover information that is delivered by fax to FFWC daily. IMD publishes on their web site processed images obtained from the Kalpana-1 geo-stationary weather satellite, which complement the images captured by the BWDB equipment. Rainfall radar images are provided by BMD via microwave link to FFWC for each of the country's radar sites at Dhaka, Khepupara, Cox's Bazaar and Rangpur.

3.1.2. Data processing

3.1.2.1. Data Entry and Processing

The gauge measurement data received from BWDB's real time network and other sources are entered into the real time database using the customized data entry forms in Flood Watch. The data are visually checked for consistency using built in tools and corrected if necessary.

3.1.2.2. Boundary Data Estimation

One of the main issues in providing accurate flood forecasts in the development of the necessary boundary data for the forecasting period. In this context boundary data refer to forecast rainfall for the rainfall-runoff models, and forecast water levels and/or flows for the hydraulic model.

3.1.3. Generation of flood forecasts

The flood forecasting model is the core component of the forecasting system. It consists of two separate but closely integrated components: a rainfall-runoff model (MIKE 11 RR) converts observed and forecast rainfall to flows, which then enter the hydraulic (MIKE 11 HD) to produce water levels. The flood forecasting model of FFWC is called "Super Model", which covers major flood prone regions of Bangladesh. The number of locations at which forecasts are issued is 52. The model simulations are automated within Flood Watch, which prepares the necessary data for the model. The forecast simulations cover a period of 10 days (7 days hind cast and 3 days forecast), taking less than 30 minutes to execute.

Once the forecast simulation is complete, a range of post processing tools built into Flood Watch are used to extract and process the results for incorporation into forecast bulletins and web pages.

These tools are semi-automated, requiring limited user intervention. The main post-processing tasks comprise:

3.1.3.1. Bulletins

These comprise tabular summaries of both existing (observed) and forecast conditions for each of the main river systems in the country.

3.1.3.2. Flood Maps

The simulated water levels in the rivers are used together with a digital elevation model (DEM) of the country to compute the expected extent and depth of flood inundation (Figure A1.4). Flood maps are produced by MIKE 11 GIS, a standard flood mapping package for MIKE 11 developed by DHI. Flood map products are also developed for the Greater Dhaka area, Sundarganj Pilot Area and the Dhaka - Mawa Road.

3.1.3.3. Thana Status

A map showing the degree of inundation in each Thana. The Thanas are color coded depending on the expected percentage area of inundation, providing a highly visual "snapshot" of the flooding status on a countrywide.

The DEM currently used in the flood was originally compiled by the FAP 19 project in the 1990's and is based on Survey of Bangladesh (SoB) maps (ISPAN 1995). The

resolution of the DEM is course at 300m, which limits the accuracy and level of detail possible in the resulting flood maps.

3.2. Dissemination

FFWC disseminate flood warning products through a range of different media as shown in Table 3.2. Email and Internet routes have been newly developed in the CSFFWS project, and are taking over somewhat from the traditional methods of hard copy and fax. Both mediums lend themselves to mass distribution of warning messages and hence are very cost effective.

Table 3.2: Flood Warning Product Dissemination Routes

Dissemination Medium	FFWC Product	Recipient Group
Hard Copy (hand delivered), Fax and Email	Bulletins	Prime Minister's Office, government ministries, BWDB officials, government organizations
Fax or Email only	Bulletins	NGO's, embassies, international donor and aid organizations, news media
Internet	Bulletins, plots, flood map, Thana status	General public, international

The web site of FFWC is hosted by a local Internet service provider as **www.ffwc.gov.bd**. The web site is very comprehensive and provides bulletins and plots of water levels and flows using simple "point and click" methods on a map based background. The ability to interact with the site and for example make a comparison of current flood levels against danger levels, highest recorded levels and historical floods is one of the strengths of this dissemination medium.

3.3. Limitation

The limitations of the existing flood early warning system are as follows:

- § Insufficient lead-time;
- § Inadequate maintenance and upgrading of FFWC System;
- § Deficiencies in the accuracy and reliability of forecasts;
- § Limited coverage;
- § Lack of customized data;
- § Flood warnings not understandable;
- § Inadequate coordination and feedback; and
- § Lack of ownership

3.4. Proposed System

Early warning system study (BWDB, 2006) proposes twenty-two interventions for the improvement of the existing early warning system. These interventions are divided into four types of activities. The interventions are:

	Intervention
A. Increase accuracy and timeliness of input data for forecasting	A.1: Upgrading collection and transmission systems for rainfall and water level data
	A.2: Enhancing the existing manual data collection system of BWDB

	A.3: Updating DEM to increase spatial extent of forecasting in flood prone area of Bangladesh
	A.4: Improvement of data exchange mechanism with riparian countries
	A.5: Installing additional Doppler Radar at Moulvi Bazar
B. Improve flood forecasts to meet demands of end-users	B.1: Expanding the flood forecasting system to cover all flood prone areas
	B.2: Preparing detailed flood forecasts at regional and local levels
	B.3: Extending lead times by preparing medium term and long term forecasts
	B.4: Preparing detailed forecasts to assess performance of key infrastructure and agricultural land during floods
	B.5: Preparing flood forecasts for metropolitan cities (Dhaka) and urban areas
	B.6: Implementing forecasting tools for storm surge areas
	B.7: Developing and implementing forecasting tools for flash floods
C. Improve the extent of coverage and the penetration of the early warning system	C.1: Establishing network of key stakeholders to develop system for disseminating flood warnings
	C.2: Developing packages of flood forecasting information in response to needs of different end users
	C.3: Extending existing systems for disseminating flood warnings from national to local levels
	C.4: Developing people-centered flood warning and dissemination
D. Expand coordination between key institutions in early warning system	D.1: Institutional study for the BWDB hydrological services
	D.2: Strengthening of BWDB in forecast Dissemination
	D.3: Strengthening the key institutions involved in the early warning system
	D.4: Enhancing national, regional and international awareness of flood forecasting
	D.5: Develop process to make flood forecasts and warnings useful to infrastructure managers
	D.6: Establishing mechanism for monitoring, evaluation and feedback

4. Institutional Mechanisms:

4.1. Role of the govt. in flood management

4.1.1. Policy

On January 30, 1999 The Ministry of Water Resources of the government of Bangladesh published the National Water Policy (NWPo). It was prepared to guide management of the country's water resources by all the concerned ministries, agencies, departments, and local bodies that are assigned responsibilities for the development, maintenance, and delivery of water and water related services as well as the private users and developers of water resources. In regard of flood

management, flood protection and flood forecasting the policy of the government is described in this Policy. It states, "Through its responsible agencies, the Government will:

- Develop early warning and flood-proofing systems to manage natural disasters like flood and drought
- Designate flood risk zones and take appropriate measures to provide desired levels of protection for life, property, vital infrastructure, agriculture and wetlands. In this regard the following principles will guide future action:
 - i. Regions of economic importance such as metropolitan areas, sea and air ports, and export processing zones will be fully protected against floods as a matter of first priority. Other critical areas such as district and upazila towns, important commercial centers, and places of historical importance will be gradually provided reasonable degree of protection against flood. In the remaining rural areas, with the exception of those already covered by existing flood control infrastructure, the people will be motivated to develop different flood proofing measures such as raising of platform for homesteads, market places, educational institutions, community centers, etc., and adjusting the cropping pattern to suit the flood regime.
 - ii. In future all national and regional highways, railway tracks, and public buildings and facilities will be constructed above the highest ever-recorded level of flood in the country. This principle will also apply in cases of reconstruction of existing structures of this nature.
 - iii. All plans for roads and railways embankment will adequately provide for unimpeded drainage.

4.1.2. Strategy

The NWPo, through its stated goals, lays the foundation for the Development Strategy for the National Water Management Plan (NWMP). This Strategy, agreed by Government as guideline for the Plan, places equal importance on each of the national goals of:

- i. Economic development
- ii. Poverty Alleviation
- iii. Food Security
- iv. Health and Safety
- v. Standard of living
- vi. Environment

According to NWMP, the aims of the plan concerning to flood management are as follows:

- Disaster management involves prevention and mitigation measures, preparedness plans and related warning systems, emergency response measures and post-disaster reconstruction and rehabilitation, and is recognized as a necessary element of overall water management. Whilst some people will always remain at risk, the main aims are to provide the means by which, through a combination of structural and nonstructural measures, adequate warnings are given, people can survive with most of their assets intact, and can rebuild their lives thereafter.
- In towns of economic importance, flood protection will be provided as a priority, and phased implementation of reasonable flood protection facilities will be introduced in Zila and Upazila towns.

4.2. Community participation

Community participation means that the community takes responsibility for all stages of programme, including planning and implementation. Community participation is one of the key ingredients of an empowered community. It is essential for minimizing people's sufferings and damages due to flood. Community involvement can play a major role in awareness generation, information dissemination, flood preparedness evacuation etc. community participation in flood risk management can reduce vulnerabilities and strengthen people's capacity to cope with hazards. Community is the key resource in disaster risk reduction. They are the key actors as well as the primary beneficiaries of disaster risk reduction. Community-based flood risk management can lead to a progressive improvement in public safety and community disaster resilience and should contribute to equitable and sustainable community development in the long term.

In Bangladesh the existing warning systems lacks in several other aspects such as: a) time dimensions (e.g. lead time problem in flood warning), b) not capable enough to penetrate the warning information at local level, c) early warning message is still complex to be interpreted by the local community, specially at rural areas. Community-based Flood Information System (CFIS) project took an initiative to generate the flood forecasting information and dissemination system acceptable and usable to the local community to reduce risks through preparedness.

A relation based flood estimation model named WATSURF has been developed to estimate the water levels in flood plain under CFIS project. In CFIS system GIS/RS based high-tech has been used with the state of art for generating the local level flood information with lead time of 48 hours and disseminate in local language in the form of understandable symbols and units using combination of both information communication technology and local level social institutes at village/household levels.

CFIS has been developed considering a study area located in a regular flood prone zone along the west bank of the Jamuna River covering Daulatpur and Ghior Thana under Manikganj District and part of Nagarpur Thana of Tangail District of North Central zone of Bangladesh. The total study area is 248 square kilometers and lies between 23°50' to 24° 05' latitude and 89°50' to 90°00' longitude. The project area is inundated mainly by the Jamuna River on the west and also by the Dhaleswari River on the east. A small river, the Ghior river, forms part of the southern boundary.

The targeted community was trained to perceive the flood warning messages in local measuring unit 'bighat' (=22cm). With active participation of the local people the message symbols were designed as below:

	<p>The present flood situation is represented by three colors: Green flag – the flood is in normal range, Yellow flag – moderate flood, Red flag – severe flood</p>
	<p>Flood prediction message are represented by two colors and number of flags - 'n' white flag – water level will fall by 'n' number of 'bighat' by next 48 hour - 'n' red flag – water level will rise by 'n' number of 'bighat' by next 48 hour</p>

In addition, colored pillars were installed indicating the flood situation with same representation of colored flags (green, yellow and red). Local people selected several persons at flag sites to receive the predicted flood information and to communicate with the WATSURF team through mobile phone.

The effect of the WATSURF generated flood prediction on the society has been assessed to identify its usability, effectiveness and scope of refinements. The investigations were done through individual and group interviews of the flag operators, gauge readers and the community peoples. It was found that the community could make use of the WATSURF flag message during the flood to save and manage their foods stocks (paddy/rice), households, fisheries, poultries etc effectively.

4.3. Standing orders

4.3.1. Purpose

On August 1999 Disaster Management Bureau, Ministry of Food and Disaster Management of the government of Bangladesh prepared Standing Orders on Disaster. The purposes of the Standing Orders are:

- i. Reduction of loss of lives and properties.
- ii. Alleviation of sufferings of people affected by natural disasters.
- iii. Provide guidelines to different functionaries at the National, Divisional, District, Upazila and Union level government and non-government agencies for actions to be taken at different stages of a disaster e.g. before, during and after the disaster.
- iv. To clearly spell out what is to be done, when and by whom at different stages of the disaster.

4.3.2. Role of different agencies

The Standing Orders on Disaster states that following Council/Committee will be responsible for policy formulation and coordination of Disaster Management at national level.

- National Disaster Management Council (NDMC)
- Inter-Ministerial Disaster Management Coordination Committee (IMDMCC)
- National Disaster Management Advisory Committee (NDMAC)

NDMC headed by the hon'ble Prime Minister, and IMDMCC, chaired by the minister-in-charge of the Ministry of Food and Disaster Management, are to ensure coordination regarding disaster management activities at national level. Coordination at field level is to be carried out by respective district, upazila and union disaster management committees headed by Deputy Commissioner, the UNO and the Chairman of the UP respectively. The institutional arrangement for disaster management is shown in figure 4.1.

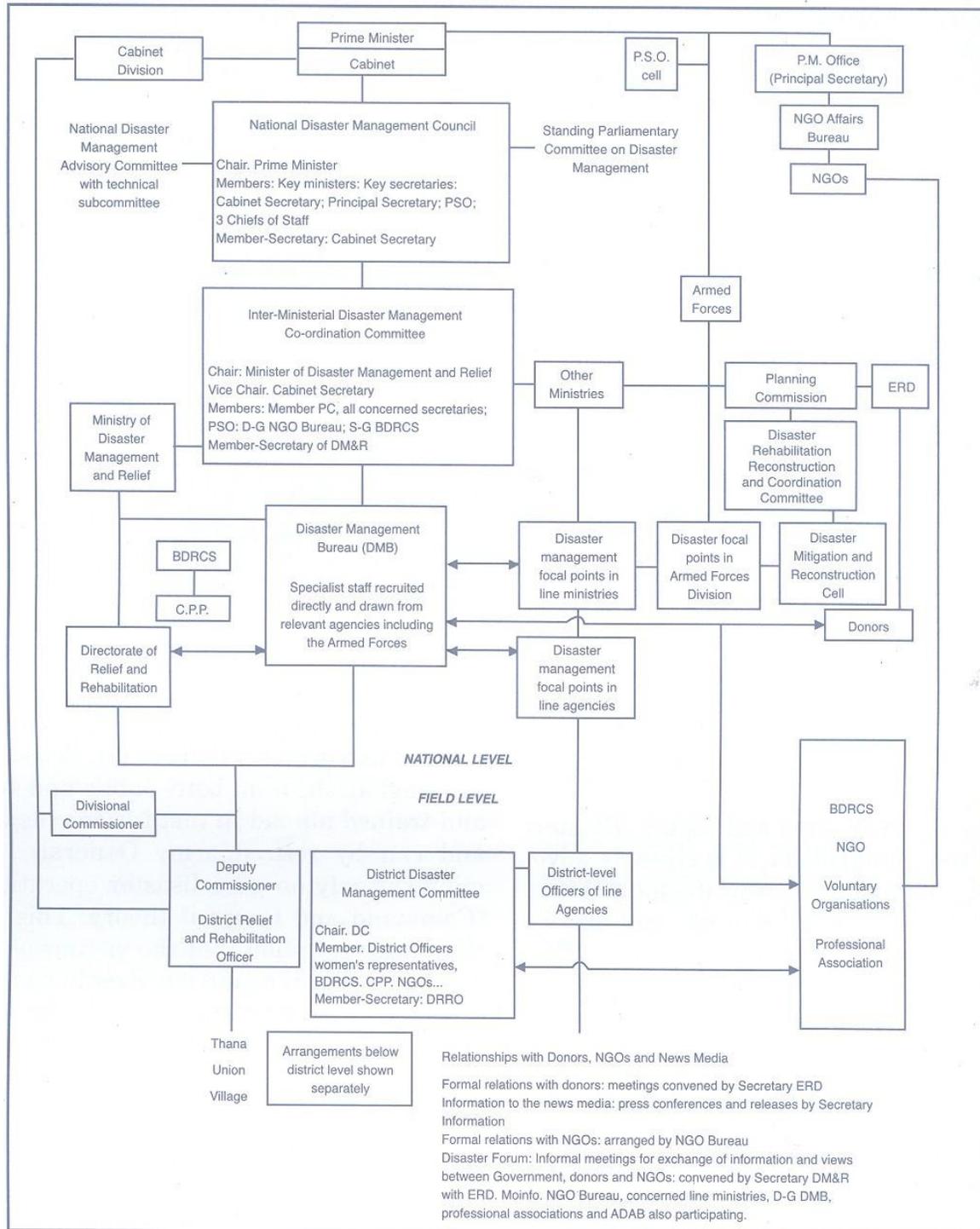


Figure 4.1: Institutional arrangement for disaster management in Bangladesh (Rahman, M.S., 2006)

According to the Standing Orders on Disaster the Ministries of disaster Management and Relief, Water Resources, Information, Health and Family Welfare, Food, Agriculture, Fisheries and Livestock, Civil Aviation and Tourism, Defense, Home Affairs, Communications, Shipping, Housing and Public works, Social Welfare, Local Government Rural Development & Cooperatives, Foreign Affairs, Finance, Industries,

Education, Commerce, Post and Telecommunication, Power Energy and Mineral Resources and Environment and Forests are closely related to disaster management. They have their own action plans and responsibilities regarding disaster management. The standing order also describes the duties of other ministries too. The roles of agencies closely related to flood management are as follows:

4.3.2.1. Disaster Management Bureau

- Advise the government on all matters relating to disaster management.
- Maintain liaison with different government agencies, aid-giving agencies, NGOs and Voluntary Organizations and ensure their maximum cooperation and coordination in all matters of disaster management.
- Undertake various activities for creating awareness among the people, government employees and people of other professions for reducing risks during disaster.
- Prepare guidelines for mitigation of disaster with the assistance of Planning Commission and other agencies for devising steps to reduce disaster risk.
- Assist in the preparation and implementation of framework for Action Plan on disaster management at District, Thana and Union levels.
- Impart training to the government employees, elected representatives and others on disaster management in cooperation with different Ministries, Local authorities, Training Institutions and NGOs.
- Establish an Emergency Operations Centre (EOC) with improved communication facilities at national level and to disseminate inputs/information to government and private agencies.
- Establish and coordinate all activities related to flood forecasting and warning dissemination.
- Keep Emergency Operations Centre (EOC) open on non-stop basis (24 hours).
- Monitor progress of rescue, relief and rehabilitation operations, identify the problems and needs and to draw the attention of the proper authority.
- Assist the Ministry of Disaster Management and Relief for supply of required information to the Economic Relations Division, Ministry of Information, Foreign agencies, NGOs etc.
- Supply information/input to concerned authority for the preparation of rehabilitation plan.
- Ensure adoption of steps for minimising future disaster risks in the rehabilitation plans.

4.3.2.2. Directorate of Relief and Rehabilitation

- Ensure stock, security and maintenance of adequate materials in disaster-prone areas.
- Utilize the materials received under the Food for Works Programme for construction of roads to raised places and shelter places and for tree plantation.
- Open Control Room in the Department and maintain link with the EOC of the Ministry.
- Inform the Ministry about relief preparedness in affected areas
- Send Daily Situation Report to the Ministry
- Ensure quick dispatch of relief materials to affected areas.
- Inform the Ministry about the requirement of relief materials.
- Recommend allocation of relief materials after assessing the requirement by touring the affected areas with intimation to the Ministry.
- Ensure quick supply of house building grants, gratuitous relief and other materials in accordance with the delegation of powers.

- Continue the most essential rehabilitation work.
- Submit the consolidated expenditure accounts to the government.

4.3.2.3. Water Development Board

- Ensure efficient management of Flood Forecasting and Warning Centre and improve procedure for flood forecasts and after necessary revisions inform the appropriate authority.
- Operate "Flood Information Centre" from April to November every year.
- Establish flood information Sub-Centre at field level from April every year.
- Collect, during monsoon period, weather forecasts, water level of all principal rivers originating from different places in Bangladesh and India. The Bangladesh Water Development Board (BWDB) will request the Ministry of Water Resources regarding the receipt of information from India.
- Inform all concerned about weekly flood situation reports.
- Ensure Coordination with Inter-Ministerial Disaster Management Coordination Committee (IMDMCC), Ministry of Disaster Management and Relief and Disaster Management Bureau.
- Appoint guards to locate leakage, breach, holes in embankments and also alert warning centres. Take steps for repairing work on emergency basis by month of April through employment of local people. For this purpose, materials and implements are to be stored at suitable place.
- Keep the officials alert for the security of life, supplies, goods in stock and implements.
- Operate information cell and Flood Control Centre day and night and send a Liaison Officer to the EOC of the Ministry of Disaster Management and Relief.
- Appoint supervisors for frequent visit to affected areas.
- In case of any difficulty in flood disasters or if any matter not possible to solve or if help of the Inter-Ministerial Disaster Management Coordination Committee/National Disaster Management Council is needed, request for intervention by the Ministry of Disaster Management and Relief.
- Take any suitable step in the exigency of circumstances for protection of life and properties.
- Quickly assess the loss and damage and prepare required plans for repair and reconstruction work on priority basis.
- Ensure the restoration of infrastructure, logistics and installations in shortest possible time for domestic, industrial and export use projects. Projects connected with agriculture, fisheries and industrial rehabilitation will be given top priority.
- Render assistance and cooperation in the rehabilitation programme of Civil administration and other agencies.

4.3.2.4. Bangladesh Betar

- On government orders Bangladesh Betar would, specially at the stage of pre-disaster period, alert the people and motivate them and inform them about the disaster position and their duties in this respect.

4.3.2.5. Bangladesh Television

- Establish contact with Meteorological Department and ensure proper functioning of telephone and teleprinter. To prevent possible disconnection, arrange, if necessary, non-exchange Magneto telephone line of T&T Board. Arrange fax communication (email) with Meteorological Department and Disaster Management Bureau at all times.

- Telecast special programmes as authorised by the Meteorological Department and the Ministry of Disaster Management and Relief for information and action of the public.
- Telecast special precautionary signals of the Meteorological Department along with their meanings.
- Bangladesh Television must telecast on receipt of warning signal No. 4 along with explanation given by Meteorological Department every one hour and continue such telecast if advised by the Ministry of Disaster Management and Relief without any interval even after normal broadcasting hours. As soon as signal No. 3 is hoisted, Bangladesh Television will establish contact with the Ministry of Disaster Management and Relief on full time basis for non-stop broadcast beyond normal broadcasting time.
- Dhaka Television shall telecast all announcements issued by the Ministry of Disaster Management and Relief and the Meteorological Department
- Announce instruction relating to precautionary measures issued by the Ministry of Disaster Management and Relief and the Meteorological Department.
- Telecast programmes to keep the morale of the affected people high
- Telecast short and long term programmes regarding rehabilitation

4.3.2.6. Mass Communication Department

- To increase public awareness about disaster by publicising the following through video, cinema, films, slides, booklets etc.
- Take technical advice on the above subjects from the Disaster Management Bureau.
- Keep the people of the disaster prone areas informed through different publicity media about their duties at these stages.
- At this stage conduct publicity work in affected area with a view to keeping mental spirit of the people high and bringing normalcy to life. Specially advise people in respect of epidemic, self reliance in reconstruction work, general security, agricultural rehabilitation etc.

4.3.2.7. Directorate of Health

- Prepare medical team; arrange supply of medicine and other emergency goods.
- Operate the Control Room round the clock (24 hrs).
- Arrange immediate primary health and medical care to affected people and if required send Medical Team(s).
- Arrange to evacuate the patients and injured persons to cyclone shelter/hospital and assist the work.
- Supply water purification tablet, bleaching powder etc and strictly comply with the rules of health care and health services at cyclone shelters and ensure supply of pure drinking water.
- Examine all supply source of drinking water and ensure arrangements for protection from pollution and necessary prevention measures.
- Remain always alert in respect of outbreaks of occurrence of epidemic and take effective measures against the spread of diseases.
- Continue arrangements for preventive steps against cholera and typhoid till completion of vaccination programme in the affected areas.

4.3.2.8. Armed Forces Division

- Maintain a full-time liaison with the EOC of the Ministry of Disaster Management and Relief.
- Ensure appropriate preparedness planning of the three services in respect of the security of the people, establishment, equipment, installation materials and transport in the cyclone/flood prone areas before the cyclone/flood season starts.
- Coordinate between the Ministry of Disaster Management and Relief and the three services where necessary regarding the deployment the Armed Forces in aid of civil authorities on the basis of requisition and request from the Ministry of Disaster Management and Relief to cope up with disasters.
- Keep the appropriate units of Army, Navy and Air force in readiness for conducting rescue, evacuation and relief operations as per requisition.
- On the basis of requisition, deploy the Armed Forces on the approval of the Prime Minister for disaster response, relief and rehabilitation work in aid to the civil power.
- Collect information on the rescue, relief and rehabilitation work of the three services and dispatch it regularly to the coordination cell of the Prime Minister's Secretariat and the Inter-Ministerial Disaster Management Co-ordination Committee and Ministry of Disaster Management and Relief.
- Analyze the activities of the three services and assess the benefits, problems and difficulties.

4.3.2.9. Meteorological Department

- Keep ever careful watch over weather conditions, and ensure improvement of cyclone forecast procedures and supply of information on regular basis.
- Ensure full time effectiveness of the quickest channel of communication for disseminating weather warnings to all concerned. Fax arrangement must be established between SWC of Meteorological Department and Radio, Television and the Ministry of Disaster Management and Relief.
- Issue as soon as possible the alert warning signals of cyclone, at least 36 hours ahead of formation of depression in the Bay of Bengal.
- Supply information through Fax/telephone/teleprinter to Cyclone Preparedness Programme (CPP) about the formation of depression in Bay of Bengal so as to allow CPP to take appropriate actions including dissemination of information to all concerned.
- Send Special Weather Bulletins to EOC at the Ministry of Disaster Management and Relief, the Directorate of Relief and Rehabilitation, the Cyclone Preparedness Programme and Bangladesh Red Crescent Society for undertaking adequate arrangements.
- Publicise warning signals at each of the following specified stages.

(a) Warning	24 hours before
(b) Danger	At least 18 hours before
(c) Great Danger	At least 10 hours before
- The same warning signals are to be repeated to the EOC at the Ministry of Disaster Management and Relief, Control Room of the Disaster Management Bureau, the Directorate of Relief and Rehabilitation, the Cyclone Preparedness Programme and the Bangladesh Red Crescent Society.

4.4. Flood management committees

According to Standing Orders on Disaster (DMB, 1999) the flood management committees should be constituted at Union, Thana District, City Corporation and Pourasava levels. The composition and mandate of these committees are as follows:

4.4.1. Union Disaster Management Committee

4.4.1.1. Composition

i. Chairman, Union Parishad	Chairman
ii. Members, Union Parishad	Member
iii. Teachers Representative	Member
iv. Government Employee at Union level	Member
v. Women Representative	Member
vi. Cyclone Preparedness Programme(CPP) Representative	Member
vii. Bangladesh Red Crescent Society's Representative	Member
viii. NGO's Representative	Member
ix. Union Parishad Secretary	Member-Secretary

In the light of local situation and special circumstances, the Chairman of the Committee can co-opt more members.

The committee will meet once in every two months. During disaster the Committee will meet once daily, and after some improvement in situation, twice in every week.

4.4.1.2. Mandate

Normal Times

- i. Arrange training and workshops on regular basis on disaster issues and keep the Disaster Management Bureau informed.
- ii. Prepare a Disaster Action Plan with a view to enabling local people, Union authority and local organization to take up security arrangement in the perspective of imminent danger related warnings or occurrence of disaster.
- iii. Take steps for quickest and effective publicity of forecasts/warnings relating to cyclone and floods and also inform people about their responsibilities of saving their lives and properties from disaster.
- iv. Determine specific safe centre/shelter where the population of certain areas will go at the time of need and assign responsibilities to different persons for various services at the shelter/centre.
- v. Arrangement for rehearsals or drills on the dissemination of warning signals/forecasts, evacuation, rescue and primary relief operations.

During Disaster

- i. Organize emergency rescue work by using locally available facilities in times of need and if directed assist others in rescue work.
- ii. Collect statistics of loss incurred in disaster in the light of guidelines of Disaster Management Bureau and Thana Authority and send the same to TDMC/Thana authority.
- iii. Take steps for distribution of articles for rehabilitation received locally or from Relief and Rehabilitation Directorate and any other source following the guidelines from Disaster Management Bureau and TDMC/Thana authority.

4.4.2. Thana Disaster Management Committee

4.4.2.1. Composition

i. Thana Nirbahi Officer	Chairman
ii. Chairman of Union Parishad	Member
iii. Officials of concerned department of Thana level	Member
iv. Women's Representative	Member
v. Representative of Thana central Cooperative Society	Member
vi. Representative of Cyclone Preparedness Programmes (CPP)	Member

- | | |
|--------------------------------------------------------|------------------|
| vii. Representative of Bangladesh Red Crescent Society | Member |
| viii. Representatives of NGOs | Member |
| ix. Thana Project Implementation Officer | Member Secretary |

The local members of Parliament will be Advisers to the Committee.

The Chairman of the Committee may co-opt any other member, if necessary, in the light of local situation and special conditions.

This Committee will sit in a meeting once in every two months. During disaster, meeting will be held once daily and after some improvement in the situation twice in every week.

4.4.2.2. *Mandate*

Normal Times

- i. To ensure increased alertness, disaster risk reduction and informing about ways of sure and effective survival.
- ii. To arrange training and workshop on disaster related issues regularly by keeping the Disaster Management Bureau informed.
- iii. To prepare a Disaster Action Plan in the light of warning signals for impending disaster including the issues below keeping in view whether Thana authority and local organizations are prepared to meet the disaster effectively and efficiently
- iv. To hold mobilization drills in cooperation with district and Union authority for intermittent publicity of information and warning signal/forecasts and of matters related to evacuation, rescue and primary relief operations in the interior of the Thana.
- v. To raise public awareness at village level by wide publicity of disaster forecasts.

During Disaster

- i. To operate emergency operation centre (Information Centre and Control Room) for coordination of activities related to evacuation, rescue and relief at Thana level.
- ii. To prepare plans carefully for rehabilitation work at local level including possible arrangements for risk minimization.
- iii. To allocate and distribute relief on the basis of actual needs.
- iv. To supervise the distribution work of relief and rehabilitation and to maintain its accounts and send the same to district authority and other relief donors.
- v. To be responsible for coordination among different offices at Thana level.

4.4.3. **District Disaster Management Committee**

4.4.3.1. *Composition:*

- | | |
|---------------------------------------------------------------|------------------|
| i. Deputy Commissioner | Chairman |
| ii. Officials of Concerned Department at District level | Member |
| iii. District Executive Officers | Member |
| iv. Women's Representative | Member |
| v. District Representative of Bangladesh Red Crescent Society | Member |
| vi. Representative of Cyclone Preparedness Programmes (CPP) | Member |
| vii. NGO's Representative | Member |
| viii. District Relief & Rehabilitation Officer | Member-Secretary |
| ix. Representative of Armed Forces (During disaster time) | Member |

All the MPs of the District will be advisers to the Committee.

The chairman of the Committee can co-opt more members in the light of the local situation and special circumstances.

The Committee will meet at least four times a year. During the disaster period, meetings should be held once daily and after some improvement of situation, at least twice a week.

4.4.3.2. *Mandate*

Normal Times

- i. To ensure that the risk factor of disaster and the possibilities of reduction of risks have been fully considered while preparing and implementing development programmes at District level.
- ii. To disseminate forecasts and warnings of disaster and to make the people conscious about them.
- iii. To prepare a District Disaster Action Plan including the following issues with a view to keep the District authority and local organizations well prepared so as to meet the disaster effectively and efficiently in the light of warning signals about imminent disaster and the occurrence of disaster

During Disaster

- i. To operate Emergency Operations Centre (Information Centre and Control Room) for maintaining coordination of activities at all places in the interior of the district in respect of evacuation, rescue, relief and primary rehabilitation work.
- ii. If necessary, to operate rescue work with the facilities locally available and to coordinate mobilization of rescue teams for rescue operations in severely affected Thanas.
- iii. To collect, verify and supply statistics relating to loss according to instructions issued by Disaster Management Bureau and other national authorities.
- iv. To prepare plans for rehabilitation work carefully based on priority measures for risk reduction at District level.
- v. To allocate and distribute relief to thanas on realistic basis according to necessity.
- vi. To supervise distribution of relief and rehabilitation activities and maintain their account and send the same to national authority and other relief donor organizations.

4.4.4. City Corporation Disaster Management Committee

4.4.4.1. *Composition*

- | | |
|-----------------------------------------------------------------------------|----------|
| i. Mayor, City Corporation | Chairman |
| ii. Chief Executive Officer, City Corporation | Member |
| iii. Concerned Deputy Commissioner | Member |
| iv. Concerned Superintendent of Police | Member |
| v. Health Officer of the City Corporation concerned | Member |
| vi. Representative of Director General, Health Directorate | Member |
| vii. Representative of Director general, Agriculture Extension Department | Member |
| viii. Representative of Chief Engineer, LGED | Member |
| ix. Representative of Chief Engineer, Public Health Engineering Directorate | Member |

x.	Chairman/MD, WASA (concerned)	Member
xi.	Representative of Water development Board	Member
xii.	Representative of concerned Electricity Authority	Member
xiii.	Representative of T&T Board	Member
xiv.	One NGO representative nominated by ADAB	Member
xv.	War Commissioners	Member
xvi.	Secretary, City Corporation	Member Secretary

The Hon'ble members of the Parliament of the City Corporation area will be the Advisers in the Committee. The Chairman of the Committee may co-opt more members in consideration of local situation and special conditions.

The Committee shall meet at least 4 times a year. But during disaster the Chairman shall hold the meeting whenever he finds it necessary.

4.4.4.2. *Mandate*

During normal time

- i. To ensure very speedy dissemination of flood forecast to all officers, concerned persons/organizations and other persons having the responsibility about it in the City area.
- ii. To determine safe centres and shelter places and distribute responsibility to different persons for rendering different services in those places.
- iii. To arrange for holding mobilization drill from time to time for disseminating warning signals/forecasts, evacuation, rescue and primary relief operations in co-operation with the Disaster Management Bureau.

During Disaster

- i. To operate emergency operations centre (Information centre and control room) for assisting co-ordination of activities relating to evacuation, rescue, relief and primary rehabilitation in all places of the city area. If necessary, to conduct rescue operations by using locally available resources and also co-ordinate overall activities including sending of reserve teams to highly affected areas for conducting rescue operations.
- ii. To collect data regarding the damages of disaster in pursuance to the directives of Disaster Management Bureau and other National authorities and also dispatching it to appropriate authorities including the Ministry of Disaster Management and Relief.
- iii. To formulate plans on priority basis and arrange for distribution of the resources received from the Ministry, district or any other authority objectively. To maintain the accounts relating to the materials concerning relief and rehabilitation and dispatching it to the relief-giving authority.

4.4.5. Poursava Disaster Management Committee

4.4.5.1. *Composition*

i.	Chairman, Poursava	Chairman
ii.	All Commissioners of the Poursava	Member
iii.	Medical Officer/Sanitary Inspector of the Poursava	Member
iv.	Executive/Assistant Engineer of Poursava	Member
v.	The officer of the Agriculture Department posted in the Poursava area	Member
vi.	The officer of the Family Planning Department posted in the Poursava area	Member
vii.	The BRDB officer posted in the Poursava area	Member
viii.	Two members of local elites of the Poursava	Member
ix.	Representative of all NGOs at work in the relevant	Member

Pourasava

- x. Representative of District Civil Surgeon Member
- xi. Chief Executive Officer Member-Secretary

(If there is a Chief Executives Officer, the Secretary of Pourasava will be a member)

The concerned Hon'ble member(s) of the Parliament will be the Adviser(s) in the Committee. The Committee shall meet bimonthly. During disaster the committee shall meet every day, and when the situation will improve to some extent, it will meet twice a week.

4.4.5.2. *Mandate*

During normal time

- i. To ensure that the local people are aware about adopting Action Plan regarding the reduction of disaster risk individually or collectively, and also to ensure wide publicity of the means of reducing disaster risk and saving life at the community level.
- ii. To arrange regular training programmes and workshops relating to disaster by keeping the Disaster Management Bureau informed.
- iii. To prepare Disaster Action Plan for taking security measures by the local people, Pourasava authority and local agencies in case of warning signals for any impending disaster or for disaster response including the following measures to take:
- iv. To arrange speedy and effective dissemination of forecasts relating to cyclone and flood and inform the people about their duty to save their life and property at such stage.
- v. To ensure supply of water from some pre-determined places to safe centres/shelter places with the assistance of District/Thana authorities and to give other necessary services.
- vi. To prepare Contingency Plan including local action for local rescue operations, primary relief work, re-establishing communication with the District/Thana headquarters and rehabilitation of seriously affected families.

During Disaster

- i. To conduct if necessary, primary rescue operations by using locally available facilities and if directed, cooperating with others in rescue operations.
- ii. To collect data about the damages of disasters in the light of the guidelines given by the Disaster Management Bureau and District/Thana authorities and dispatching it to District/Thana authorities.
- iii. To arrange for distribution of rehabilitation materials collected locally or received from any other source including Relief and Rehabilitation Directorate in the light of the guidelines given by the Disaster Management Bureau and District/Thana authorities, and
- iv. To dispatch accounts of the distribution of the resources so received to District/Thana authorities or donor agencies.

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Community Flood Management Training

Module 3: Role of Flood Management Committee

1.0 Objective of the module

- To discuss the expected roles of FMCs at different phases of flood preparedness
- To discuss different tasks that need to be performed
- To discuss few important flood management instruments in details (first aid, flood fighting, evacuation, hand pump cleaning etc.)

2.0 Role before flood season (Normal Time)

2.1 Flood Emergency Response Planning

- Awareness build up for adopting Disaster Action Plan
- Collection of required information on past flood events and related damages
- Collection of required information on preparedness, forecasting and warning, before, during and after the floods.
- Review of past flood relief activities by FMC
- Preparation of Disaster Action Plan
- Discussion on past unprecedented flood in the pourasava and its impact.
- Construction of a permanent structure where indicative mark of unprecedented floodwater height would be drawn
- Preparation of Infrastructure Map in a map of pourasava
- Preparation of Map indicating distress and danger prone points (flood intrusion points)

- Updating of flood risk map after each monsoon season
- Listing of organizations (GOs, NGOs) available for local support
- Identification of all evacuation centres
- Identification of severely affected roads and other structures in the last flood
- Identification of severely suffered water logging areas and most risky populated areas.
- Identification of storm drainage path and related structure upon it
- Identification of big rivers with hard water structures around Pourasava
- Identification of floodwater path around Pourasava and its influence

2.2 Assessment of flood fighting capacity

- Review of advance actions taken by FMC for dealing with flood problem
- Review of organizational structure of FMC and status of control room activities under FMC
- Review of preparatory measures like training to individuals, allocation of duties, contingency planning and setting out flood drill, undertaken by Control Room before flood season starts
- Checking of all equipment required in control room so that they are in good working condition and ready for all flood times
- Assess the capacity of control room in issuing flood warning to the people
- Review of the repair of breaches in rivers, rivulets, canals, bridges and roads 2-3 months in advance.
- Deflecting flow from one to other direction
- Isolating water wells
- Provision stores, health centres and other structures from being flooded away
- Adequate provision of required materials for flood fighting activities at convenient places
- Based primarily on the experience of the previous flood, MFC would first assess the need of materials like sand bags, stones, gabion wares, etc. for flood fighting

2.3 Liaison with GO/NGO

- Efforts to bring GO/NGO to table for carrying out concerted flood management activities
- To contact pro-poor GO/NGO for better coordinated efforts to fight floods
- To contact pro-poor GO/NGO for bringing external support

3.0 Roles in preparation for incoming flood

3.1 Awareness

- Orientation-cum-training programme
- Interaction with experts through invitation
- Arrange regular meetings for enhancement of flood fighting awareness

3.2 Disseminate flood warning

- Use of print/electronic media, posters, pamphlets, street plays and other materials
- Translation of floodwater warnings in local language and warn people
- Details of arrangements for disseminating flood warning to all concerned officials, to the population in the risk areas, and to the manager/officials of important organizations.

- Preparation of list of people to be responsible for disseminating flood warning messages
- Method of reaching the warning message to concerned people and alternative arrangement if problems arise in reaching warning/warning message

3.3 Stocking of essentials

- Storage arrangement: Location, size/capacity and ownership
- Stock of food department: Normal stock of LSD from time to time
- POL Location, ownership, and normal stock of petrol and diesel
- Private traders' names, address, and normal stock of important utensils for daily use, kerosene, etc.
- Transport arrangement: Number of trucks and water transports in Poursava, transportation capacity, and ownership, and the means of to organize them in times of emergency

3.4 Preparing shelter spaces

- Specific shelter spaces if possible multi purpose will be determined by Poursava FMC at higher land or safe spaces
- Responsibilities will be assigned to different persons for various services at the shelters
- Number of shelters will depend on the extent of flooding
- In case there are public buildings like schools on uplands, they may be used for temporary shelter and should have a separate room for storage of essential items

3.5 Ensuring water supply at shelters

- Ensurance of water supply to shelter spaces by filling cans, or receive NGO support for safe water supply
- Arrangements of other necessary services to shelter spaces through Poursava FMC in cooperation with union and thana level FMCs

3.6 Preparing for medical emergencies

- Ensure whether all children in the flood prone area are vaccinated/inoculated against disease
- Ensure whether all children between the age of 3 and 6 years and pregnant women have been administered vitamin A capsule in the past three months
- Ensure sufficient stock of oresaline, water purification tablet or alum with trained persons for use

4. Roles during flood

4.1 Evacuation to shelters

- Evacuation will be started when flood water level height will cross the danger level predetermined earlier
- Women, babies, and infirm people will have first preference for evacuation. The family will decide who will be evacuated at the last moment to guard household belongings
- Decide what articles in small quantity should accompany at the time of evacuation
- Identify the mode of transport to be used for shifting to shelter spaces
- Registration of volunteers engaged in operation of evacuation

4.2 Ensuring safety for evacuees

- One superintendent for supervising of every shelter will be employed for ensuring safety of the evacuees, who will be responsible:
 - To arrange for keeping the assets of people and livestock,
 - To keep separate arrangement for babies, women, and older in the shelter
 - To ensure keeping tube-well in working condition
 - To ensure required number of latrines and to keep them fit for use
 - If the shelters are to be kept under lock and key during normal times, then one key should be kept with the superintendent and the other with any responsible person
 - If advised to evacuate, to do so immediately. Evacuation is much simpler and safer before floodwaters become too deep for ordinary vehicles to drive through.
 - To listen to a batter-operated radio for evacuation instructions.
 - To follow recommended evacuation routes--shortcuts may be blocked.
 - To leave early enough to avoid being marooned by flooded roads.

4.3 Arranging food and medicines for evacuees

- Stock of dry food: Every family would be encouraged to stock dry food during flood seasons. At times of flood, they will carry a part of their food in the shelters and keep the rest under earth
- Packet ore saline, water purification tablets, first aid medicaments, keeping carbolic acid in open bottle at a safe place to be kept, etc.

4.4 Coordinating with other committees and govt. officials

- From Emergency Operation Centre (Information Centre and Control Room) coordination of activities will be maintained at all places in the interior of the district and accordingly with concerned persons
- Continuous coordination with other committees and govt. officials will be maintained during rescue work, plans for evacuation, supplying of relief, allocation and distribution of materials under relief and rehabilitation activities and maintain account and send the same to national authority and other relief donor organizations
- To perform overall coordination among various departments at district level

5.0 Roles after flood

5.1 Ensuring safe return of evacuees

- To ensure safe return of evacuees, FMC with proper supporting agencies will focus on restoration of health care and maintenance of hygiene and sanitation
- Ensure people in need of food
- Restoration of communication
- Preparation of restoration plan
- Supply of potable water and monitoring of its availability
- Mobilizing health personnel
- Mobilizing people to clear the drainage for fast drain out of flood water

5.2 Monitoring diarrhoeal situation and taking necessary steps

- Local youth and women will be trained as paramedical persons for handling diarrhoea, hepatitis-A, typhoid, cholera, and other common ailments afflicting human beings
- Arrangements for vaccines for endemic diseases
- Arrangements of ore saline for fighting diarrhoeal situation

5.3 Arranging relief for returnees

- Preparation of a list of families which will require relief after disaster. The most deserved families such as women as head of family and unemployed and landless family etc. will be included. The limited quantity of relief that will be received after floods will be distributed amongst the people requiring them.
- A place will be selected for receipt and storage of relief materials
- Identification of several distribution points of relief materials and will be noted in the registrar
- Selection of one person from poor people for coordinating distribution work of relief materials
- To allocate and distribute to Thanas the materials, received from local source or Relief Directorate/any other source on realistic basis according to necessity as per directives issued from Disaster Management Bureau and District authority

5.4 Cleaning up the town

- Cleaning up activities will be carried out in drainage khals, canals, water bodies to remove accumulated garbage
- Garbage locked around structures (bridge, sluices, regulators, pipes, in canal junctions will be carried out
- Ponds, low lying areas where mosquitoes may grow will be cleaned
- Selection of people responsible for removing the obstacles on roads especially the link road from Poursava
- Selection of people responsible for disposal of carcasses and burial of human dead bodies. Identification of burial /funeral rites will be done

5.5 Assist in damage assessment

- Poursava FMC will assist in undertaking systematic assessment of flood damages, work out their monetary value at prices prevailing in the locality and identify flood victims eligible for relief
- Formation of a team for assessment of primary loss/damage and requirement
- A few educated people may be given training on damage assessment and preparation of list of beneficiaries

5.6 Arranging rehabilitation of damaged infrastructures

- Community can help in restoration of houses, sanitation facilities in each household, water supply facilities at community level, commuter roads, bridges/culvert/electric connections etc.
- FMC will repair breached embankments, and reestablish a sense of security as soon as possible
- Make community based efforts to restore road networks by reviving the washed off rural roads, and reestablishing culverts/bridges
- Repair, in a participatory manner, partially or fully destroyed local educational institutions (schools, madrasas, colleges, etc.)
- Reconstruct, if needed, local markets and community centres

- Reestablish telecommunication network
- FMC, if necessary, may approach higher authority for supply construction materials
- The services of local youths will be utilized

6. Roles in long term planning for flood

- Long term spatial planning as policy instrument for non-structural measures for flood
- To reduce vulnerability in flood-prone areas by controlling developments on floodplains
- Providing development possibilities in non-hazardous areas

6.1 Enhancing coping capacity:

- Enhancing coping capacity requires planning, participatory operationalization, monitoring, and continuous evaluation of overall implementation of related activities
- Construction of multipurpose flood shelters
- Assessment and enhancement of adaptive capacity of both social and physical systems, so that these systems may cope better with flood vulnerability.
- Guidelines on a range of important activities, including the development of adaptive capacity for priority groups, the development of adaptive capacity indicators, and identification and assessment of key adaptation options with flood.
- Dissemination of Flood Forecasting and Warning System effectively on participatory mode

6.2 Flood proofing of infrastructures

- Construction of new buildings, land use to be in areas which are not in high risk of flooding
- In lower risk areas, development needs to be of a design and with an appropriate level of protection to ensure that the risk of damage from flooding is minimized.
- To protect public safety and property from the risk of flooding and to reduce the requirement for flood defences and flood damage remediation.
- Any development within a flood risk area should not impede water flows or exacerbate flood risk elsewhere.
- To pursue local media on raising flood awareness providing important information to the community with following activities:
 - Publish a special section in the local newspaper with emergency information on floods,
 - Periodically inform the community of local public warning systems, etc.

6.3 Keeping account of lessons learned

- The flood situation may be better managed if the past lessons are kept and taken into account during the incoming flood.
- FMC will in coordination with different institutions collect required information on preparedness, forecasting and warning, crop management, before, during and after floods.
- FMC will keep record of all flood events and the associated damages caused, together with the activities conducted by FMC in response to the flood.

- The records will be in writing and remain in safe-keeping.

6.4 **Mapping – resources and services**

- Mapping of resources and services is necessary to cope with disaster of flood
- Mapping of resources such as important administrative buildings, industrial units, historical important places, high land, embankment, high bridges, flood shelters, hospitals, educational institutions, cultivable land, forests, grazing land and villages, etc. would be done by FMC.
- A detailed inventory of services of the mentioned structures will be done. The resource and service map is instrumental to assess the risk and vulnerability involved in a community as well as for the mitigation planning.
- The flood risk map will be updated by FMC annually after each flood event.
- The list of organizations available locally for support and their address will be updated periodically.

7.0 **Few Flood Management Instruments (first aid, preparation for basic services, flood fighting, evacuation, installation of hand pump & cleaning up in case of contamination with floodwater, etc.)**

7.1 **First Aid**

Flood is a disaster and accompanies many sufferings. The people are to take first hand helping kits to save them from those befalling events like **Cuts, Scrapes** and **Puncture wounds, Snake bites**, etc.

Followings are some measures to be taken as first aid:

- The most important first step is to thoroughly clean the wound with soap and water.
- To remove any foreign material, such as dirt or bits of grass.
- The area should then be kept clean and dry that is required to care for most wounds.
- Putting alcohol, hydrogen peroxide, and iodine into a wound can delay healing and should be avoided.
- To seek medical care early if need stitches. Any delay can increase the rate of wound infection.
- Any redness, swelling, increased pain, or pus draining from the wound may indicate an infection that requires professional care.
- Covering the area with a bandage (such as gauze or a band-aid) helps prevent infection and dirt from getting in the wound.
- People who have diabetes, other long-term illnesses should be seen by a health care professional.
- Any cut that goes beyond the top layer of skin should be seen by a health care professional.
- Generally, the sooner sutures are put in, the lower the risk of infection.
- Therefore, any cut that might need suturing should be seen as soon as possible.

7.1.1 **First Aid Kit**

Assemble a first aid kit for home. A First Aid Kit should, at least, include:

- Sterile adhesive bandages in assorted sizes
- 2-inch sterile gauze pads (4-6)
- 4-inch sterile gauze pads (4-6)
- Adhesive tape
- Triangular bandages (3)
- 2-inch sterile roller bandages (3 rolls)
- 3-inch sterile roller bandages (3 rolls)
- Scissors
- Needle
- Antiseptic
- Thermometer
- Cleansing agent/soap

7.1.2 To Review the First Aid Kit

- To review the checklists.
- To gather the supplies those are listed.
- A family may be confined at home at any time.
- To place the supplies for an evacuation in an easy- to-carry container.
- It is to be remembered that disaster may happen anytime and anywhere. And when disaster strikes, you may not have much time to respond.

7.2 To make the "Emergency Preparedness Checklist."

There are six basics to be stocked at home: water, food, first aid supplies, clothing and bedding, tools and emergency supplies and special items. They are like:

7.2.1 Water:

- To store one gallon of water/person/day in plastic soft drink bottles
- To keep at least a three-day supply of water for each person for drinking and for food preparation/sanitation in household.

7.2.2 Food:

- To store at least a three-day supply of non-perishable food. To select foods that require no refrigeration, preparation or cooking and little or no water.
- To select food items that are compact and lightweight like:
- Muri (puffed rice), Chira (flattened rice), Gur (hard molasses)
- Biscuits
- Vitamins
- Foods for infants, elderly persons or persons on special diets

7.2.3 Non-Prescription Drugs:

- Aspirin or non-aspirin pain reliever
- Anti-diarrhoeal medication
- Antacid (for stomach upset)
- Syrup of Ipecac (use to induce vomiting if advised by the Poison Control Center)

- Laxative

7.2.4 **Tools & Supplies:**

- Mess kits, or paper cups, plates and plastic utensils
- Cash money
- Utility knife
- Matches in a waterproof container
- Plastic storage containers
- Paper, pencil
- Needles, thread
- Map of the area

7.2.5 **Sanitation:**

- Soap, liquid detergent
- Personal hygiene items
- Disinfectant
- Household chlorine bleach

7.2.6 **Clothing & Bedding:**

- To include at least one complete change of clothing and footwear per person.

For Baby:

- Bottles
- Powdered milk
- Medications

For Adults:

- Heart and high blood pressure medication
- Insulin
- Prescription drugs
- Extra eye glasses

Important Documents:

To keep the records of important documents in a waterproof, portable container:

- Will, insurance policies, contracts, deeds, stocks and bonds
- Passports, social security cards, immunization records
- Bank account numbers
- Inventory of valuable household goods, important telephone numbers
- Family records

7.3 Flood Fighting

7.3.1 To create a "Family Disaster Plan"

A family disaster plan may be very effective as a flood fighting tool. It may start in the following way:

- FMC can, as an awareness programme, arrange seminars on family level how to create a family disaster plan or family head can approach FMC for help how to prepare for his family this disaster plan.
- To meet the family.
- To discuss the types of flood disasters that could occur. To explain how to prepare and respond. To discuss what to do if advised to evacuate. To practice what have been discussed.
- To plan how family will stay in contact if separated by disaster. To pick two meeting places: 1) a location a safe distance from the home in emergency. 2) A place outside neighborhood in case if not possible to return home. 3) To choose an out-of-state friend as a "check-in contact" for everyone to call.

7.3.2 To complete the mentioned steps:

- To post emergency telephone numbers by phone for family members.
- To show responsible family members how and when to shut off water, gas and electricity at main switches.
- To contact your local fire department to learn about home fire hazards.
- To learn first aid.

7.3.3 To meet with the neighbors:

- To plan how the neighborhood could work together after a disaster.
- To know neighbors' skills (medical, technical).
- To consider how each could help neighbors who have special needs, such as elderly or disabled persons.

7.4 Emergency Installation of Hand Pumps & Cleaning up

7.4.1 Emergency installation of hand pumps

- In emergency for drinking and other purposes, hand pump tubewells are often installed in camps/shelters for community use.
- Efforts must be made to avoid contamination of the groundwater aquifer by the pathogen loaded floodwaters while drilling for the tubewell.
- To select a higher non-flooded ground for the installation of the tubewell.
- To install at the upstream side of the latrine.
- To maintain at least 15 meter distance from latrines.
- To do not allow pool of contaminated water around the tubewell.
- To tie the hand pump tightly with a suitable support such as a bamboo or wooden pole to avoid shaking/movement while in use.

7.4.2 Cleaning up of hand pumps

- If the aquifer is contaminated during pump installation, by floodwaters, or by any other source, the well must be disinfected and cleaned.

The following procedures need to be followed:

- To mix 4 teaspoonful of bleaching powder in one tin of water (usually 18 litres).
- To open the parts of the hand pump (i.e., barrel, plunger, plunger rod, weight valve, bucket etc.).
- To keep the parts submerged in chlorine solution (in the tin) for at least an hour.
- Not to allow children to use the chlorine water.
- To take ten litres of water in a bucket and mix 4 teaspoonful of bleaching powder.
- To pour the chlorine water, after thorough mixing, into the tube (pipe) and keep it for three hours.
- To assemble the pump head, valve, plunger etc. and reinstall the tubewell.
- To pump vigorously for 30 minutes to drain out chlorine treated water from the well. When the water has the smell of mild chlorine, it may be used for drinking purpose.
- To keep children out of the site during the course of the operation.

7.4.3 **Long-term flood resistant hand pumps**

- In flood prone areas, to campaign for hand pumps over raised platforms/pedestals, above flood level with steps and railing.
- To carry out checking before the beginning of a flood season, whether there is any crack in the base structure. If there is any, to mend it well ahead of time.
- If, any how, the hand tubewell is constructed under flood design, then to take measure for inserting additional pipe to increase the heights of the tubewell above high flood level.

Community Flood Management (CFM)

Venue: Hotel Raffles-Inn, Faridpur

Date: 10-11 February 2008

To control flood at the community level, suggestions from the participants of the workshop are given below:

SUGGESTIONS:

1. Early maturing varieties of crops should be cultivated. .
2. Low land should be avoided to build house. If it is not possible to avoid, the houses should be sufficiently high.
3. Volunteer team should be formed and the team should be given proper training.
4. The shelters should be high enough with sufficient latrines and tubewells.
5. Not only school, college but also community centres, mosques etc. should be made with a sufficient height so that during flood they can be used as shelters.
6. Flood Control activities should be planned in consultation with the community people.
7. The local media should be used for proper publicity of flood information.
8. Mobile medical team should be available for emergency service with sufficient medicine and equipments.
9. Sufficient drains should be built so that flood water can be discharged out of the town easily.
10. In the important points, bridges should be constructed instead of culvert.
11. Training program and seminar should be arranged to raise the awareness among the people. Knowledge should be shared.
12. In Padma river, nearby the town, many bars have formed which have decreased the depth of the river. The river should be dredged properly for normal flow of water. Small rivers should also be dredged properly. Such as, Kumar river which is so much important to discharge the flood water out of the town.
13. Flood Management Committee should be formed at village and union level.
14. Cultural program can be arranged and money earned from the program can be used to help the flood affected people.
15. Work plan should be taken and implemented in collaboration with GOs and NGOs.
16. Roads and Bridge should be constructed with a sufficient height.
17. The natural symptoms should be observed as a warning system of flood. Such as, generally red ants come up before flood.
18. Flood management knowledge should be included in text curriculum of school and college. Proper training should be given to the students to make them aware about their duties during flood.
19. Flood Management Committee (FMC) should be formed and proper training should be given on their duties.
20. Pure water supply should be assured.
21. Necessary steps for excavation of river, canal and drain should be taken. Illegal possessions should be prohibited.
22. Warning should reach the people before 24 hours.

23. Rescue programme should be done with collaboration of Government and Non-government association.
24. Health complex and pourashava office should have some speed boat for the safety of pregnant women and critical patient.
25. Grass root level people should participate in management program.
26. Necessary steps should be taken to protect from the illegal use of relief goods.
27. Water purification tablet should be available.
28. Many ponds and low lands in the town are filling up. This filling should be stopped and more pond should be dug.

Community Flood Management (CFM)

Venue: Sirajganj Pourashava

Date: 27-28 January 2008

To control flood at the community level, suggestions from the participants of the workshop are given below:

SUGGESTIONS:

29. A permanent embankment to protect this town from flood is necessary.
30. Lowland should be avoided to build house. If it is not possible to avoid, the houses should be sufficiently high.
31. For the people on river bank and low land, houses of such a technology should be made, such that, during flood the houses can be transferred in a short time to the safe place.
32. The shelters should be high enough with sufficient latrines and tube wells.
33. Not only school, college but also community centres, mosques etc. should be made with a sufficient height so that during flood they can be used as shelters.
34. Every government office should have sufficient small and big boats. People who are able should have their own boat.
35. Disable, Old, Women and Children should be transferred to the shelters with start of flood.
36. The shelters should be made as a multi-storeyed building. The water pump should be placed at the 1st floor.
37. Pourashava and Union Parishad should have sufficient medicine and equipment facilities for emergency treatment. In this office, boats should be available for the doctors to provide mobile treatment service.
38. Sufficient drains should be constructed so that flood water can discharge out of the town easily.
39. In the important points to discharge water, bridge should be constructed instead of culvert.
40. Poor people cannot store food or money. During flood sufficient food, cloths and medicine should be given to them as relief goods.
41. Flood Management Committee should be formed at village and union level.
42. Work plan should be taken and implemented in collaboration with GOs and NGOs.
43. Roads and Bridge should be constructed with a sufficient height.
44. 10% money of Development Fund of every institution should be spent for flood preparatory works.
45. A big high land should be kept for sheltering the livestock.
46. Every school should have the swimming learning programme.
47. Sufficient number of mobile police should be engaged for the safety of the houses.
48. Flood warning system should be more developed.
49. The main switches of street electricity lines should be put above flood level.
50. There is a community medical centre in every ward of Pourashava. These medical centres should be reconstructed in such a way that they can be used as shelters when necessary.
51. Necessary steps should be taken to protect from the illegal use of relief goods.

52. Water purification tablet should be made available.
53. Many ponds and low lands in the town are filling up. This filling should be stopped and more pond should be dug.