

National Workshop on Options for Flood Risks and Damage Reduction in Bangladesh

**7 - 9 September 2004
Bangladesh-China Friendship Centre, Dhaka**

Recommendations



**Organised By
Prime Minister's Office
People's Republic of Bangladesh**

31 October 2004

Foreword

Bangladesh is one of the most disaster prone countries in the world. Flood, drought and cyclone occur here quite frequently. Bangladesh experiences normal flood almost every year. However, the incidence of devastating floods has increased in recent times. During last 16 years, the country experienced four devastating floods - in 1987, 1988, 1998 and the last one in 2004.

As a vast flood plain, the country benefits from the normal floods, but the abnormal ones cause enormous damages to infrastructures, agriculture, non-farm activities, transportation, industries, economy and livelihood. Our government is much concerned with the damage caused by such floods, affecting the economy and sustainability of development efforts. It was in the backdrop of the devastating flood of 2004 that the Hon'ble Prime Minister directed us to hold a National Workshop on Floods in order to develop/design a context based set of policy recommendations for flood management in Bangladesh and evaluate the experiences of flooding and flood management initiatives and lessons learnt from different kinds of interventions in the flood plains. The workshop was also asked to explore the socio-economic aspects of the problem.

The workshop was held on 7, 8 and 9 September 2004 in Dhaka with over 900 participants. The workshop concluded with a set of valuable recommendations on options for flood risks and damage reduction in Bangladesh.

The enthusiastic response from the participants showed an earnest desire among all concerned to find a sustainable solution to the problems resulting from floods in Bangladesh.

I take this opportunity to thank all concerned for making this workshop a success. I am sure, the outcome of this workshop will be of some use to the Government of Bangladesh in adopting a pragmatic strategy for flood mitigation in the country.

As the preparation of the proceedings of the National Workshop will take sometime, without waiting for the publication of the final proceedings, we wish to bring the recommendations of the National Workshop to the notice of the policy/ decision makers as early as possible, so that some actions may start soon. An implementation matrix has also been presented here, identifying the implementing Ministry/ Department/ Organization, resource need, probable development partner, the time frame for implementation and the linkages among the recommendations.

Sd/-

Kamal Uddin Siddiqui

Principal Secretary

Prime Minister's Office

& Convenor

National Workshop Organizing Committee

31 October 2004

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Address by
Begum Khaleda Zia
Hon'ble Prime Minister
People's Republic of Bangladesh



Bismillahir Rahmanir Rahim

Mr. Chairman,
Colleagues,
Members of the diplomatic corps,
Representatives from donor agencies,
Distinguished water experts and environmentalists,
Participants in the workshop,
Ladies and Gentlemen,

Assalamu Alaikum

Today's workshop is both important and timely. All of you participating in this workshop have achieved excellence in your respective fields by dint of your merit. The nation counts on you. I sincerely hope your deliberations will come upto the nation's expectations from you.

I am sure you are aware of the objectives of this workshop. Since time immemorial, Bangladesh has been known as a flood-prone landmass. Flood is now a reality for our country. The people, land and nature here draw benefits from the normal floods in different ways. However, at times these turn devastating, causing colossal loss of life and property. It is now imperative for us to find ways and means to minimize the risks and damages due to such abnormal floods. If we fail to do so, our progress and achievements will be hindered to a great extent.

I firmly believe the participants of this workshop will be able to come up with appropriate recommendations, drawn from brain storming sessions on various aspects of the flood mitigation experiences elsewhere (Huang Ho and Mississippi, for example) and our own ground realities. I also hope that these recommendations will provide us with immediate, mid-term and long-term strategies to face the devastating floods.

Before, I inaugurate this workshop; I would like to raise some issues for your consideration. The origin of the recurrent floods we face is not Bangladesh. Therefore, we do not have all the solutions within our means. We have fifty-four rivers that have their origin outside Bangladesh. We share rivers with India, China, Nepal and Bhutan. Nothing could be better if all these co-riparian countries could sit together and hammer out a pragmatic plan of action for mutual benefits. In other words, you need to come up with recommendations as to what would be the areas of cooperation and how these could be worked out at bilateral, regional and international levels.

It is also imperative for us to work out a strategy for optimum utilization of the existing techniques and the resources for reducing risks and losses due to floods.

There are some internal reasons that accentuate the severity of floods. These include unplanned construction of roads and dykes, putting in place inadequate drainage systems, filling up rivers and water reservoirs for human settlement and such other acts that destroy the environment. We look forward to your suggestions in overcoming these problems.

Ladies and Gentlemen,

During the last two decades, Bangladesh has faced a number of severe floods. The magnitude of loss due to these floods is on a steep increase. So, is the duration of floods; The reasons include building infrastructure and carrying out activities that lead to destruction of ecology and environment, both in and outside the country. A rise in sea level due to Green House Effect is perhaps another reason for worsening the flood situations. In order to solve these problems, we require concrete suggestions from you.

You have also to find out what should be done with regard to improving the flow and direction of rivers and in deepening their beds; the need for canal digging and building water reservoirs; the requirement for constructing barrages; and the necessity of checking river erosion and salinity within our ability and resources. Furthermore, I urge you to come up with innovative and effective means, as distinct from conventional wisdom, to prevent damages to agriculture, fisheries and livestock, roads and railways, small and large industries, house and educational institutions. I would particularly request you to suggest the use of indigenous technology in this regard. At the same time, you also have to tell us how to make the optimum use of ICT and satellite technology in tackling floods.

We also hope to receive well thoughtout ideas from you with regard to building structures in order better cope with floods and adopting suitable measures for reducing the loss of lives and property during the devastating floods.

I have already directed concerned officials to build new government buildings, including educational institutions, in a way that these can be used as flood shelters. We seek your suggestions about what more can be done in this regard.

We expect necessary recommendations from you on how we may be informed about possible floods much earlier through modernization of flood forecasting and developing an early warning system.

I also request you to come up with precise proposals on improved storage and effective distribution of food, medicine and drinking water during the relief stage and updating the existing government standing orders for facing the floods.

Utmost emphasis should be given on averting loss of lives. Children and women are most vulnerable during the floods. You should, therefore, formulate concrete suggestions as to how they may be provided with extra care and security during the disaster period.

Ladies and Gentlemen,

We have been coping with floods for a long time. However, with the passage of time our methods and techniques have undergone some changes. We may now further fine-tune these by reviewing, analysing and summing up our recent experiences and the various initiatives taken at local and national levels. We have successfully conducted relief activities with our own resources during this year's devastating flood. We have just launched a massive rehabilitation programme. I would like to take this opportunity to thank the friendly countries, international organizations, private bodies and NGOs, which have come forward for successful implementation of this rehabilitation programme.

I understand that local people's representatives, professionals, NGOs, development partners, civil and military officials, media experts, women leaders and members of the law enforcing agencies are taking part in different business sessions of this workshop, along with representatives from relevant Ministries and Departments. I am sure their experiences, particularly those gathered from the field, would make special contributions in formulating the recommendations of this workshop. I also sincerely hope that your recommendations would not only modernize Bangladesh's approach to flood mitigation but also act as a model for other flood-prone countries of the world.

Flood is a national problem. Today's workshop has been organized to adopt a work-plan at the national level to face this problem. Initiatives are required at all levels for implementing the recommendations of this workshop. Therefore, I call upon all our citizens, irrespective of their political affiliation and opinion, to join this great effort to face floods effectively.

I declare the workshop open and wish it all success.

Thank you all.

Allah Hafez
Bangladesh Zindabad

A Brief Account of the National Workshop on Options for Flood Risks and Damage Reduction in Bangladesh

In 2004, Bangladesh experienced one of the most devastating floods in nearly 50 years. About 40 % of the country went under water. The damage caused by the flood was to the tune of US\$ 2 billion. Millions people were affected. The most affected were the poor- the most vulnerable in such disasters.

A preliminary assessment of the damage caused by the floods of 2004 shows the following:

Damages caused by the floods of 2004

Affected Districts	39
Affected Upazilas	266
Area Affected	34583 km sq
Affected Families	7,468,128
Affected Population	36,337,944
Human Lives Lost	747
Loss of Livestock	15,143
Crops Destroyed	1,605,958
Crops Damaged (partially)	1,038,176
Houses Destroyed	894,954
Houses damaged (partially)	338,9101
Road Network Destroyed	14,271 km.
Road Network Damaged	45,528 km.
Bridges and Culverts Damaged	5,478
Embankment Damaged	3,158 km.
Schools Destroyed	1,295
Schools Damaged (partially)	24,276

In the backdrop of the devastating flood of 2004, the Hon'ble Prime Minister desired that a National Workshop on Floods be held, in order to develop / design a context based set of policy recommendations for flood management in Bangladesh and evaluate the experiences of flooding and flood management initiatives and lessons learnt from different kinds of interventions in the flood plains. The workshop also explored socio-economic aspects of the problem.

A three day National Workshop on “ Options for Flood Risks and Damage Reduction in Bangladesh ” was held on 7, 8 and 9 September 2004 in Dhaka at the Bangladesh-China Friendship Centre, Agargaon. The Workshop was organised by the Office of the Prime Minister, Peoples' Republic of Bangladesh. More than 900 participants attended the seminar. The participants included scientists, academicians, engineers, government servants, social workers, NGO leaders, defence personnel, businessmen and industrialists, representatives from development partners and the private sector.

On 7 September 2004, the workshop was inaugurated by the Hon'ble Prime Minister of the People's Republic of Bangladesh. Hon'ble Ministers from the ministries concerned were present throughout the seminar. The Workshop started with presentation of three keynote papers from three very eminent experts on water resources, community participation and economy. Thereafter, the workshop broke up into parallel working group sessions along six broad themes. The themes included: (i) Working Group 1: Flood & Disaster Management and Mitigation Options, (ii) Working Group 2: Impact of Flood on National Transportation and Mitigation Options, (iii) Working Group 3: Impact of Flood on Agriculture, Livestock, Fisheries & Industries Sector and Mitigation Options, (iv) Working Group 4:

Impact of Flood on Housing, Urban Planning Utilities (Water Supply, Sanitations) & Environment and Mitigation Options, (v) Working Group 5: Impact of Flood on Social Services and Law & Order and Mitigation Options, (vi) Working Group 6: Impact of Flood on Economy Major Infrastructures and Livelihood and Mitigation Options.

On 9 September 2004, the workshop concluded successfully and came up with a set of recommendations on the Options for Flood Risks and Damage Reduction in Bangladesh. These were presented, debated and adopted at the plenary session, presided over by Dr. Kamal Uddin Siddiqui, Principal Secretary and Convenor of the National Workshop Organizing Committee.

Organising Committee

Dr. Kamal Uddin Siddiqui Principal Secretary, Prime Minister's Office	-	Convenor
Mr. Siddiqur Rahman Secretary, Ministry of Food and Disaster Management	-	Member
Dr. Omar Faruque Khan Secretary-in-Charge, Ministry of Water Resources	-	Member
Mr. Mukhlesuzzaman Director General, Bangladesh Water Development Board	-	Member
Mr. A.N.H. Akhtar Hossain, PEng Honorary Secretary General, The Institution of Engineers, Bangladesh & Managing Director, Dhaka WASA	-	Member
Mr. M. Shahidul Hassan Chief Engineer, Local Government Engineering Department	-	Member
Mr. A.H.M. Shamsul Islam Director General, Disaster Management Bureau	-	Member
Mr. Mahfuzur Rahman Director General, Department of Relief and Rehabilitation	-	Member
Mr. Md. Abdul Matin APS-II to Hon'ble Prime Minister	-	Member Secretary

Recommendations from the Keynote Papers

Keynote Paper 1: An Overview on Impact of Flood in Bangladesh and Options for Mitigation

By

A. N. H. Akhtar Hossain, PEng
Honorary Secretary General, The Institution of Engineers, Bangladesh
& Managing Director, Dhaka WASA

General Recommendations

- **Regional cooperation:** As more than 90% of the flood flow originate from outside the country, Bangladesh alone cannot solve the flood problem. For effective flood management, basin-wide approach with concerted regional participation may be pursued. A regional flood management initiative should be initiated with participation from all co-riparian countries.
- **The Indian River Link Project:** The proposed Indian river link project would be a disaster for the society, economy and ecology of Bangladesh. Immediate actions are required to foster dialogue with the India on this issue. There should also be an initiative from the civil society, academicians, scientists and professionals on both sides of the border to develop awareness regarding the probable adverse effects of the proposed project. Scientific studies may be undertaken to assess all the probable impact of the Indian River Interlink Project. The international community may also be apprised of Bangladesh's points of view.

Flood preparedness

- **Flood zoning and risk mapping:** A comprehensive approach is required to develop flood zoning and risk maps. All development activities in the floodplains should be coordinated accordingly;
- **Rationalization and adequate maintenance of existing FCD projects:** for prevention of any failure of flood protection embankments or infrastructure, mitigate adverse impact on unprotected areas, by making existing infrastructure for drainage (sluices, drainage channels etc.) functional;
- **Flood management modeling:** development options in the floodplains should be studied in an integrated and scientific manner;
- **Erosion prediction and monitoring:** available modeling integrated with remote sensing and GIS technology should be immediately instituted for a nation-wide erosion prediction and monitoring;
- **Drainage Improvement:** The natural drainage need to dredged and made free from encroachment to bring back the original conveyance capacity. Canal Digging program may be strengthened with proper technical guidelines and effective monitoring.
- **Off-take Maintenance:** It is important the off-takes of the rivers are regularly dredged to allow flood flow distribution in wider areas.
- **Integrated Floodplain Management:** It is of utmost importance that all agencies operating in the floodplains should follow an integrated approach on a scientific basis. People of floodplains should be consulted and involved in all phases of development. There should be government guidelines for any development in the floodplains, which would pave the way for Integrated Floodplain Management.
- **Urban Flood Management:** Cities and towns are losing the natural drainage routes and flood retention ponds rapidly. As a result, severe drainage congestion in many of the Towns and Cities has become a common phenomenon. There is a need for immediate actions to free the natural drainage routes from encroachment, and to design and implement sustainable drainage management system for each of the urban areas. Proper urban planning should be undertaken for the growth centres and newly developed urban areas, incorporating provisions for urban drainage.
- **Improvement of Lead-time for Flood Forecast:** The existing flood forecasting technology is able to provide short-term (48 hrs) forecasts, which are not sufficient in taking comprehensive

flood preparedness/response activities. The lead-time of forecasts could be extended using climate forecasts. The CFAB project has paved the way and the developments made through CFAB should be carried forward.

- **Flood Proofing and Shelters:** In many areas of Bangladesh, like the Haor areas, Chalan Beel or the depressions of the south-central region, full flood protection would not be advisable because these kinds of measures are not economically viable and at the same time this could result in destruction of the ecologically sensitive wetland environment. Options for flood mitigation in these areas should focus on saving people's life and property. Various flood proofing measures could be adopted for the purpose. One of the options may be to build clustered habitats with all the civic amenities. This may be undertaken on a pilot basis under Asrayan Project for the poor in the Haor areas.

Flood Response

- Updating and further development of the Standing Orders for Disaster Management should be undertaken.
- An ICT based Flood Response system, including a nation-wide network of flood information database by connecting databases of various agencies involved in flood response activities, should be developed and implemented. Such a system could be developed based on internet and wireless communication technologies;
- Training and capacity building of field officials and community workers, volunteers and NGO staffs in flood fighting and relief activities should be undertaken;
- It is imperative that for implementing a participatory approach in flood disaster management and to make it effective, awareness about any disaster event and the role of all concerned should be clearly understood. For this purposes, the government, NGOs and others concerned should undertake concerted efforts. Together with training and capacity building of field officials and community workers, volunteers and NGO staffs in flood fighting and relief activities, the media has a crucial role to play in all stages of disaster management. The media should play a constructive role by issuing special bulletins about the disaster, and making people aware of their responsibility during and after the floods.

Post Flood Reconstruction and Rehabilitation

- **Methods and tools for damage assessment:** One of the constraints in responding to any disaster and mobilizing resources for reconstruction and rehabilitation is the lack of reliable data on flood damage. Measures should be taken to develop tools and methods for generating such data;
- **Coordination:** The limited resources of the government should be properly mobilized and coordinated. For this, all agencies working for the post-flood rehabilitation and reconstruction should carry out their activities in a transparent and coordinated manner. There should be a central flood rehabilitation body to coordinate such activities.

Keynote Paper 2: Flood Disaster Management and Risk Reduction in Bangladesh

By

Muhammad Saidur Rahman
Director
Bangladesh Disaster Preparedness Centre

Implementation of a proposed project titled as “**Reducing Disaster Risks of the Poorest through Sustainable Livelihood Development**”. This will demonstrate national political commitment to support the poorest households at-risk, living in the most disaster prone areas, to develop capacity to manage livelihoods and thereby address disaster risks.

The objectives of the project are:

- **Reducing Risks** by improving the economic status of the poor who are vulnerable to natural disasters;

- **Reducing Poverty** by enhancing the long-term development capacity of the poor vulnerable to natural disasters;
- **Sustainable Development** by enabling access to development resources and services for long-term resilience of the targeted households.

Keynote Paper 3: The Impact of Floods on the Economy of Bangladesh

By

Prof. Wahiduddin Mahmud
Department of Economics, Dhaka University
& Former Adviser, Caretaker Government

- **Economic Recovery:** To the extent that the increased disbursements meet the genuine short-run needs of working capital and is paid back in time, a moderate expansionary stance in monetary management in the short run may be desirable for the sake of economic recovery, even if it means violating the rigid IMF prescriptions.
- **Poverty Alleviation:** Ensuring food security is an immediate priority in post-flood economic management. Keeping food prices from rising is only one part; another is to know how to generate enough purchasing power in the hands of the flood-affected poor so that widespread starvation can be avoided.

Summary of Recommendations by the Six Working Groups

Recommendations in the Keynote Addresses and from each of the Working Groups have been presented under four main stages of flood mitigation. These are (i) Flood Management and Mitigation, (ii) Flood Preparedness, (iii) Flood Response and (iv) Post flood Reconstruction and Rehabilitation.

The recommendations were further grouped into (i) General Recommendations (ii) Structural Measures and (iii) Non-structural Measures.

The implementation period for each of the recommendations was categorized as follows:

- i. Immediate: within 6 months
- ii. Short-term: within 2 years
- iii. Long-term: Between 3 – 10 years

Recommendations of Working Group 1

Flood and Disaster Management and Mitigation Options

Day 1: Tuesday, September 7, 2004

- Chair: Mr. Chowdhury Kamal Ibne Yusuf, MP, Hon'ble Minister for Food and Disaster Management
- Co-Chair: Major (Retd.) Hafizuddin Ahmed B.B. MP, Hon'ble Minister for Water Resources

Day 2: Wednesday, September 8, 2004

- Chair: Advocate Goutam Chakraborty, MP, Hon'ble State Minister for Water Resources
- Co-Chair: Mr. Asadul Habib Dulu, MP, Hon'ble Deputy Minister for Food & Disaster Management

Papers Presented:

1. Flood Forecasting, Warning and Response System by **Mr. Md. Salim Bhuiyan**
Executive Engineer, FFWC, BWDB
2. Weather Forecasting for Flood Disaster and Mitigation by **Mr. Md. Akram Hossain**
Director, BMD
3. Regional Cooperation on Flood Management by **Mr. Tauhidul Anwar Khan**, Member, JRC,
Ministry of Water Resources
4. BRAC's Experience on Flood Disaster, Risk Management and Reduction **Ms. Nasima Akter,**
PhD, Coordinator, Environmental Research Unit, BRAC
5. Flood Disaster Management in Dhaka City, **Mr. Muhammad Abul Hasnat**, Executive
Engineer, Dhaka City Corporation
6. Flood Disaster Management in the Affected Areas, **Mr. Md. Saeedur Rahman**, Chief
Engineer, BWDB
7. Application of Remote Sensing and GIS in Flood Mapping, **Mr. Abdul Halim Howlader,**
Mr. A. Z. MD. Zahedul Islam, SPARRSO
8. Use of Information and Communication Technology (ICT) in Flood Management by **Mr.**
Emaduddin Ahmad, PEng, Executive Director, **Mr. S M Mahbubur Rahman**, Division
Head, WRP, **Mr. Jalaluddin Md. Abdul Hye, PEng**, DED (P&D), IWM
9. Flood Disaster Management, **Mr. Siddiquir Rahman**, Secretary, Ministry of Food and
Disaster Management
10. Emergency Food Storage and Supplies, **Mr. Ilahi Dad Khan**, Additional Director,
Department of Food
11. Impact of Flood on Flood Control and Drainage Infrastructures and Mitigation Measures, **Mr.**
Giasuddin Ahmed Choudhury, Additional Director General (Planning), BWDB
12. Guidelines on Flood Disaster Management, **Major General A. I. M. Mustafa Reza Noor,**
NDC, Armed Forces Division,

Recommendations

Flood Management and Mitigation

General Measures

- G1-001 Set national priorities on comprehensive flood management
- G1-002 Ensure coordinated planning, design and construction of all infrastructure in the floodplains
- G1-003 Ensure required fund for maintenance of physical infrastructure (embankments, regulators, barrages, drainage canals, etc.)
- G1-004 Ensure risk-based design of projects and ancillary structures
- G1-005 Integrate disaster risk management into national development process and introduce Disaster Impact Assessment (DIA) for project approval
- G1-006 Adopt a comprehensive all-risks management programme (initiated through the Comprehensive Disaster Management Programme-CDMP)
- G1-007 Organise a Regional Conference on Flood Management. This issue may be included in the ensuing SAARC and BIMSTEC agenda.
- G1-008 Foster regional cooperation among the co-basin countries such as China, Nepal, India, Bangladesh and Bhutan for collaborative management of water and floods of the Ganges, the Brahmaputra and the Meghna River Basins
- G1-009 Create suitable institutional framework like the River Basin organization (RBO) for the Ganges, the Brahmaputra and the Meghna involving the co-basin countries of respective rivers
- G1-010 Intensify diplomatic efforts to involve the international community to facilitate regional cooperation for flood management and improvement of flood forecasting and warning system.
- G1-011 Urge the co-basin countries to start the process of cooperation by agreeing to establish a mechanism for free flow of all flood related data and information in order to help improve the flood forecasting and warning system in the individual countries
- G1-012 Develop policy guidelines for use of advanced analytical tools like mathematical models and GIS for flood impact assessment in any project to be undertaken in the floodplains

Structural Measures

- G1-013 Rationalise existing Flood Control and Drainage (FCD) infrastructures
- G1-014 Re-excavate and de-silt rivers, khals and oftakes of distributaries, etc.
- G1-015 Ensure safe conveyance of cross-boundary flows by channelising and stabilizing the major rivers.
- G1-016 Ensure flood protection to all towns and cities including Dhaka Eastern Embankment with provision for efficient storm water drainage from city areas.
- G1-017 Construct cluster residential housing above high flood levels, with all necessary facilities and amenities through dredged filling of 2-3 ha of area in the Haor and flood-prone areas. Remodel and redesign existing Asrayan Projects accordingly. In such a situation, relocate one

village in an area of 2-3 ha.

Non-Structural Measures

- G1-018 Create awareness for community participation in embankment maintenance
- G1-019 Promulgate Water Act to regulate all water management activities
- G1-020 Prepare an updated topographic map of the country with all infrastructure in digital cover
- G1-021 Undertake flood risk zoning/flood mapping preferably through updating the Digital Elevation Model (DEM) based on topographic survey data
- G1-022 Develop a distributed flood information base linking the databases of all agencies involved in flood data collection
- G1-023 Establish a Flood Response System (FRS) to support flood response activities
- G1-024 Extend the existing flood-forecasting model in the upstream basins of major rivers in order to increase the lead-time of forecast.
- G1-025 Improve existing weather forecasting (NWP) and climate prediction along with improvement of lead-time of flood forecast in the short-term (5-7 days), medium-term (20-30 days) and long-term (monthly, seasonal) through developing and introducing a Numeric Weather Prediction Model (NWPM). Continue the ongoing programme on Climate Forecast Application in Bangladesh (CFAB).
- G1-026 Strictly follow the practices of Flood Management Models and Erosion Forecast Models for flood impact assessment and erosion monitoring
- G1-027 Develop guidelines for rehabilitation of infrastructures
- G1-028 Develop quick flood damage assessment methods and tools

Flood Preparedness

General Measures

- G1-029 Conduct hazard mapping, vulnerability and capacity assessments.
- G1-030 Intensify public awareness and advocacy in order to enhance capacity to cope with disasters.
- G1-031 Promote family and community level flood preparedness and contingency planning.
- G1-032 Include gender issue in planning and implementation of all aspects related to flood risk management
- G1-033 Conduct “lessons learnt workshops” on 2004 flood at different levels.
- G1-034 Take care of special needs of vulnerable groups, including the disabled, the children and the elderly.
- G1-035 Review the Standing Order on Disaster (SOD) to bring about necessary amendments in the light of lessons learnt from the 2004 floods.
- G1-036 Ensure wide circulation of and strict adherence to Standing Orders on Disasters (SOD) at all levels. Activate all the committees as stated in the SOD and ensure preparation of Action Plans at all levels.
- G1-037 Incorporate the issues and concerns of river erosion and earthquake in the SOD.
- G1-038 Develop a Programme Management Information System (PMIS) with updated and accurate information on vulnerable population
- G1-039 Strengthen the Disaster Management Bureau in terms of manpower and logistics.
- G1-040 Adopt measures to prevent frequent turnover of officials trained and involved in main-stream disaster management.
- G1-041 Consider the option of distributing balanced diet as relief goods instead of rice only, specially take care of pregnant women and babies
- G1-042 Put in place a mechanism for continuous and routine feedback for improvement of forecast and warning.

Structural Measures

- G1-043 Ensure that all structural interventions follow the National Water Policy and National Water Management Plan
- G1-044 Construct high raised multi-purpose flood shelters, (including shelters for cattle and other domestic animals) like the cyclone shelters in the coastal areas.
- G1-045 Ensure that roads and highways are constructed high enough to be used as a temporary refuge to accommodate flood affected people.
- G1-046 Develop at least one flood-proof pond (for drinking water and cooking) in every village.

Non-Structural Measures

- G1-047 Promote and strengthen indigenous coping mechanisms and survival techniques among the vulnerable people.
- G1-048 Implement the project titled “Reduction of Risk through Sustainable Livelihood Support” for the most vulnerable people.
- G1-049 Update flood forecasting data collection system in terms of intensity, frequency, mode of collection and transmission.
- G1-050 Establish Flood Preparedness Programme in line with Cyclone Preparedness Programme, as suggested by a UNDP sponsored study report.
- G1-051 Commission two Meteorological-cum-hydrological Doppler Radars, one in the northeast (Moulvibazar) and other in northwest (Rangpur) for estimating precipitation covering at least 400km of Ganges, Brahmaputra and Meghna River Basins
- G1-052 Improve weather forecasts and warnings by introducing Numerical Weather Prediction (NWP) System together with networking of the existing different observatories in BMD. Transfer the NWP Model of CFAB to BMD with necessary capacity building.
- G1-053 Modernize the existing Meteorological Training Institute of BMD with adequate facilities and carry out R&D programmes for upgrading knowledge-base and developing appropriate tools for weather predictions.
- G1-054 Put in place an operational flood mapping system based on mathematical modeling, remote sensing and GIS techniques.
- G1-055 Ensure that warning messages are made user-friendly and relevant to the local context. Replicate the people- oriented flood warning dissemination procedure piloted by BWDB through BDPC
- G1-056 Ensure storage of emergency material (food, fodder, etc.) near flood risk areas and installations
- G1-057 Designate BWDB as the nodal agency to issue flood forecasts by coordinating the efforts of BMD, BWDB, IWM and SPARRSO
- G1-058 Up-grade the existing GTS Link of BMD from 2400 bps to 64000 bps.
- G1-059 Integrate storm water drainage, sewerage system management and flood prevention in urban areas in the flood prone areas of the country specially for Dhaka Metropolitan City areas.
- G1-060 Prepare Master Plans for proper land use planning of all urban areas, Municipalities and City Corporations.
- G1-061 Ensure availability of equipment, material and manpower prior to the crisis period through effective contingency plans.
- G1-062 Put in place a mechanism for continuous training to improve the capacity and skills of all those who are involved in disaster management

Flood Response

General Measures

- G1-063 Establish effective communication with the media, so that the extent of damage and government responses are correctly reported.

Structural Measures

- G1-064 Undertake sinking and repair of high platform tube-wells in all the flood-prone areas.
- G1-065 Ensure availability of mobile water treatment plant.

Non-Structural Measures

- G1-066 Establish an effective system for Damage and Needs Assessment (DNA)
- G1-067 Ensure effective coordination among GoB agencies and between GoB and other agencies
- G1-068 Monitor flood response activities at all levels under proper guidelines
- G1-069 Ensure IT and telecommunications support for field level offices.

Post-Flood Reconstruction and Rehabilitation

Structural Measures

- G1-070 Ensure safe drinking water and sanitation facilities in flood-prone areas.
- G1-071 Undertake re-engineering of damaged structures according to changed hydrological/morphological scenarios.
- G1-072 Undertake skill development programmes for quick assessment of damage and proper rehabilitation measures before the next monsoon.
- G1-073 Put emphasis on creation of employment and income generation for the flood affected people.

Non-Structural Measures

- G1-074 Undertake comprehensive programmes to prevent deaths from starvation, restore homesteads, rehabilitate agriculture, create employment, prevent epidemics, provide nutritional support to pregnant women and children, and bring back life to normalcy.
- G1-075 Ensure safety of vulnerable groups (women, children, disabled) during the floods.
- G1-076 Establish effective GO-NGO coordination for ensuring better flood risk management before, during and after flood disaster.

Recommendations of Working Group 2

Impact of Flood on National Transportation and Mitigation Options

Day 1: Tuesday, September 7, 2004

Chair: Barrister Nazmul Huda, MP, Hon'ble Minister for Communication

Co-Chair: Lt. Col. (Retd.) Akbar Hossain B.B. MP, Hon'ble Minister for Port, Shipping & IWT

Day 2: Wednesday, September 8, 2004

Chair: Mr. Ziaul Haq Zia, MP, Hon'ble State Minister for Local Govt. Rural Development & Co-operatives

Co-Chair: Mr. Salahuddin Ahmad, MP, Hon'ble State Minister for Communications

Papers Presented:

1. Impact of Flood on Railway & Mitigation Options by **Mr. Yusuf Ali Mridha**, Bangladesh Railways (BR).
2. Impact of Flood on Major Highways & Mitigation Options by Roads and Highways Department by **Mr. AKM Faizur Rahman**, Additional Chief Engineer (ADB Projects), Roads & Highways Department
3. Impact of Flood on Rural Roads and Proposed Mitigation Options, **Mr. Md Shahidul Hassan**, Chief Engineer, Local Government Engineering Department
4. Impact of Flood on Waterways & Mitigation Options by **Mr. Napal Chandra Sarker**, Bangladesh Inland Water Transport Authority (BIWTA)
5. Impact of Flood on Air Transport & Mitigation Options, **Group Captain M. Obaidur Rahman, psc**, Member (Ops & Plan), Civil Aviation Authority
6. Impact of Flood on Urban Transportation & Mitigation Options (Major Cities), by **Mr. Ashraful Alam Sarkar**, Senior Transport Economist, **Mr. A T M Helaluddin Nagari**, Advisor, Support Services & Linkages, Dhaka Transport Coordination Board

Recommendations

Flood Management and Mitigation

General Measures

- G2-001 Consider other water related natural disasters such as erosion, cyclone, etc in drawing up the risk mitigation options
- G2-002 Ensure that planning, implementation and maintenance of roads, highways, railways and cross drainage structures, bridges and flood mitigation embankments and appurtenant structures and water ways are done in an integrated approach with emphasis on unimpeded drainage
- G2-003 Enhance knowledge base and technological capability of monitoring flood vulnerability and real time management of flood hazards by establishing a cell and appropriate institutional linkages with specialist institutions such as BUET, IWM and RRI, etc.
- G2-004 Consider cyclonic surge flood drainage for designing coastal roads with the provision of cross drainage structure and overtopping
- G2-005 For tackling flood and emergency situation, provide the executing agency with authority to procure services through short notice tendering; amend the Public Procurement Regulations (PPR 2003) to include such provisions.
- G2-006 Develop strong public and private sector institutions through inter-organization linkages and sharing responsibilities
- G2-007 For better institutional co-ordination, rename Ministry of Communications as Ministry of Surface Transport

Structural Measures

- G2-008 Construct flood fuses at predetermined locations on roads and embankments and operate these on the basis of real time flood forecasting in order to reduce flood damage
- G2-009 Metal coastal polders crowns to facilitate rescue and relief operations
- G2-0010 Raise railways in flood prone areas above Highest Flood Level on a priority basis
- G2-011 Undertake protection of embankments following guidelines in worst affected locations through stabilisation / slope protection measures e.g. Geo-textile and CC blocks; and in less affected locations through plantation /turfing
- G2-012 Provide adequate opening in the bridges and the drainage structures for quick passage of floodwater.

Non-Structural Measures

- G2-013 Put in place a multi-modal integrated transport policy
- G2-014 Carry out a comprehensive study including drainage modelling and environmental analysis
- G2-015 Prepare a detailed guideline for the studies on assessment of flooding impact of development works in the transportation sector

- G2-017 Extend the present flood forecasting system to cover the transportation network and facilities
- G2-018 Monitoring of hydraulic and morphological conditions of the rivers on which major bridges like Hardinge, Lalan Shah, Bhairab, Meghna and Rupsha were constructed regularly through establishing bridge inspection and flood monitoring unit and having a morphological modelling programme.
- G2-019 Strengthen hydrological data collection network and agency
- G2-020 Formulate a National Policy to protect the waterways and determine fix-up the level of fixed structures (roads, railways).
- G2-021 Redefine navigation headway clearance at different locations
- G2-022 Develop strong public and private sector institutions through inter-organizational linkages and sharing responsibilities.

Flood Preparedness

General Measures

- G2-023 Preserve buffer stock of construction materials and bailey bridges to face emergency
- G2-024 Strengthen coordination among RHD, LGED, BR and other agencies.
- G2-025 Ensure that BRTA acts as a regulatory body; if necessary, privatise fitness and registration process.
- G2-026 Construct bus and launch terminals in such a way that these may be used as flood shelters.
- G2-027 Make more allocations for shipping sector to have ensure maintenance program for river dredging; procure more dredgers
- G2-028 Give the responsibility of dredging/ re-excavation/digging of rural internal navigation channels at local level (included in the master plan) to LGED/BWDB
- G2-029 Ensure private sector participation in route maintenance; ensure total leasing of dredging and route operation
- G2-030 Ensure improvement of drainage system and regular maintenance in each city/town

Structural Measures

- G2-031 Ensure slope protection of approach roads to bridges / culverts using measures such as CC Blocks, geo-textile, mattress gabion and for flood embankment by growing turfs like vetiver (Kashful)
- G2-032 Provide causeways (Irish crossing) in roads in the flash flood areas
- G2-033 Remove obstructions from and stop encroachments in waterways near bridges. Promulgate necessary regulations
- G2-034 For National and Regional Highways, provide asphalt concrete pavement with hard shoulders
- G2-035 Upgrade at least one road to above the flood level in each union with adequate cross-drainage provisions

- G2-036 Provide flood overflow system along submersible roads
- G2-037 For flood free roads, adopt adequate flood flow openings in order to ensure unimpeded drainage
- G2-038 Implement flood shelters/flood refuge along with road construction
- G2-039 Before and during implementation of dredging, carry out impact study for adversities in the river regime
- G2-040 Modernise and improve existing major river port terminals and also construct new ones as required
- G2-041 Encourage and implement river loop cuts; ensure proper study of the impact of loop cuts on other areas and study their long-term sustainability by morphological modelling studies
- G2-042 Undertake Gorai and Kalni-Kushiyara dredging
- G2-043 Unplanned infrastructure quite often deteriorates siltation condition. Undertake measures to prevent siltation. Carry out strategic dredging to prevent siltation of navigation routes
- G2-044 Preserve natural drainage around all airports (Nikunja created obstacle to ZIA drainage).
- G2-045 Keep flood free Tejgaon airport operational along with its surroundings for emergency relief operations; remove unauthorised/ high-rise buildings in adjacent areas.
- G2-046 Construct flood embankments around all the flood prone airports of the country; carry out appropriate drainage impact studies
- G2-047 Complete Patenga Coastal Embankment
- G2-048 Upgrade, improve and maintain Cox's Bazar Airport for disaster management operations
- G2-049 Implement Dhaka Integrated Flood Embankment (Eastern By-Pass) project as a priority project
- G2-050 Re-excavate existing drainage canals – especially khals in and around Dhaka city.
- G2-051 Remove encroachment /constriction of natural drainage
- G2-052 Protect important cities and towns from flood and drainage congestion
- G2-053 Resuscitate drainage canal system within the cities/towns for removing drainage congestion and for navigation if possible

Non-Structural Measures

- G2-054 Ensure that JMBA, RHD and Railway install flood monitoring cell and use JMBA morphological study experience
- G2-055 Monitor regularly the hydraulic and morphological conditions of rivers on which major Bridges like Paksey, Bhairab, Meghna and Rupsha were constructed through establishing bridge inspection and flood monitoring unit and having Morphological modelling programme
- G2-056 Enact regulations/legislations to regulate plying of all types of vehicles over submerged roads

- G2-057 Include appropriate provisions in PCPs for hydraulic, morphological and engineering investigations and studies
- G2-058 Check plying of overloaded vehicles through strong regulations
- G2-059 Regularly undertake pre-flood inspection and preventive repairs.
- G2-060 Carry out comprehensive river morphology study for determining the causes for the deterioration of navigability due to siltation
- G2-061 Monitor and select channel routes in big rivers through appropriate hydraulic study
- G2-062 Develop strategic master plan for navigability improvement through dredging programmes
- G2-063 Reclassify waterways and redistribute responsibilities amongst organisations such as BWDB, IWTA, LGED, etc.
- G2-064 Enact regulations for private dredging and provide authority to an appropriate body to take punitive measures.
- G2-065 Modernise mechanised boats' registrations and regulations
- G2-066 Enhance cargo handling capacity of the international airports for efficient handling of relief goods
- G2-067 Allow handling of Relief Cargo flights by Civil Aviation Authority, with information to Foreign Ministry and PMO (Armed Forces Division)
- G2-068 Computerise operation of drainage system based on Drainage models

Flood Response

General Measures

- G2-069 Delegate administrative and financial power to field officers for quick protection and restoration works during flood emergencies.

Non-Structural Measures

- G2-070 Bring small air-crafts belonging to private sector into the relief net

Recommendations of Working Group 3

Impact of Flood on Agriculture, Livestock, Fisheries & Industries Sectors and Mitigation Options

Day 1: Tuesday, September 7, 2004

Chair: Mr. M.K. Anwar, MP, Hon'ble Minister for Agriculture

Co-Chair: Mr. Abdullah Al Noman, MP, Hon'ble Minister for Fisheries and Livestock

Day 2: Wednesday, September 8, 2004

Chair : Mr. Shahjahan Seraj, Hon'ble Minister for Jute and Textile

Co-Chair: Mr. Md. Abdus Salam Pintu, MP, Hon'ble Deputy Minister for Industries

Papers Presented:

1. 2004 Floods and the Industries of Bangladesh by **Col. M. M. Jahangir psc (rtd)**, The Federation of Bangladesh Chambers of Commerce & Industry (FBCCI)
2. Impact of Flood on Agriculture and Mitigation Options by **Md. Tariq Hassan**, Director General & **Md. Wasiuzzaman Akand**, Director Training, Department of Agricultural Extension
3. Options for Flood Risks and Damage Reduction for Fisheries Sector by **Dr. Md. Giasuddin Khan** & **Mr. Syed Arif Azad**, Department of Fisheries
4. Impact of Flood on Livestock & Mitigation Options by Department of Livestock Services by **Dr. Md. Abul Kalam**, Upazila Livestock Officer, DLS.
5. Impact of Flood on Dairy Farming and Mitigation Options by **Mohammad Younus Miah**, President, Bangladesh Dairy Owners Association
6. Impact of Flood on the Garments Industry and Mitigation Options by Research Cell, BGMEA

Recommendations

Flood Preparedness

General Measures

- G3-001 Continuously monitor major infrastructure, e.g., Jamuna Bridge, to detect adverse effects on erosion and take remedial measures
- G3-002 Facilitate additional investment for flood proofing construction through appropriate credit facilities and construction codes as appropriate; also for build-up of strategic reserve
- G3-003 Facilitate local government & community involvement in flood preparedness activities through participatory process

Structural Measures

- G3-004 Raise mud-built platforms, perimeter of ponds, extra floors in schools (in old and new ones as appropriate) & factory buildings as shelters for livestock, poultry, machineries, inventories, etc. Take extra care of saline zone industries in order to minimize the corrosive action of saline water.
- G3-005 Use nets, cages and bamboo-made 'bana' to prevent fish migration
- G3-006 Construct roads higher than the flood level
- G3-007 Make road, embankment & similar infrastructure environment-friendly in general, and fish-friendly, in particular, through appropriate and adequate appurtenant structures
- G3-008 Use concrete blocks of sand and cement to lower construction costs, minimise sand carpeting and keep rivers more navigable
- G3-009 Plant suitable trees species for preventing soil erosion along roads and embankments
- G3-010 Plant fodder trees to provide fodder and also fuel in times of emergency

Non-Structural Measures

- G3-011 Ensure supply of strategic inputs such as, feed and drugs for livestock, seed and seedlings for crops. To this end, build up strategic reserves of feed, medicines & seeds and maintain these at various admin. levels through DAE, DLS, respective associations, etc.
- G3-012 Undertake R&D on shorter crop cycles, problems of sand carpeting and appropriate crop varieties
- G3-013 Regulate feed and veterinary drugs market in times of floods
- G3-014 Ensure emergency vaccination programmes through mobilisation of veterinary teams
- G3-015 Facilitate communication in times of floods, provide for several mechanised boats at an appropriate admin. level (village/union)
- G3-016 Ensure gender dimensions of production activities and flood proofing
- G3-017 Facilitate land zoning for settlement purposes, resettlement of distressed people, specific production activities, such as dairy farming through appropriate laws, rules and procedures, as necessary
- G3-018 Institute more dependable & flexible Early Warning System (EWS) by incorporating as many relevant factors as possible

- G3-019 Disseminate flood forecast and warning messages in simple and easy language through all national and regional level media
- G3-020 Ensure that flood early warning is as much region and location specific as possible
- G3-021 Involve local government in dissemination of early warning

Post- Flood Reconstruction and Rehabilitation

Non-Structural Measures

- G3-022 Damage assessment is often inaccurate. For rehabilitation purpose, estimate asset loss properly through independent, properly trained assessors, transparent book keeping and validation through sample surveys
- G3-023 Take into account both positive and negative effects of flood during damage assessment
- G3-024 Identify most severely affected - by and large the poor, the weak and the marginal groups. Ensure that they are the main focus of rehabilitation
- G3-025 Ensure methodological improvement in assessing damages to the poor, as benchmarking makes all the difference
- G3-026 Facilitate risk insurance for various sectors. Make settlement of insurance claims easier
- G3-027 Provide credit, if necessary, on easy terms. Use refinancing and rescheduling facilities as necessary. If needed, provide appropriate legal cover
- G3-028 Underwrite provisions for consumption loans in credit operations of financial institutions, if necessary.
- G3-029 Create Risk Management Fund in revenue budget of ministries with stringent conditions of utilisation during disaster emergencies.
- G3-030 Create enabling conditions for voluntary fund creation by community for use only during emergency
- G3-031 No recommendations but questions were raised on how beneficiaries of help/grants/support may pay back to community once production resumes; could be no retrenchment promise by industrialists for a year or farmers paying back seeds or its value in future. Some of this can be part of a community emergency fund that will lessen need for immediate help from government during future crises
- G3-032 Facilitate IGAs and micro credit after flood. If necessary, use central Zakat funds as well as encourage individuals to contribute to Voluntary Community Fund
- G3-033 Lack of coordination is a major impediment. To overcome this, each year within a specific date, inform Local Governments of all public interventions including their budgets under their geographical jurisdiction in order to scrutinize overlapping, remove lack of coordination and finalise through their vetting. Build local government capacity in this regard.
- G3-034 Most policies do not include disaster risk reduction provisions. Revise and make these consistent with one another. Revise PoAs also accordingly. Provide legal cover for these major changes as soon as possible.
- G3-035 Delineate administrative responsibility for crops outside the purview of MoA, and industries outside MoI during emergencies

Recommendations Of Working Group 4

Impact of Flood on Housing, Urban Planning, Utilities (Water Supply, Sanitation) & Environment and Mitigation Options

Day 1: Tuesday, September 7, 2004

Chair: Mr. Tariqul Islam, MP, Hon'ble Minister for Environment & Forest

Co-Chair: Mr. Aman Ullah Aman, MP, Hon'ble State Minister for Labour & Employment

Day 2: Wednesday, September 8, 2004

Chair: Mr. Alamgir Kabir, MP, Hon'ble State Minister for Housing & Works

Co-Chair: Mr. Zafrul Islam Chawdhury, MP, Hon'ble State Minister for Environment & Forest

Papers Presented:

1. Impact of Flood on Water Supply, Sanitation, Drainage of Dhaka City and Mitigation Options by **Mr. A.N.H Akhtar Hossain, PEng.** Managing Director, **Dr. Kazi Ali Azam,** Deputy Managing Director and **Mr. Md. Serajuddin,** Superintending Engineer, Dhaka Water Supply & Sewerage Authority
2. Impact of Flood on Rural Water Supply & Sanitation and Mitigation Options by **Mr. Amanullah-al-Mahmood,** Superintending Engineer, DPHE
3. Impact of Flood on Environment and Mitigation Options by **Mr. Khan M Ibrahim Hossain,** Additional Secretary, Govt. of Bangladesh and **Dr. Mostafa Kamal Farooque,** Director General, Department of Environment (DoE)
4. Global Climate Change and Floods in Bangladesh: Mitigation Options by **Dr Mahfuzul Haque,** Joint Secretary, Ministry of Environment and Forests
5. Impact of Flood on Forest Resources and Mitigation Options by **Mr. M. Anwarul Islam,** Chief Conservator of Forests, Forest Department
6. Impact of Flood On Housing and Flood Shelters and Mitigation Options by **Mr. A. F. M. Manzurul Islam,** Chief Engineer, Public Works Department
7. Flood Impact Mitigation in Cities through Landuse Planning by **Mr. K.M. Maniruzzaman,** Associate Professor and Head, Dept. of Urban and Regional Planning, Bangladesh University of Engineering and Technology
8. Impact of Flood and National Housing Policy by **Mr. ATM Ataur Rahman,** Chairman, National Housing Authority
9. Implications of Flood and Dhaka City Planning by **Md. Shahid Alam,** Chairman, RAJUK

Recommendations

Flood Management and Mitigation

General Measures

- G4-001 Update Water Supply and Sanitation Policy, 1998 through addressing disaster management issues
- G4-002 Ensure integrated planning
- G4-003 Ensure coordination among the concerned agencies for better preparedness and management of floods in urban areas
- G4-004 Ensure that only one organization has the authority & responsibility for developing & maintaining the drainage system of Dhaka. Apply the same principle to other metropolitan cities.
- G4-005 Besides capital investment, ensure non-capital intensive measures
- G4-006 Ensure comprehensive master plan for disaster management for all urban areas, including Dhaka city
- G4-007 Update and integrate the Dhaka city sewerage master plan & drainage master plan
- G4-008 Foster close cooperation between Bangladesh and upper riparian states such as India and Nepal
- G4-009 Seek international cooperation for mitigation of impact due to global climate change
- G4-010 Ensure that EIAs for industries take flood into consideration and are reviewed by an independent committee
- G4-011 Strengthen DOE
- G4-012 Seek increased assistance from Global Environment Facility (GEF) on climate change mitigation and adaptation measures
- G4-013 Conduct a study in order to examine co-relation between the recent floods and climate change
- G4-014 Conduct a full-scale Environmental Impact Assessment (EIA) of the 2004 floods with suggested recommendations to overcome difficulties
- G4-015 Undertake necessary preparatory work in order to enlist in the agenda of the up-coming climate change related meetings, issues related to “environmental refugees” due to climate change and relaxation of immigration laws of the developed countries to accommodate such refugees
- G4-016 Revisit the existing laws and regulations and frame new laws in order to prohibit actions causing climate change
- G4-017 Undertake studies on sector-specific vulnerability and adaptation to climate change and mitigation measures
- G4-018 Implement development projects aimed at promotion of alternate and renewable sources of energy
- G4-019 Establish coordination among all sectoral agencies on climate change related issues

- G4-020 Accelerate activities of the Designated National Authority (DNA) and develop projects under Clean Development Mechanism (CDM)
- G4-021 Raise the most vulnerable nursery sites through earth filling
- G4-022 Monitor NGO activities
- G4-023 Ensure decentralization of urbanization & proper urban planning for rural townships / Growth centres

Flood Preparedness

General Measures

- G4-024 Stop indiscriminate housing in the flood plains, villages. Immediately start planned village programme & regulate rural housing
- G4-025 Consider alternative sources of drinking water, including rain water harvesting and reserve ponds with raised embankment
- G4-026 Stop box culvert construction
- G4-027 Make provision for waste water treatment plant compulsory for industries
- G4-028 Establish new nurseries at heights above the maximum flood height level
- G4-029 Raise more flood-resistant species in the nurseries of flood-prone areas. Similarly plant more flood-resistant and comparatively taller species
- G4-030 Construct floating nurseries
- G4-031 Enhance coastal green belt programmes
- G4-032 Make flood (disaster) risk mitigation through land use planning an integral part of land use planning process
- G4-033 Protect rivers from encroachment
- G4-034 Impose restriction on further industrialization in and around Metro Dhaka
- G4-035 Review and update DMDP plan (structure plan and urban area plan)
- G4-036 Ensure institutional reform and adequate manpower to enhance the capacity of RAJUK

Structural Measures

- G4-037 Develop appropriate technology with local adaptation for raising tube wells and, honour indigenous knowledge
- G4-038 Install at least 2 tube wells in each flood -prone village with raised platforms at feasible strategic location (growth center, educational institute).
- G4-039 Construct immediately a sewerage treatment plant to make the Begunbari khal pollution free
- G4-040 Keep and maintain the existing wetlands in and around the natural canals as retention ponds.

- G4-041 Construct pumping stations on an emergency basis at Rampura & Janapath with sufficient retention pond area. In particular, maintain Hatir Jheel as a retention pond in front of Rampura Regulator
- G4-042 Restore and maintain all wet lands
- G4-043 Ensure EIA for drainage before communication infrastructure development
- G4-044 Ensure sufficient open space and water bodies in residential area development plans (both private and public)
- G4-045 Restore all Canals/Khals/Lakes in Dhaka City
- G4-046 Undertake regular dredging of rivers around Metro Dhaka
- G4-047 Construct retention ponds by acquiring land and maintain these properly
- G4-048 Construct all structures including shelter, schools, health centers above maximum flood level
- G4-049 Update Building Construction Act 1952, with punitive provision for hill cutting. Implement Wetland Act 2000 and Town Improvement Act 1953
- G4-050 Construct school buildings with vertical expansion for optimum use of land
- G4-051 Ensure that building construction considers all disasters, including flood, cyclone, storm surge, earthquake and land slide
- G4-052 Explore innovative technologies such as floating construction

Non-Structural Measures

- G4-053 Develop an emergency preparedness plan
- G4-054 Increase manpower of DPHE including capacity building
- G4-055 Build awareness through dissemination of IEC materials on water and sanitation
- G4-056 Strengthen information management system of DPHE to ensure prompt emergency mitigation (e-mail, fax, mobile phone, etc at Upazila level)
- G4-057 Activate Dhaka city disaster management committee
- G4-058 Formulate and implement appropriate and comprehensive national land use plan
- G4-059 Make urban land use planning mandatory
- G4-060 Enforce Wetland Act properly. Update the Act to minimize legal loop holes.
- G4-061 Strengthen legal provisions for land use control
- G4-062 Use more local expertise in urban planning and address local situations
- G4-063 Impose restriction on dense industrialization
- G4-064 Ensure sufficient open space and water bodies in residential area development plans (both private and public)

- G4-065 Prepare urban area plan for each city and implement the plan
- G4-066 Ensure comprehensive EIA before any flood control structure is implemented
- G4-067 Streamline update of town plans and monitoring of implementation
- G4-068 Encourage planned growth of small towns as service centres for rural areas
- G4-069 Promote the idea of compact township to reduce haphazard settlement expansion.
- G4-070 Legalise the BNBC 1993.
- G4-071 Approve and enforce the Building Construction Rule, 2004

Recommendations Of Working Group 5

Impact of Flood on Social Services, Law & Order and Mitigation Options

Day 1: Tuesday, September 7, 2004

Chair: Mr. Ziaul Haq Zia, MP, Hon'ble State Minister for Local Govt. Rural Development & Co-operatives

Day 2: Wednesday, September 8, 2004

Chair: Mr. A. N. M. Ehsanul Haq Milon, MP, Hon'ble State Minister for Education

Papers Presented:

1. Impact of Flood on Primary Education and Mitigation Options by **Dr. Aslam Alam**, Project Director, IDEAL Project, Department of Primary Education
2. Impact of Flood on Health and Hygiene in Rural and Urban Areas and Mitigation Options by Professor **Dr. Md. Mizanur Rahman**, Director General of Health Service et al
3. Impact of Flood on Women and Children in Bangladesh by **Ms. Yeameen Akbory**, Project Director, Ministry of Women and Children Affairs
4. Community Participation in Flood Management by **Dr. Riaz Khan, Mr. Ahmadul Hassan, Mr. S.H.M. Fakhruddin**, CEGIS

Recommendations

Flood Preparedness

Structural Measures

- G5-001 Raise the playground of schools above the highest flood level wherever possible
- G5-002 Construct 3/4 storied Cluster Residential Housing above the highest flood level in the flood prone areas having facilities for schooling, health care, market, etc as rural township

Non-Structural Measures

- G5-003 Carryout impact assessment study for flood damage
- G5-004 Prepare guidelines for disaster damage assessment
- G5-005 Undertake vulnerability analysis of different communities, structures, etc
- G5-006 Prepare a standing order on roles and responsibilities of education sector officials/ Management Committee/Governing Body office bearers
- G5-007 Install and maintain an effective information system
- G5-008 Identify schools used as flood shelters
- G5-009 Organise training programmes on disaster management for heads of institutions and chairmen of school management committees
- G5-010 Update disaster education curriculum
- G5-011 Incorporate health education in the curriculum
- G5-012 Develop disaster coping strategies
- G5-013 Create awareness and community participation among the flood-prone people

Flood Response

Structural Measures

- G5-014 Construct new health facilities above flood levels.
- G5-015 Construct innovative latrines to avoid contamination of flood water

Non-Structural Measures

- G5-016 Deploy forces as necessary
- G5-017 Involve the local community and local administration at district and upazila level; coordinate at Union Parishad level
- G5-018 Introduce community police and employ them for maintaining law and order
- G5-019 Develop a code of ethics for the print and electronic media

- G5-020 Develop guidelines for electronic media for disaster preparedness
- G5-021 Ensure regular and timely weather forecasting
- G5-022 Ensure positive information and reporting in the newspapers
- G5-023 Highlight vital instructions in the media for people to follow in areas such as safety of life, health, hygiene, mother & child care & safety, availability of medicines, snake bite, diseases etc.
Publicise crop damages & rehabilitation programme.
- G5-024 Prepare local contingency plan for flood prone zones [**Components:** (a) Early warning and quick dissemination of message, (b) evacuation plan, (c) plan for protection of life, community and household resources including live stock, (d) standard guidelines for flood shelters with respect to space per capita, toilet facility for male and female, privacy, cleaning, sanitation, vector control, water supply, facility for medical services and health education, security, special protection for children; (d) food supply plan with respect to cooking, safety, adequacy, balance, age, sex and vulnerability and distribution method, (d) transportation, (e) continuing availability of basic services (health, family planning, nutrition), (f) communication and coordination within and between departments and with higher levels, (g) post-flood rehabilitation plan including special credits for women entrepreneurs
- G5-025 Provide adequate fund and administrative authority to district and upazila health managers for emergency purchase, repair or rental through Shastha Sheba Unnayan Committee.
- G5-026 Improve inter-sectoral coordination among different departments (viz. with customs)
- G5-027 Provide EPR training to health personnel
- G5-028 Prepare long term appropriate and sustainable solutions for water supply, sewerage system and garbage disposal in urban areas
- G5-029 Provide health education covering flood and disaster related health problems.

Recommendations Of Working Group 6

Impact of Flood on Economy, Major Infrastructures & Livelihood and Mitigation Options

Day 1: Tuesday, September 7, 2004

- Chair: Barrister Aminul Haque, MP, Hon'ble Minister for Post & Telecommunication
- Co-Chair: Mr. Anwarul Kabir Talukdar, MP, Hon'ble State Minister for Planning & Finance

Day 2: Wednesday, September 8, 2004

- Chair: Mr. Iqbal Hassan Mahmud, MP, Hon'ble State Minister for Power, Energy & Mineral Resources
- Co-Chair: Mr. Shah Mohammad Abul Hossain, MP, Hon'ble State Minister for Finance & Planning

Papers Presented:

1. Macroeconomic Impact of Flood in Bangladesh: Some Thoughts and Recommendations, by **Dr. Quazi Mesbahuddin Ahmed**, Member, **Dr. M. Ismail Hossain**, Consultant & **Dr. Bazlul Haque Khondoker**, Consultant, General Economics Division, Planning Commission
2. Impact of Flood on Power Sector and Mitigation Options: BPDB's Perspective by **Mr. Md. Abdul Muttalib**, Member, P&D, Bangladesh Power Development Board
3. Impact of Flood on Power Sector & Mitigation Options by **Mr. Syed Sarwar Hussain**, Executive Director, Rural Electrification Board
4. Impact of Flood on Telecommunications & Mitigation Options by BTTB by **Engr. Md. Monwar Hossain**, GM / Project Director, Submarine Cable Project, BTTB, Ministry of Posts & Telecommunications
5. Mobilization of External Resources for Flood Rehabilitation By **Mr. M. A. Muktadir Mazumder**, Joint Chief, Economic Relations Division (ERD), Ministry Of Finance

Recommendations

Flood Preparedness

General Measures

- G6-001 Examine the existing development policies and reformulate them in the context of recent flood. Ensure that the initiative in this regard is taken by the Ministry of Finance & Planning
- G6-002 Make provision for an emergency special fund in the annual budget for disaster management and rehabilitation and reallocate funds from one area to another if this special fund is found inadequate. Also generate additional funds through lottery or any other legal means and in rest the unspent amount of this fund to generate additional fund
- G6-003 Ask Planning Commission to follow simplified project processing mechanism in order to help quick assessment and expeditious implementation of disaster rehabilitation activities
- G6-004 Delegate more administrative and financial power to the local administration and local level officials of different departments through amending the existing Public Procurement Regulation.

Structural Measures

- G6-005 Construct different installations of important utility services e.g. Power, T&T, Gas, Water Supply, etc installations at an elevation higher than the maximum flood level
- G6-006 Revise vertical clearance for distribution lines in the flood prone areas
- G6-007 Connect all Upazilas and Growth Centres with the district H/Q through digital radio links in the flood prone areas

Non-Structural Measures

- G6-008 Develop appropriate expansionary economic policy that incorporates Disaster Risk Management best practices.
- G6-009 Develop in house capacity through BBS for rapid assessment of macroeconomic losses caused by natural disasters. Conduct household income and expenditure surveys as frequently as possible.
- G6-010 Involve private sector in risk analysis and risk reduction studies.
- G6-011 Ensure separate specifications for electrical service connections in the flood prone areas.
- G6-012 Ensure capacity building for emergency infrastructure e.g. Gas, Power, T&T etc. maintenance work.
- G6-013 Ask BTTB mobile network to give priority to flood prone areas.
- G6-014 Allocate funds for emergency restoration and rehabilitation works at the local administrative level.

Flood Response

Non-Structural Measures

- G6-015 Build an effective and timely flood warning and flood forecasting system based on modern technology. Ensure dissemination of Early Warning to all stakeholders.

Post- Flood Reconstruction and Rehabilitation

Non-Structural Measures

- G6-016 Speedily implement rehabilitation projects and ensure transparent use of funds.
- G6-017 For facilitating income generation for the rural poor, start rehabilitation in the rural areas immediately.
- G6-018 Ensure the availability of adequate critical inputs to the farmers such as seeds, fertilizer, agricultural credit, power, diesel and equipments through appropriate institutional mechanism.
- G6-019 Re-introduce of KABIKHA and similar types of programmes during the post-disaster period.

Glimpses of the Workshop



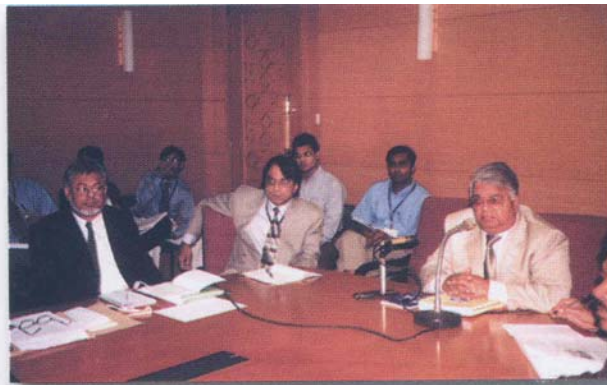
Mr. M. Saifur Rahman, Hon'ble Finance and Planning Minister, Government of Bangladesh, delivering his speech at the inaugural session of the Workshop



Closing session of the workshop









Implementation Matrix

The implementation matrix should be regarded as only preliminary and indicative. The matrix would be finalized after further consultation with concerned Ministries and organizations

Matrix for Implementation of the Recommendation of National Workshop on Flood Risk and Damage Reduction in Bangladesh

Keynote Paper 1: An Overview on Impacts of Flood in Bangladesh and Options for Mitigation

Code No.	Recommendations	Linkage	Time Frame (Month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Flood Management and Mitigation								
General Measures								
K1-001	Regional cooperation: As more than 90% of the flood flow originate from outside the country, Bangladesh alone cannot solve the flood problem. For effective flood management, basin-wide approach with concerted regional participation may be pursued. A regional flood management initiative should be initiated with participation from all co-riparian countries.	G1-008 G4-008	6	MoWR/MoFA	WARPO/ JRC	1.0	GoB/UNDP/ WB/ADB	SAARC/ BIMTEC forums could be utilised, Track-2 initiative should be further strengthen.
K1-002	The Indian River Link Project: The proposed Indian river link project would be a disaster for the society, economy and ecology of Bangladesh. Immediate actions are required to foster dialogue with the Indian side on this issue. There		6	MoWR/MoFA	WARPO/ JRC	1.0	GoB/WB/ADB	Civil Society should be mobilised to foster people to people contact. Scientific and academic institution should initiate research programmes. Media has

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	should also be an initiative from the civil society, academicians, scientists and professionals on both sides of the border to develop awareness regarding the probable adverse effects of the proposed project. Scientific studies may be undertaken to assess all the probable impact of the Indian River Interlink Project. The international community may also be apprised of the viewpoints of Bangladesh.							an important role.
Flood Preparedness								
General Measures								
K1-003	Flood zoning and risk mapping: A comprehensive approach is required to develop flood zoning and risk maps. All development activities in the floodplains should be coordinated based on these	G1-021	12	SoB/BWDB/MoL/MoA/SRI	Consultants	2	GoN/GoB/ADB/WB/JICA	This may be included in the on going CDMP
K1-004	Rationalization and adequate maintenance of existing FCD projects: for prevention of any failure of flood protection embankments or infrastructure, mitigate adverse impact on unprotected areas, by making	G1-013	6	BWDB	Planning cell of agency	0.25	GoN/GoB/ADB/WB/JICA	WMIP project would support this initiative

Code No.	Recommendations	Linkage	Time Frame (Month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	existing infrastructure for drainage (sluices, drainage channels etc.) functional							
K1-005	Flood management modeling: development options in the floodplains should be studied in an integrated and scientific manner.	G1-026		MoWR/ MoLGRDC/ Planning Commission	IWM/ BWDB	On-going	GoN/GoB/ADB /WB/JICA	Existing models to be updated with recent topographic data of flood plains. P C should issue directive.
K1-006	Erosion prediction and monitoring: available modeling integrated with remote sensing and GIS technology for a nation-wide erosion prediction and monitoring should be immediate instituted	G1-026	24	MoWR	IWM	On-going	GoN/GoB/ADB /WB/JICA	On-going project of BWDB. Further expansion of the project is required to cover the entire country.
K1-007	Drainage Improvement: The natural drainage need to dredged and made free from encroachment to bring back the original conveyance capacity. Canal Digging program may be strengthened with proper technical guidelines and effective monitoring.		12	MoWR	Existing Resources of BWDB	700	UNDP/ADB/W B/GoN/GoB	Nation-wide programme with people's participation.
K1-008	Off-take Maintenance: It is		12	MoWR/	BWDB/	1	UNDP/ADB/W	Coordination between

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	important the offtakes of the rivers are regularly dredged to allow flood flow distribution in wider areas.			MoShipping	BIWTA		B/GoN	BWDB and BIWTA is required.
K1-009	Integrated Floodplain Management: It is of utmost importance that all agencies operating in the floodplains should follow an integrated approach on a scientific basis. People of floodplains should be consulted and involved in all phases of development. There should be government guidelines for any development in the floodplains, which would pave the way for an Integrated Floodplain Management.		12	MoWR/ MoLGRDC	Consultants	2.0	UNDP/ADB/W B/GoN	
K1-010	Urban Flood Management: Cities and towns are losing the natural drainage routes and flood retention ponds rapidly. As a result, severe drainage congestion in many of the Towns and Cities has become a common phenomenon. There is a need for immediate actions to free the natural drainage routes from encroachment, and to design and implement		12	MoWR/ MoLGRDC/MoL/ MoEst	BWDB/ City Corporation/ DWASA/ CWASA/ DC Office	2.0	UNDP/ADB/W B/GoN	Coordination of activities of various agencies and harmonisation of Sectoral policy is the key.

Code No.	Recommendations	Linkage	Time Frame (Month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	sustainable drainage management system for each of the urban areas. Proper urban planning should be undertaken for the growth centres and newly developed urban areas, incorporating provisions for urban drainage.							
K1-011	Improvement of Lead-time for Flood Forecast: The existing flood forecasting technology is able to provide short-term (48 hrs) forecasts, which are not sufficient in taking comprehensive flood preparedness/response activities. The lead-time of forecasts could be extended using climate forecasts. The CFAB project has paved the way and the developments made through CFAB should be carried forward.	K1-011 G1-052 G1-025	36	MoD/BMD/BWD B/DAE/DMB	Gatech/ADP C/BMD/BW DB/TWM/C EGIS/DAE/ DMB	5	UNDP/ADB/W B/GoN/USAID	USAID funded project CEAB may be extended.
K1-012	Flood Proofing and Shelters: In many areas of Bangladesh, like the Haor areas, Chalan Beel or the depressions of the south-central region, full flood protection would not be advisable because these kinds of	GI-017	24	BWDB/LGED/LGI /MoL	Consultants/ Planning cells of Agencies	10	GoN/GoB/ADB /WB	

Code No.	Recommendations	Linkage	Time Frame (Month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	measures are not economically viable and at the same time this could result in destruction of the ecologically sensitive wetland environment. Options for flood mitigation in these areas should focus on saving people's life and property. Various flood proofing measures could be adopted for the purpose. One of the options may be to build clustered habitats with all the civic amenities. This may be undertaken on a pilot basis under Asrayan Project for the poor in the Haor areas.							
Flood Response								
K1-013	Updating and further development of the Standing Orders for Disaster Management should be under taken.		12	MoFDM	Consultant	1.0	WB/GoB	CDMP
K1-014	An ICT based Flood Response system, including a nation-wide network of flood information database by connecting databases of various agencies involved in flood response activities should be developed	G1-023	24	MoFDM	Consultant	2.0	WB/ADB/ JICA/UNDP	Include as a component of CDMP

Code No.	Recommendations	Linkage	Time Frame (Month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	and implemented. Such a system could be developed based on internet and wireless communication technologies;							
K1-015	Training and capacity building of field officials and community workers, volunteers and NGO staffs in flood fighting and relief activities should be under taken.		24	MoFDM/DMB	Consultant	2.0	WB/ADB/UNDP/JICA/GoB	
K1-016	It is imperatives that for implementing a participatory approach in flood disaster management and to make it effective, awareness about any disaster event and the role of all concerned should be clearly understood. For this purposes the government, NGOs and others concerned should undertake concerted efforts. Together with training and capacity building of field officials and community workers, volunteers and NGO staffs in flood fighting and relief activities, the media has a great role to play in all stages of disaster management. The media should play a constructive role by issuing special bulletins			MoIn/MoWR/MoFDM	Existing Resources	1.0	GoB	

Code No.	Recommendations	Linkage	Time Frame (Month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	about the disaster, and making people aware of their responsibility during and after the floods.							
Post-Flood Reconstruction and Rehabilitation								
K1-017	Methods and tools for damage assessment: One of the constraints in responding to any disaster and mobilizing resources for reconstruction and rehabilitation is reliable data on flood damage. Measures should be taken to develop tools and methods for generating such data.	G1-066	12	MoFDM/DMB	Consultants	2.0	UNDP/ADB/WB/GoB	
K1-018	Coordination: The limited resources of the government should be properly mobilized and coordinated. For this all agencies working for the post-flood rehabilitation and reconstruction should carry out their activities in a transparent and coordinated manner. There should be a central flood rehabilitation body to	G1-002, G4-002	6	RHD/LGED/BWD B	Planning cell of agencies	3.0	GoB	

Code No.	Recommendations	Linkage	Time Frame (Month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	coordinate such activities.							

Matrix for Implementation of the Recommendation of National Workshop on Flood Risk and Damage Reduction in Bangladesh

Keynote Paper 2: Flood Disaster Management and Risk Reduction in Bangladesh

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Flood Management and Mitigation								
General Measures								
K2-001	Reducing Risks by improving the economic status of the poor who are vulnerable to natural disasters;	G3-027, G3-028, G3-029	12	MoF&P		2.0	GoB	Appropriate regulations required
K2-002	Reducing Poverty by enhancing the long-term development capacity of the poor vulnerable to natural disasters;			MoF&P		10.0	GoB	Policy directives required
K2-003	Sustainable Development by enabling access to development resources and services for long-term resilience of the targeted households;	G3-027		MoF&P		5.0	GoB	Policy directives required

Matrix for Implementation of the Recommendation of National Workshop on Flood Risk and Damage Reduction in Bangladesh

Keynote Paper 3: The Impact of Flood on the Economy of Bangladesh

Code No.	Recommendations	Linkage	Time Frame (Month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Flood Management and Mitigation								
General Measures								
K3-001	Economic Recovery: To the extent that the increased disbursements meet the genuine short-run needs of working capital and is paid back in time, a moderate expansionary stance in monetary management in the short run may be desirable for the sake of economic recovery, even if it means violating the rigid IMF prescriptions.		6	MoF&P				
K3-002	Poverty Alleviation: Ensuring food security is an immediate priority in post-flood economic management. Keeping food prices from rising is							

Code No.	Recommendations	Linkage	Time Frame (Month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	only one part; another is to know how to generate enough purchasing power in the hands of the flood-affected poor so that widespread starvation can be avoided.							

Matrix for Implementation of the Recommendation of National Workshop on Flood Risk and Damage Reduction in Bangladesh

Working Group 1: Flood and Disaster Management and Mitigation Options

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Flood Management and Mitigation								
General Measures								
G1-001	Set national priorities on comprehensive flood management		6	MoWR/WARPO MoF&P		2.0	GoB/UNDP/ WB/ADB	
G1-002	Ensure coordinated planning, design and construction of all infrastructure in floodplains	G4-002	6	RHD/LGED/ BWDB	Planning Commission /IMED/ Planning Cell of Agencies	3.0	No	A policy directives to be issued by the Planning Commission.
G1-003	Ensure required fund for maintenance of physical infrastructure (Embankments, regulators, barrages, drainage			GoB		-	No.	

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	canals, etc.)							
G1-004	Ensure risk-based design of projects and ancillary structures		6	MoF&DM/MoWR/MoC	Design Cell of Agencies	1.0	UNDP/WB/ADB	
G1-005	Integrate disaster risk management into national development process and introduce Disaster Impact Assessment (DIA) for project approval		6	MoF&P/MoF&DM	PC, Planning Cell of Agencies	0.5	UNDP/DFID/ADB/CIDA/USAID/JICA	Policy and Guidelines to be issued by the Planning Commission
G1-006	Adopt a comprehensive all-risks management programme (initiated through the Comprehensive Disaster Management Programme-CDMP)		6	MoFDM/DMB	Consultants	2	UNDP/ADB/WB/CIDA/DFID/JICA	CDMP may look into it.
G1-007	Organise a Regional Conference on Flood Management. Include the issue in the ensuing SAARC and BIMSTEC agenda.		6	MoWR/MoFA	JRC/SA Desk of MoFA	1	UNDP/ADB/WB/CIDA/GoN/JICA/USAID (OFDA)/DANIDA	
G1-008	Foster regional cooperation amongst the co-basin countries such as China, Nepal, India, Bangladesh and Bhutan for collaborative management of water and floods of the Ganges, the Brahmaputra and the Meghna River Basins	G4-008	12	MoWR/MoFA	JRC/SA Desk of MoFA	1	UNDP/ADB/WB/CIDA/GoN/JICA/DANIDA/USAID(OFDA)	

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
G1-009	Create suitable institutional framework like River Basin organization (RBO) for the Ganges, the Brahmaputra and the Meghna, involving the co-basin countries of respective rivers		12	MoWR/MoFA	JRC/ SA Desk of MoFA	0.5	GoN/ADB/WB/ CIDA/JICA/US AID	
G1-010	Intensify diplomatic efforts to involve the international community in order to facilitate regional cooperation for flood management and improvement of flood forecasting and warning system.		12	MoWR/MoFA/ MoFDM	JRC/ SA Desk of MoFA		GoN/UNDP/ /WB	
G1-011	Urge the co-basin countries to start the process of cooperation by agreeing to establish a mechanism for free flow of all flood related data and information to help improve the flood forecasting and warning system in the individual countries		6	MoFA/ MoWR	JRC/ SA Desk of MoFA	1	GoN/UNDP/ ADB/WB/JICA /USAID/CIDA/ DANIDA	
G1-012	Develop policy guidelines for use of advanced analytical tools like mathematical models and GIS for flood impact assessment in any project to be undertaken in the floodplains		6	MoF/MoP/MoWR/ IWM	Planning Cell of Agencies/ IWM	2	GoN/UNDP/ ADB/WB/JICA /USAID	On-going EMIN project may take up some pilot area.

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Structural Measures								
G1-013	Rationalise existing Flood Control and Drainage (FCD) infrastructures		6	BWDB/LGED	Planning Cell of Concerned Agencies	0.25	GDN/WB/ADB	
G1-014	Re-excavate and de-silt rivers, khals and offtakes of distributaries etc.	G2-050, G4-045	24	BWDB/LGED/BIWTA	Planning Cell of Concerned Agencies	20	GoN/GoB/ADB/CIDA/JICA	
G1-015	Ensure safe conveyance of cross-boundary flows by channelising and stabilizing of major rivers.		24	BWDB/JRC		10	GoN/GoB/ADB/WB	
G1-016	Ensure flood protection to all towns and cities including Dhaka Eastern Embankment with provision for efficient storm water drainage from city areas.	G2-049, G2-050	24	BWDB/DWASA/DCC/Municipality	Planning Cell of Agencies/Consultants	10	GoN/GoB/ADB/WB	
G1-017	Construct cluster residential housing above high flood levels with all necessary facilities and amenities through dredged filling of 2-3 ha of area in the Haor and flood prone areas. Remodel and redesign existing Asrayan Projects accordingly. In such a situation, relocate one village in an area of 2-3 ha.		24	BWDB/LGED/LGI / MoL	Planning Cell of Agencies/Consultants	10	GoN/GoB/ADB/WB	

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Non-Structural Measures								
G1-018	Create awareness for community participation in embankment maintenance		12	BWDB/LGED/LGIs/Disaster Management Committee	Field Offices of Agencies/NGOs	2	GoN/GoB/ADB/WB/DFID/EU	
G1-019	Promulgate Water Act to regulate all water management activities		24	WARPO	Legal Consultants	1.5	GoN/GoB/ADB/WB	
G1-020	Prepare an updated topographic map of the country with all infrastructure in digital cover		48	SOB/BWDB/WARPO/SPARRSO	Outsource to Specialised Organisation /Agency	20	GoN/GoB/ADB/WB/JICA	
G1-021	Undertake flood risk zoning/flood mapping preferably through updating Digital Elevation Model (DEM) based on topographic survey data		12	SOB/BWDB/WARPO/MoL/MoA/ SRI	Consultants	2	GoN/GoB/ADB/WB/JICA	
G1-022	Develop a distributed flood information base linking the databases of all agencies involved in flood data collection		12	BWDB/MoFDM/DMB	Outsource to Specialised Organisation	2	GoN/GoB/ADB/WB/JICA	On going CDMP project may include this component
G1-023	Establish Flood Response System (FRS) to support flood response activities		12	BWDB/ CEGIS/IWM/ADPC/BDPC	Outsource to Specialised Organisation	1	GoN/GoB/ADB/WB/JICA/DANIDA/DFID/UNDP	On going project of FFWS of DANIDA may be further extended
G1-024	Extend the existing flood-		24	BWDB/IWM/	Existing	1	GoN/GoB/ADB	

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	forecasting model in the upstream basins of the major rivers to increase the lead-time of forecast.			IWFM	resources		/WB/JICA/ DANIDA	
G1-025	Improve existing weather forecasting (NWP) and climate prediction along with improvement of lead-time of flood forecast in the short-term (5-7 days), medium-term (20-30 days) and long-term (monthly, seasonal) through developing & introduction of Numeric Weather Prediction Model (NWPM). Continue the ongoing programme on Climate Forecast Application in Bangladesh (CFAB).		36	BWDB/DMB/ BMD/ DAE	On going GATECH, ADPC, BMD, BWDB, DAE, DMB, CEGIS, IWM	5	GoN/GoB/ADB /WB/JICA	On going project CFAB of USAID, needs extension and further resource mobilization
G1-026	Strictly follow the practice of using Flood Management Models and Erosion Forecast Models for flood impact assessment and erosion monitoring		24	BWDB/IWM/WA RPO/LGED/RHD	On going	2	GoN/GoB/ADB /WB/JICA	On going project of BWDB, WARPO need better co-ordination
G1-027	Develop guidelines for rehabilitation of infrastructures		24	Planning Commission	Consultants/ Deptt. Resource	2	GoN/GoB/ADB /WB/JICA	
G1-028	Develop quick flood damage assessment methods and tools	G1-072, G3-022	24	Planning Commission	Consultant	1.5	GoN/GoB/ADB /WB/JICA	

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Flood Preparedness								
General Measures								
G1-029	Conduct hazard mapping, vulnerability and capacity assessments.	G1-020 G1-021	24	BWDB/DMB/ WARPO	Consultants	2	GoN/GoB/ADB /WB/JICA	This may be included in the on going CDMP
G1-030	Intensify public awareness and advocacy in order to enhance people's capacity to cope with disaster.		60	MoF&DM/DMB	NGOs/ Field offices of Agencies	2	GoN/GoB/ADB /WB/JICA/ DFID	This may be included in the on going CDMP
G1-031	Promote family and community level flood preparedness and contingency planning.		60	MoFDM/DMB/ Disaster Management Committees	NGOs/ Field offices of Agencies	2	GoN/GoB/ADB /WB/JICA/ DFID	This may be included in the on going CDMP
G1-032	Include gender issue in planning and implementation of all aspects related to flood risk management	G3-016	24	MoWR	Planning cell of Agencies	2	UNDP/ADB/ WB/GoN/ DFID	This may be included in the on going CDMP
G1-033	Conduct "lessons learnt workshops" on 2004 flood at different levels.		12	BWDB/IWM	Existing Resources	1	UNDP/ADB/ WB/GoN/ DFID	This may be included in the on going CDMP
G1-034	Take care of special needs of vulnerable groups including the disabled, the children and the elderly.		12	MoHFPW/ MoFDM	Planning cells	1	UNDP/ADB/ WB/GoN/ DFID	
G1-035	Review the standing order on		12	MoFDM/DMB	Consultants	0.5	UNDP/ADB/W	This may be

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	disaster to bring about necessary amendments in the light of the lessons learnt from the 2004 floods.						B/GoN	done under on going CDMP
G1-036	Ensure wide circulation of and strict adherence to Standing Orders on Disaster (SOD) at all levels. Activate all the committees as stated in the SOD and ensure preparation of Action Plans at all levels.		12	DMB	Existing resources	0.5	UNDP/ADB/W B/GoN	This may be done under on going CDMP
G1-037	Incorporate the issues and concerns of river erosion and earthquake in the SOD.		12	DMB	Existing resources	0.5	UNDP/ADB/W B/GoN	This may be done under on going CDMP
G1-038	Develop a Program Management Information System (PMIS) with updated and accurate information on vulnerable population		24	DMB	Consultants	1	UNDP/ADB/W B/GoN	
G1-039	Strengthen the Disaster Management Bureau in terms of manpower and logistics.		24	MoFDM	New recruitment	2	UNDP/ADB/W B/GoN	This may be done under on going CDMP
G1-040	Adopt measures to prevent frequent turnover of officials trained and involved in main-stream disaster management.		PM's Office	MoFDM/ Mo Establishment/ DMB	-	0.5	UNDP/ADB/W B/GoN	
G1-041	Consider the option of distributing		24	MoFDM/ MoHFP	-		UNDP/ADB/W	Necessary

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	balanced diet as relief goods instead of rice only.						B/GoN	Policy Directives may be issued by MoF&DM
G1-042	Put in place a mechanism for continuous and routine feedback for improvement of forecast and warning.		24	BWDB/DMB/ Disaster Management Committees	FFWC/ Consultants	2	UNDP/ADB/W B/GoN	This may be included in the on going FFWSP/ CDMP
Structural Measures								
G1-043	Ensure that all structural interventions follow the National Water Policy and National Water Management Plan		12	WARPO/ Planning Commission	Existing resources	0.5	UNDP/ADB/W B/GoN	
G1-044	Construct high raised multi-purpose flood shelters, (including shelters for cattle and other domestic animals) like the cyclone shelters in the coastal areas. <i>Killa/Halipad/Garveyard</i>	G4-047	3	BPWD/ BWDB/ LGED/ LGIs		10	UNDP/ADB/W B/GoN	
G1-045	Ensure that roads and highways are constructed high enough to be used as a temporary refuge for flood affected people.	G2-035, G3-006	24	Planning Commission/ RHD/ LGED		20	GoB	Policy Guidelines may be issued. Pilot project may be taken up.
G1-046	Develop at least one flood-proof pond (for drinking water and		24	UP/ LGIs		10	UNDP/ADB/ WB/GoN/	

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	cooking) in every village.						UNICEF/JICA/GoB	
Non-Structural Measures								
G1-047	Promote and strengthen indigenous coping mechanisms and survival techniques among the vulnerable people.		36	MoFDM/ DMB		2	UNDP/ADB/WB/GoN	May be included in the CDMP
G1-048	Implement the project titled “Reduction of Risk through Sustainable Livelihood Support” for the most vulnerable people.		36	MoFDM/ DMB/ Planning Commission	Consultants	2	UNDP/ADB /WB/GoN/ DFID/GoB	May be included in the CDMP
G1-049	Update flood forecasting data collection system in terms of intensity, frequency, mode of collection and transmission.		24	BWDB	Outsource to Specialised organisations	3	UNDP/ADB/ WB/GoN DANIDA	May be included in the on going project FFWSP
G1-050	Establish Flood Preparedness Programme in line with Cyclone Preparedness Programme, as per a study report sponsored by UNDP.		24	DMB	NGOs/LGIs	2	UNDP/ADB/ WB/GoN/ DFID	CDMP
G1-051	Commission two Meteorological-cum-hydrological Doppler Radars, one in the northeast (Moulvibazar) and other in northwest (Rangpur) for estimating precipitation covering at least 400km of Ganges, Brahmaputra and Meghna		24	BMD	Consultants	20	JICA	This is important for forecasting flash flood.

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	River Basins							
G1-052	Improve weather forecasts and warnings by introducing Numerical Weather Prediction (NWP) System together with networking of the existing different observatories in BMD. Transfer the NWP Model of CFAB to BMD with necessary capacity building.		36	MoD/ BMD/ BWDB/ DAE/ DMB	GaTech, ADPC/ BMD/ BWDB/ IWM/ CEGIS/ DAE/ DMB	5	UNDP/ADB/ WB/GoN/ USAID	USAID funded CFAB project may be extended with resource mobilization for another 5 years
G1-053	Modernize the existing Meteorological Training Institute of BMD with adequate facilities and carry out R&D programmes for upgrading knowledge-base and developing appropriate tools for weather predictions		24	BMD	Consultants	2	UNDP/ADB/ WB/GoN/ USAID	
G1-054	Put in place an operational flood mapping system based on mathematical modeling, remote sensing and GIS techniques.		24	BWDB/ SPARRSO/ WARPO	Consultant IWM/ CEGIS	2	UNDP/ADB/ WB/GoN/ USAID	On going project of CIDA entitled EMIN / USAID FLOOD MAPPING project may be reviewed and redesigned
G1-055	Ensure that warning messages are user-friendly and relevant to the local context. Replicate the people- oriented flood warning	G3-019	24	BWDB/IWM/ CEGIS/ DMB	Consultants	1.5	UNDP/ADB/W B/GoN	This may be included in CDMP/FFWSP

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	dissemination procedure piloted by BWDB through BDPC							
G1-056	Ensure storage of emergency material (food, fodder, etc.) near flood risk areas and installations		12	MoFDM/ DoF/ DMB/Disaster Management Committee		3	UNDP/ADB/WB/GoN	
G1-057	Designate BWDB as the nodal agency to issue flood forecasts by coordinating the efforts of BMD, BWDB, IWM and SPARRSO		12	BWDB/BMD	Existing resources	0.5	UNDP/ADB/WB/GoN	On going project of DANIDA and JICA may be used
G1-058	Up-grade the existing GTS Link of BMD from 2400 bps to 64000 bps.		24	BMD	Consultants	0.5	UNDP/ADB/WB/GoN	
G1-059	Integrate storm water drainage, sewerage system management and flood prevention in urban areas in the flood prone areas of the country specially for Dhaka Metropolitan City areas.	G4-007	24	DWASA/DCC	Consultants	10	UNDP/ADB/WB/GoN/SIDA	
G1-060	Prepare Master Plan for proper land use planning for all urban areas, Municipalities and City Corporations.		36	LGI/ MoHPW/, MoLGRDC,DoUP, Municipality, City Corporation	Consultant	3	UNDP/ADB/WB/GoN	
G1-061	Ensure availability of equipment, material and manpower prior to crisis period through effective contingency plans.		6	MoFDM		5	UNDP/ADB/WB/GoN/DFID/EU	
G1-062	Put in place a mechanism for continuous training to improve the		6	MoFDM/ DMB/ Disaster	Consultants		UNDP/ADB/WB/GoN/DFID	CDMP project may be used

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	capacity and skills of all those who are involved in disaster management			Management Committees			/JICA/EU	
Flood Response								
General Measures								
G1-063	Establish effective communication with the media so that the extents of damage and government responses are correctly reported.		12	MoI/MoFDM			GoB	
Structural Measures								
G1-064	Undertake sinking and repair of high platform tube-wells in all the flood prone areas	G4-037	12	MoLGRDC/ DPHE	Existing resources	1	WB/GoB	
G1-065	Ensure availability of mobile water treatment plants		12	DWASA/CWASA/ DPHE/ NGO	Existing resources	5	JICA/CIDA/ DFID/DANIDA /SIDA	
Non-Structural Measures								
G1-066	Establish an effective system for Damage and Needs Assessment (DNA)		12	MoFDM/ DMB/ Planning Commission	Consultants	2	UNDP/ADB/W B/GoN	
G1-067	Ensure effective coordination among GoB agencies, and between GoB and other agencies		12	PM's office/Cabinet Div.	Existing resources			Necessary instruction may be issued and effective monitoring necessary
G1-068	Monitor flood response activities		12	MoFDM/ DMB/		0.5	UNDP/DFID/	May be

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	at all levels under proper guidelines			BWDB			DANIDA	conducted under CDMF
G1-069	Ensure IT and telecommunication support for the field level offices.		24	MoTelCom/ T & T Board		2	GoB	
Post-Flood Reconstruction and Rehabilitation								
Structural Measures								
G1-070	Ensure supply of safe drinking water and sanitation facilities in flood-prone areas.		24	DWASA/ CWASA/ / DPHE		5	GoB/ADB/WB/ UNICEF	
G1-071	Undertake re-engineering of damaged structures according to changed hydrological/ morphological scenarios.		24	BWDB/ RHD/ LGED/ PWD	Consultants/ Design cell of agencies	2	GoB	
G1-072	Undertake skill development programmes for quick damage assessment and proper rehabilitation measures before the next monsoon.	G1-031, G3-022	12	Planning Commission and all concerned agencies	Consultants	2	UNDP/ADB/ WB/GoN/DFID /CIDA/JICA	
G1-073	Put emphasis on creation of employment and generation of income for the flood affected people.		12	MoFDM/ DoR & R/ NGO Bureau/BB/PKSF/ SDF		2	ADB/WB/GoB/ JICA/CIDA	
Non-Structural Measures								
G1-074	Undertake comprehensive		24	MoH&PW/	Existing	20	GoB	

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	programmes to prevent deaths from starvation, restore homesteads, rehabilitate agriculture, create employment, prevent epidemics, provide nutritional support to pregnant women and children, and bring back life to normalcy.			MoF&DM/DoHS/ All Disaster Management Committees/LGIs/ DoR&R/WHO/ UNICEF	resources			
G1-075	Ensure safety of vulnerable groups (women, children, disabled) during floods.		24	MoFDM/ MoWCA/ LGIs/NGOs		20	UNDP/ADB/ WB/ILD/UNICEF/WFP	
G1-076	Establish effective GO-NGO coordination for ensuring better flood risk management before, during and after flood disaster.	G4-003, G2-024, G5-024	24	NGO Bureau	Existing resources	2	UNDP/ DFID/ USAID/JICA	May be taken up under CDMP

Matrix for Implementation of the Recommendation of National Workshop on Flood Risk and Damage Reduction in Bangladesh

Working Group 2: Impact of Flood on National Transportation and Mitigation Options

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Flood Management and Mitigation								
General Measures								
G2-001	Consider other water-related natural disasters such as erosion, flood and cyclone etc in drawing up the risk mitigation options		6	MoF&P/MoFDM/ MoWR/WARPO/ DMB	Existing resources			Policy directives may be issued

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
G2-002	Ensure that planning, implementation and maintenance of roads, highways, railways and cross drainage structures, bridges and flood mitigation embankments, appurtenant structures and water ways are done in an integrated manner with emphasis on unimpeded drainage		12	RHD/BWDB/LGE D/ LGIs/ Planning Commission	Planning cell of agencies			Policy directives may be issued
G2-003	Enhance knowledge base and technological capability of monitoring flood vulnerability and real time management of flood hazards by establishing a cell and appropriate institutional linkages with specialised institutions like BUET, IWFM, IWM and RRI etc.		24	MoF&P/ MoWR/ MoFDM	Existing Resources	0.25	UNDP/ ADB/WB/ GoN/JICA	
G2-004	Consider cyclonic surge flood drainage for designing coastal roads with the provision of cross drainage structures and overtopping		12	BWDB/ RHD/ LGED	Planning cell of agencies			Policy and guidelines formulation
G2-005	For tackling flood and emergency situation, provide the executing agency with authority to procure services through short notice tendering; amend the Public Procurement Regulations (PPR 2003) accordingly.		6	MoF & P/ IMED	Existing resources			Policy and guidelines formulation
G2-006	Develop strong public and private sector institutions through inter-	G2-022	12	MoFDM/ NGO Bureau	Existing resources	1		Institutional Development

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	organization linkages and sharing responsibilities							
G2-007	For better institutional co-ordination, rename Ministry of Communications as Ministry of Surface Transport		12	Cabinet Division				Policy formulation

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Structural Measures								
G2-008	Construct flood fuses at predetermined locations on the roads and embankments and operate these on the basis of real time flood forecasting to reduce flood damage		12	BWDB/ RHD/ LGED	Planning & Design cell of Deptt.	30.0		Pilot project may be taken up
G2-009	Metal coastal polder crowns to facilitate rescue and relief operations		6	BWDB/LGED/ RHD	Existing resources	30.0		Policy Directives may be issued
G2-010	Raise railways in flood-prone areas above the Highest Flood Level on a priority basis		6	BR/RHD	Existing resources			Policy Directives
G2-011	Undertake protection of embankments following guidelines in worst affected locations through stabilisation / slope protection measures e.g. Geo-textile and CC blocks; and in less affected locations through plantation /turfing		12	BWDB/LGED/ RHD	Consultants /Planning & Design cell of Deptt.		GoB	Planning and design guidelines may be issued. May be taken up under on-going projects
G2-012	Provide adequate opening in the bridges and drainage structures for quick passage of floodwater.		24	BWDB/LGED/ RHD	Consultants /Design cell of Deptt.	30.0	GoB/ADB/ WB	Guidelines may be issued. MAY be taken up under on-going projects

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Non-Structural Measures								
G2-013	Put in place a multi-modal integrated transport policy		24	MoC/ MoSIWT		1.0	UNDP/ WB/ ADB	Policy and Guidelines may be formulated
G2-014	Carry out a comprehensive study including drainage modelling and environmental analysis		36	BWDB/DoE/RHD/ LGED	Existing resources/ IWM/ CEGIS	2.0	WB/ADB/ GoN/CIDA /JICA/ SIDA	
G2-015	Prepare a detailed guideline for assessment of impact of flood on development works in the transportation sector		24	BWDB/ RHD/ LGED	Existing resources	0.1	GoB	Policy and Guidelines may be formulated
G2-016	Prepare assets inventory of each department for risk assessment and risk management		24	MoFP/MoF&DM/ all concerned agencies	Consultants	2.0	GoB/ UNDP/ DFIP/ USAID/ JICA/ CIDA/EU	Development of proper database may be undertaken
G2-017	Extend the present flood forecasting system to cover the transportation network and facilities	G2-055, G3-001	24	BWDB/DMB/MoC /RHD/LGED	Existing resources	1.0	UNDP/WB /ADB/ DANIDA	May be included in an on-going project
G2-018	Monitoring of hydraulic and Morphological conditions of the rivers on which major bridges like Hardinge, LalanShah, Bhairab, Meghna and Rupsha were constructed regularly through establishing bridge inspection and flood monitoring unit and having		12	BWDB/RHD/BR/ LGED	Existing resources	2.0	UNDP/WB /ADB/ GoB/ DANIDA	Develop monitoring system and models and maintain the models. May be included in on-going projects of BWDB and WARPO, RHD

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	Morphological modelling programme							
G2-019	Strengthen hydrological data collection network and agency		24	BWDB	Existing resources	2.0	UNDP/WB /ADB/ DANIDA/ GoN	Institutional Study and Capacity Building may be included in an on-going project
G2-020	Formulate a National Policy to protect the waterways and to determine the level of fixed structures (roads, railways).		24	BIWTA/BWDB	Consultants	0.5	UNDP/WB /ADB/GoN /DANIDA	Formulation of Guidelines
G2-021	Redefine navigation headway clearance at different locations		12	BIWTA/BWDB/ LGED/ RHD	Consultants	1.0	GoB	Formulation of Guidelines
G2-022	Develop strong public and private sector institutions through inter-organizational linkages and sharing responsibilities.	G2-007		MoC/MoF&DM/ NGO Bureau/LGIs	Existing resources			Institutional Development
Flood Preparedness								
General Measures								
G2-023	Preserve buffer stock of construction materials and bailey bridges to face any emergency		36	RHD/LGED	Existing resources	30.0	UNDP/WB /ADB/GoN /DANIDA	
G2-024	Strengthen coordination among RHD, LGED, BR and other relevant agencies	G1-076, G5-026		RHD/ LGED/ BR etc	Existing resources			Directives may be issued

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
G2-025	Ensure that BRTA acts as regulatory body; if necessary privatise fitness and registration process		12	MoC/ BRTA	consultant	1.0		Institutional Study
G2-026	Construct bus and launch terminals in such a way that these may be used as flood shelters		24	RHD/LGED	Consultants	0.25	UNDP/WB /ADB/GoB	Guide lines for design of terminal
G2-027	Make more allocations for the shipping sector in order to have a proper maintenance programme for river dredging; procure more dredgers		36	BIWTA/BWDB			UNDP/WB /ADB/ GoB	
G2-028	Give the responsibility of dredging/ re-excavating/digging rural internal navigation channels at local level (included in the master plan) to LGED/BWDB		24	BWDB/LGED/ LGIs/ Peoples' participation	Existing resources		GoB	Directives may be issued
G2-029	Ensure private sector participation in route maintenance; ensure total leasing of dredging and route operation		36	BIWTA/BWDB/ LGED	Existing resources	1.0	GoB/NGOs	May be studied and pilot project may be taken up
G2-030	Ensure improvement of drainage system and regular maintenance in each city/town		36	MoLGRD/ DWASA/CWASA/ City Corporation/ Municipalities	Consultants	10.0	UNDP/WB /ADB/ JICA	New project may be formulated and may be incorporated in on-going projects.

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Structural Measures								
G2-031	Ensure slope protection of approach roads to bridges / culverts using measures such as CC Blocks, geo-textile, mattress gabion and for flood embankment by growing turfs like vetiver (Kashful)		12	BWDB/ LGED/ RHD/RRI/IWFM	Consultants / Research	10	UNDP/WB /ADB/ JICA/GoN	Research programme
G2-032	Provide causeways (Irish crossing) in roads in the flash flood areas		24	RHD/LGED	Consultants	2.0	UNDP/WB /ADB	Pilot Study may be taken up
G2-033	Remove obstructions from and stop encroachments in waterways near bridges; promulgate necessary regulations	G2-051, G4-032	36	MoL/District Admn/ BIWTA/ BWDB/ RHD/LGED	Existing resources	0.1		Policy guidelines should be formulated and implementation of existing laws
G2-034	For National and Regional Highways, provide asphalt concrete pavement with hard shoulders		12	RHD	Existing resources	5.0		Pilot Project may be taken up
G2-035	Upgrade at least one road to above the flood level in each union with adequate cross-drainage provisions	G1-045	36	RHD/LGED	Existing resources	5.0	UNDP/ ADB/WB	Pilot project may be undertaken
G2-036	Provide flood overflow system along submersible roads		24	MoC/MoLGRD/ LGED/ RHD/	Consultants	10.0	GoB	Pilot Project may be taken up
G2-037	For flood free roads, adopt adequate flood flow openings to		24	RHD/LGED/ BWDB/Research	Consultants	2.0	GoB/ GoN	Formulation of Design standards

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	ensure unimpeded drainage			Organiasation				and guidelines
G2-038	Implement flood shelters/flood refuge along with road and embankment construction		24	RHD/LGED/BWDB	Consultants	20.0	WB/ADB/GoB/JICA/DFID	Pilot Project may be taken up identifying vulnerable points on priority basis
G2-039	Before and during implementation of dredging, carry out impact study for adverse impact on the river regime		24	BIWTA/BWDB	Consultants	1	GoB/GoN/JICA	Action research
G2-040	Modernise and improve existing major river port terminals and also construct new ones as required		36	BIWTA/BWDB/LGED	Consultants/Contractor	15	UNDP/GoN/WB/ADB	Study and implementation
G2-041	Encourage and implement river loop cuts; ensure proper study of impacts of loop cuts on other areas and study their long-term sustainability through morphological modelling studies		36	BWDB/BIWTA	Consultants/Contractors	20	UNDP/GoN/WB/ADB	Study and implementation
G2-042	Undertake Gorai and Kalni-Kushiyara dredging		36	BWDB	Existing resources and consultants	50	WB/ADB/CIDA	Renewal of project
G2-043	Unplanned infrastructure quite often deteriorates siltation condition; undertake measures to prevent siltation; carry out strategic dredging to prevent siltation of navigation routes		36	BWDB/RRI/BIWTA	Consultants/Research	5	UNDP/GoN/WB/ADB	Action Research and Study

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
G2-044	Preserve natural drainage around all airports (Nikunja created obstacle to ZIA drainage)		36	MoL/DWASA/ Dhaka Dist. Admn/ RAJUK	Existing resources	2	GoB	
G2-045	Keep Tejgaon airport flood free and operational along with its surroundings for emergency relief operations; remove unauthorised/ high-rise buildings in adjacent areas.		36	MoCA/MoL/ RAJUK/ CAAB				Policy directives to be issued
G2-046	Construct flood embankments around all the flood-prone airports of the country or raise the existing Air ports above 100 years Frequency Flood Level; carry out appropriate drainage impact studies		24	MoCA/ CAAB/ BWDB		15	GoB	Policy directives required
G2-047	Complete Patenga Coastal Embankment		36	BWDB	Existing resources	15	ADB/WB/ GoB	
G2-048	Upgrade, improve and maintain Cox's Bazar Airport for disaster management operations		36	MoCA/CAAB		5	GoB/JBIC	
G2-049	Implement Dhaka Integrated Flood Embankment (Eastern By-Pass) project as a priority project		48	BWDB/RHD/ DWASA/ RAJUK/ DCC	Consultants	400	GoB/ADB/ WB/ JBIC	
G2-050	Re-excavate existing drainage canals – especially khals in and	G1-014, G4-045	36	BWDB/BIWTA/ DWASA	Existing resources	10	WB/GoB/ ADB/ JBIC/	

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	around Dhaka city.						JICA	
G2-051	Remove encroachments /constrictions of natural drainage	G2-033, G4-032	24	MoL/All Agencies	Existing resources	2	GoB	Enforcement of existing Law
G2-052	Protect important cities and towns from flood and drainage congestion	G1-016, G2-049	24	MoLGRDC/ MoWR/ BWDB/ City Corporation/ Municipalities	Consultants		WB/ ADB/GoB	
G2-053	Resuscitate drainage canal system within the cities/towns for removing drainage congestion and for navigation, if possible		24	DWASA/ City Corporation/ Municipalities	Consultants	30.0	ADB/WB/ GoN/ DANIDA	An early assessment all over the country may be undertaken
Structural Measures								
G2-054	Ensure that JMBA, RHD and Railway put in place flood monitoring cells and use JMBA morphological study experience		12	RHD/JMBA/BR/ BWDB	Consultants	0.1	DANIDA/ GoB	FFWC may be provide necessary help
G2-055	Monitor regularly the hydraulic and morphological conditions of rivers on which major bridges like Paksey, Bhairab, Meghna and Rupsha were constructed through establishing bridge inspection and flood monitoring unit and having a Morphological modelling programme	G3-001	12	RHD/JMBA/BR/ BWDB	Consultants	2	GoB	Concerned organizations may develop monitoring model with the assistance of IWM and CEGIS

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
G2-056	Enact regulations/legislations to regulate plying of all types of vehicles over submerged roads		12	MoC/MoLGRD	Consultants	0.1		Policy directives may be issued
G2-057	Include appropriate provisions in PCPs for hydraulic, morphological and engineering investigations and studies		12	MoFP/ Planning Commission				Policy guidelines and Implementation
G2-058	Check plying of overloaded vehicles through strong regulations		12	MoC/ BRTA/ RHD/ LGED				Necessary rules may be adopted and public awareness to be created
G2-059	Regularly undertake pre-flood inspection and preventive repairs.		12	All Agencies				Necessary instruction may be used and monitored
G2-060	Carry out comprehensive river morphology study for determining problems during the deterioration of navigability due to siltation		24	BWDB/ BIWTA	Consultants	2	UNDP/AD B/WB	
G2-061	Monitor and select channel routes in big rivers through appropriate hydraulic study		24	BIWTA/BWDB/ RRI	Consultants	2	UNDP/AD B/WB	Action Research may be undertaken
G2-062	Develop a strategic master plan for navigability improvement through dredging programmes		36	BIWTA/BWDB/ RRI	Consultants	2	UNDP/AD B/WB	
G2-063	Reclassify waterways and redistribute responsibilities amongst organisations such as		24	MoPSIWT/ MoWR/IWTA	Consultants	1	UNDP/AD B/WB	Study and recommendation

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	BWDB, IWTA, LGED, etc							
G2-064	Enact regulations for private dredging and provide authority to appropriate body to take punitive measures		24	BIWTA/ MoL/ Dist admn	Consultants	0.50		Policy Guidelines to be prepared
G2-065	Modernise registrations and regulations mechanised boats		24	MoSIWT/				Necessary Act may be promulgated and rules may be framed
G2-066	Enhance cargo handling capacity of the international airports for efficient handling of relief goods		24	MoCA/ CAAB		10.0	GoB	
G2-067	Allow Civil Aviation Authority to handle relief cargo flights with information to Foreign Ministry and PMO (Armed Forces Division)		6	MoCA/ CAAB		0.1		Necessary rule may be framed
G2-068	Operation of drainage system based on drainage models for Dhaka City and Realtime forecasting on drainage congestion and Urban flooding		24	DWASA		2	UNDP/WB /ADB/ DANIDA	
Flood Response								
General Measures								
G2-069	During flood emergencies, delegate administrative and financial power to field officers for quick protection and restoration works		12	MoF&P/ IMED				Review of existing delegation of financial & administrative powers

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Non Structural Measures								
G2-070	Bring small air-crafts belonging to private sector into the relief net		12	MoCA/CAAB				Necessary Act may be promulgated and rules may be framed

Matrix for Implementation of the Recommendation of National Workshop on Flood Risk and Damage Reduction in Bangladesh

Working Group 3: Impact of Flood on Agriculture, Livestock, Fisheries & Industries Sector and Mitigation Options

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Flood Preparedness								
General Measures								
G3-001	Continuously monitor major infrastructure, e.g., Jamuna Bridge, to detect adverse effects on erosion and take remedial measures	G2-054	12	MoWR/ MoC/BWDB/ RHD/ JMBA/ RRI			GoB	Necessary assistance may be obtained from IWM & CEGIS
G3-002	Facilitate additional investment for flood proofing construction through appropriate credit facilities and construction codes as appropriate; also for build-up of strategic reserve	G3-027	12	MoFP/MoFDM/ HBFC/Banks/ MoH & PW				Necessary regulations may be issued.
G3-003	Facilitate local government & community involvement in flood preparedness activities through a participatory process		12	MoFDM/DMB/ NGO Bureau	Consultant	1.0	DFID/SID A/UNDP/C IDA	May be undertaken under CDMP

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Structural Measures								
G3-004	Raise mud-built platforms, perimeter of ponds, extra floors in schools (in old and new ones as appropriate) & factory buildings as shelters for livestock, poultry, machineries, inventories, etc. Take extra care for saline zone industries in order to minimise corrosive action of saline water.		6	MoFP/MoFDM/ MoLGDR/ LGIs/ DMB/ Disaster Management Committees/ LGED	Consultant	5.0	UNDP/ DFID/ CIDA/ USAID/ JICA	Policy guidelines may be issued. Pilot project may be taken up.
G3-005	Use nets, cages and bamboo-made 'bana's to prevent fish migration		6	DoF				Awareness on to be built among all the stakeholders
G3-006	Construct roads higher than the flood level	G1-045, G2-035	12	RHD/LGED	Consultant	1.0	UNDP/WB/ ADB	Policy directives to be issued
G3-007	Make roads, embankments & similar infrastructures environment-friendly in general, and fish-friendly in particular, through appropriate fish adequate appurtenant structures		12	BWDB/RHD/ LGED	Consultant	0.5	UNDP/WB/ ADB/CFDA	Necessary guidelines to be prepared and circulated
G3-008	Use concrete blocks of sand and cement to lower construction costs, minimise sand carpeting and keep rivers more navigable		12	BIWTA/BWDB/ RRI		0.25	GoB	Application Research
G3-009	Plant suitable tree species for		3	MoFE			GoB	Policy directives to

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	preventing soil erosion along roads and embankments							be issued
G3-010	Plant fodder trees to provide fodder and also fuel in times of emergency		3	MoFE				Policy directives to be issued
Non Structural Measures								
G3-011	Ensure supply of strategic inputs such as feed and drugs for livestock, seed and seedlings for crops. Towards this end, build strategic reserves of feed, medicines & seeds and maintain these at various admin. levels by DAE, DLS, respective associations , etc.		12	MoFDM/ DMB Disaster Management Committee			UNDP/ DFID/ JICA/ CIDA	SOD may be updated under CDMP
G3-012	Undertake R&D on shorter crop cycles, problems of sand carpeting and suitable crop varieties		24	DAE/ BRRI/ BARC	BRRI/ BARC	1.5	GoB/USAID/ CIDA	Application Research
G3-013	Regulate feed and veterinary drugs market in times of floods		3	MoFDM/ MoFLS/ DMB/ DLS				May be included in the SOD
G3-014	Ensure emergency vaccination programmes through mobilisation of veterinary teams		3	MoFDM/ MoFLS/ DMB/ DLS				May be included in the SOD
G3-015	Facilitate communication in times of floods, provide for several			MoFDM/ DMB/ Dist Admn.				May be incorporated in SOD

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	mechanised boats at an appropriate admin. level (village/union)							
G3-016	Ensure gender dimensions in production activities and flood proofing	G1-032	12	MoWCA/ /MoFDM	Consultant	1.0	DFID/USAID /CIDA/ UNDP	May be included in the CDMP
G3-017	Facilitate land zoning for settlement purposes, resettlement of distressed people, specific production activities, such as dairy farming through appropriate laws, rules and procedures, as necessary	G1-020	24	MoL/BWDB/SoB/ SRI/SPARRSO/ LGIs/LGED	Consultant	2.0	DFID/USAID /ADB/WB/U NDP	
G3-018	Institute more dependable & flexible Early Warning System (EWS) by incorporating as many relevant factors as possible		6	BWDB/ BMD/ DMB/DAE	Consultant	1.0	DFID/USAID /ADB/WB/U NDP	May be undertaken under CDMP on pilot basis
G3-019	Disseminate flood forecast and warning messages in simple and easy language through all national and regional level media	G1-055	12	MoF&DM/BWDB/ Disaster Management Committees		0.5	DFID//ADB	May be undertaken under CDMP, FFWSP & EMIN
G3-020	Ensure that flood early warning is as much region & location specific as possible	G1-055	12	BWDB/BMD/DAE /DMB	ADPC, IWM, CEGIS	0.5	DFID/USAID /ADB/WB/U NDP	May be undertaken under CDMP, FFWSP & EMIN
G3-021	Involve local government in dissemination of early warning	G1-055		MoLGRD/CDMP/ All agencies				May be undertaken under CDMP & updating of SOD

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Post-Flood Reconstruction and Rehabilitation								
Non Structural Measures								
G3-022	Damage assessment is often inaccurate. For rehabilitation purpose, estimate asset loss properly through independent, properly trained assessors, transparent book keeping and validation through sample surveys	G1-028, G1-072	24	MoFP/ MoFDM/ DMB	Consultant	2.0	UNDP/WB/A DB/DFID	Separate study may be undertaken to establish methodology & testing. Finally it may be included in the SOD
G3-023	Take into account both positive and negative effects of flood during damage assessment			MoFP/Planning Commission/ BIDS/BARC/ WARPO	Research	2.0		Separate study may be undertaken to establish methodology & testing. Finally it may be included in the SOD
G3-024	Identify the most severely affected - by and large the poor, weak and marginal group. Ensure that they are the main focus of rehabilitation		12	MoFDM/ MoLGDR/ LGIs/ UPs	Consultant/ NGO	5.0	UNDP/DFID/ USAID/ CIDA/ JICA	Village wise database may be prepared
G3-025	Ensure methodological improvement in assessing damages to the poor, as benchmarking makes all the difference	G1-072	12	MoFDM/ DMB/ All agencies				A database may be prepared
G3-026	Facilitate risk insurance for various sectors. Make settlement of insurance claims easier		12	MoFDM/ MoFP/ BB				Necessary law may be enacted & rules may be framed

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
G3-027	Provide credit, if necessary, on easy terms. Use refinancing and rescheduling facilities as necessary. If needed, provide appropriate legal cover		12	MoFP/ BB/ PKSP/ SDF/NOGs				Appropriate regulations need to be prepared
G3-028	Underwrite provisions for consumption loans in credit operations of financial institutions, if necessary.			MoFP/ BB				Necessary law and rules may be promulgated
G3-029	Create Risk Management Fund in revenue budgets of relevant ministries, with stringent conditions of utilisation during disaster emergencies.		12	MoFP/ MoFDM			GoB	Necessary act & rules may promulgated
G3-030	Create enabling conditions for voluntary fund creation by the community for use only during the emergency		24	MoFDM/ PKSf/ MoLGRDC/ NGO/ UPs / Gram Sarkar/ SDF			UNDP/ WB/ ADB/ DFID/ JICA	Initially Pilot project may be under taken
G3-031	No recommendations but questions were raised on how beneficiaries of help/grants/support may pay back to community once production resumes; could be no retrenchment promise by industrialists for a year or farmers paying back seeds or its value in future. Some of this can be part of a community emergency		24	MoFP/ MoFDM/ MoI/ BB/ Banks				Initially Pilot project may be under taken in the most vulnerable groups, e.g marginal farmers, Hand looms owner, small & medium Businessmen

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	fund that will lessen need for immediate help from Govt during future crises							
G3-032	Facilitate IGAs and micro credit after flood. If necessary, use central zakat funds as well as encourage individuals to contribute to Voluntary Community Fund		12	MoFP/BB				Policy guidelines required
G3-033	Lack of coordination is a major impediment. To overcome this, each year within a specific date, inform Local Governments of all public interventions including their budgets under their geographical jurisdiction for scrutinising overlapping, removing, lack of coordination and finalising through their vetting. Build local government capacity in this regard.		12	MoLGRDC/ LGIs/ Gram Sarkars				Pilot project may be undertaken
G3-034	Most policies do not include disaster risk reduction provisions. Revise and make these consistent with one another. Revise PoAs also accordingly. Provide legal cover for these major changes as soon as possible.		12	MoFP/ Planning Commission				Policy guidelines to be issued

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
G3-035	Delineate administrative responsibility for crops outside the purview of MoA, and industries outside MoI during emergencies			MoFDM/ MOI/ MOA/LGIs				Policy directives to be issued

Matrix for Implementation of the Recommendation of National Workshop on Flood Risk and Damage Reduction in Bangladesh

Working Group 4: Impact of Flood on Housing, Urban Planning, Utilities (Water Supply, Sanitation) & Environment and Mitigation Options

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Flood Management and Mitigation								
General Measures								
G4-001	Update Water Supply and Sanitation Policy 1998 through incorporation of disaster management issues		12	MoLGRDC	Consultant	0.25	DANIDA	Policy guidelines to be revised under Sector Development Framework Study
G4-002	Ensure integrated planning	G1-002	12	MoFP/Planning Commission				Concerned Agencies/ Department can implement it.
G4-003	Ensure coordination among the concerned agencies for better preparedness and management of floods in the urban areas		6	MoLGRDC/DCC/ DWASA/RAJUK/ Municipalities				SOD must include Urban Disaster Management issue
G4-004	Ensure that only one organization has the authority & responsibility for developing & maintaining the drainage system of Dhaka and		6	MoLGRDC/ DWASA/DCC				Policy decision & guidelines required

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	other metropolitan cities.							
G4-005	Besides capital investment, ensure non-capital intensive measures		12	MoLGRDC/ DWASA/ MoFCDM			GoB	Policy guideline required
G4-006	Ensure comprehensive master plan for disaster management for all urban areas, including Dhaka city		24	MoLGRDC/ DWASA/DCC/ Municipalities/ City Corporations	Consultants	2.0	WB/UNDP /ADB/SID A/DFID/ JICA	SOD may be revised and updated
G4-007	Update and integrate the Dhaka city sewerage master plan & drainage master plan	G1-059	12	MoLGRD/ DWASA	Consultants	2.0	WB/ADB/ SIDA/ JICA/JBIC	Study may be undertaken
G4-008	Foster close cooperation between Bangladesh and upper riparian countries, such as India and Nepal	G1-088	12	MoFA/MoWR			GoB	
G4-009	Seek international cooperation for mitigation of adverse impact due to global climate change		12	MoFE/MoWR/ MoFA/DoE/ WARPO			GoB	Concerned Agencies need to take initiatives
G4-010	Ensure that EIA for industries take flood into consideration and are reviewed by an independent committee		12	MoI/ MoWR/Planning Commission/BB	Consultants	1.5	WB/UNDP /ADB/DFI D	Necessary rules may be prepared
G4-011	Strengthen DOE		12	MoFE/DoE	Consultants	2.0		Institutional Development and Capacity Building

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
								are required
G4-012	Seek increasing assistance from Global Environment Facility (GEF) on climate change mitigation and adaptation measures		12	MoFA/MoFE/DoE				Concern Agencies need to take initiatives
G4-013	Conduct a study in order to examine co-relation between recent floods and climate change		24	MoWR/BMD/BWDB/WARPO	CEGIS, IWM	0.5	UNDP/US AID/ADB/EU	
G4-014	Conduct a full-scale Environmental Impact Assessment (EIA) of the 2004 floods with suggested recommendations in order to overcome difficulties		12	MoWR/MoFE/BWDB/BMD/WARPO/DoE	CEGIS and other NGO's	1.0	UNDP/US AID/ADB/EU	
G4-015	Undertake necessary preparatory work in order to enlist in the agenda of the up-coming climate change related meetings, issues related to "environmental refugees" due to climate change and relaxation of immigration laws of the developed countries to accommodate the refugees		12	MoFA/MoFE/MoWR/BMD				Necessary instruction to be issued

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
G4-016	Revisit the existing laws and regulations and frame new laws in order to prohibit actions causing climate change							Environmental Protection Act and Rules need to be updated
G4-017	Undertake studies on sector-specific vulnerability and adaptation to climate change and mitigation measures		6	MoFE/DoE/ MoFDM/DMB/ BMD/MoWR/ BWDB/WARPO				Necessary instruction need to be issued
G4-018	Implement development projects aimed at promotion of alternate and renewable sources of energy		12	MoE	Research Organization	2.0	WB/UNDP /ADB/EU/ FAO	Action Research may be undertaken
G4-019	Establish coordination among all sectoral agencies on climate change related issues		6	MoFE/DoE/ Concerned agencies				Necessary instruction may be issued
G4-020	Accelerate activities of the Designated National Authority (DNA) and develop projects under Clean Development Mechanism (CDM)		12	MoFE/DoE Planning Commission	Consultant	1.0	UNDP/WB /ADB/EU/ JICA/JBIC	Necessary instruction should be issued
G4-021	Raise the most vulnerable nursery sites through earth filling		6	All Concerned agency/ LGI's				Appropriate guidelines may be issued

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
G4-022	Monitor NGO activities			NGO Bureau				
G4-023	Ensure decentralization of urbanization and proper urban planning for rural townships/Growth Centres			MoHPW/DUP/ MoLGRDC/LGIs				Law & Necessary regulation may promulgated
G4-024	Stop indiscriminate habitat building in the Flood Plains, e.g. in villages. Immediately start planned village programme and regulate rural housing & settlement activities		24	MoLGRDC/LGIs/ LGED/ MoH&PW/ DoUP		10	UNDP/WB /ADB/ JICA/JBIC	Initiate pilot project in the most flood-prone areas to build clustered housing
Flood Preparedness								
General Measures								
G4-025	Consider alternative sources of drinking water including rain water harvesting and reserve ponds with raised embankment			DWASA/CWASA/ DPHE/ Other agency	Consultants	2.0	WB/UNDP /ADB/GoN /JICA/ DANIDA	Pilot project may be taken up
G4-026	Stop box culvert construction			MoLGRD/ DWASA/DCC				Policy guideline required
G4-027	Make provision for waste water			MoI/ MoFE/DoE/				Necessary rules

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	treatment plant compulsory for industries			DWASA/CWASA/ City Corporations				should be implemented
G4-028	Establish new nurseries at heights above the maximum flood level	G4-021		MoA/MoFE/DAE/ DoF				Necessary Guidelines should be issued
G4-029	Raise more flood-resistant species in the nurseries of flood-prone areas. Similarly, plant more flood-resistant and comparatively taller species in such areas			MoA/DAE	Agriculture Research Organization		GoB/CIDA /JICA/ USAID/ FAO	Action Research may be initiated
G4-030	Construct floating nurseries		12	MoE&F/DoE/DoF		0.5	GoB/FAO/ JICA	
G4-031	Take up more coastal green belt programmes		24	MoE&F/DoE/DoF/ BWDB/LGED			EU/WB/ ADB	Necessary rules may be framed & implemented
G4-032	Make flood (disaster) risk mitigation through land use planning an integral part of land use planning process		24	MoL/SoB/SRI/ MoLGRDC/LGIs/ LGED				Necessary guidelines may be formulated
G4-033	Protect rivers from encroachment	G2-033, G2-051		MoWR/BWDB				Appropriate act & regulations may be promulgated
G4-034	Impose restriction on further industrialization in and around Metro Dhaka			MoI/MoL/DoE/BB				Policy guidelines needed
G4-035	Review and update DMDP plan (structure plan and urban area		36	MoHPW/RAJUK/ DCC/DWASA	Consultants	2.0	UNDP/WB /ADB	May be considered during ongoing

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	plan)							activities of detailed area plan
G4-036	Ensure institutional reform and adequate manpower to enhance the capacity of RAJUK		24	MoHPW/RAJUK	Consultants	1.0	Capacity building	Institutional Development and Capacity building programme needed
Structural Measures								
G4-037	Develop appropriate technology with local adaptation for raising tube wells and take due note of indigenous knowledge		12	MoLGRDC/DPHE /LGED			GoB	Guidelines may be issued
G4-038	Install at least 2 tube wells in each flood-prone village with raised platforms at feasible strategic location (growth center, educational institute).		24	DPHE/LGED		0.50	ADB/WB/ UNICEF	Instructions may be issued
G4-039	Immediately construct a sewerage treatment plant to make the Begunbari khal pollution free		36	DWASA/ Planning Commission/ ERD	Consultants/ Contractor	150	ADB/WB/ SIDA	This project may be undertaken as a fast track project

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
G4-040	Keep and maintain the existing wetlands in and around the natural canals as retention ponds		12	DoE/BWDB/DoF/DWASA/ Planning Commission	Consultants/ Contractor	20	ADB/WB/ GoB	
G4-041	Construct pumping stations on an emergency basis at Rampura & Janapath with sufficient retention pond area. In particular, maintain Hatir Jheel as a retention pond in front of Rampura Regulator		24	MoLGRDC/ DWASA	Consultants/ Contractor	10	ADB/WB	This project may be included in the emergency FDR project
G4-042	Restore and maintain all wet lands		24	DoE/BWDB/DoF/ DWASA				Formulation of Policy needed
G4-043	Ensure EIA for drainage before communication infrastructure development project is undertaken		12	DoE/DWASA/ MoLGRDC/ DCC/LGED/RHD	Consultant	0.25		Formulation of Guidelines required
G4-044	Provide for adequate open space and water bodies in residential area development plans (both private and public)		12	RAJUK/Minicipal Corporations/LGI/ DWASA	Consultant	0.25		Formulation of Appropriate Guidelines
G4-045	Restore all City Canals/Khals/Lakes in Dhaka City		24	DWASA	Consultant/ Contractor	3.0		Activities may be taken up on urgent basis

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
G4-046	Undertake regular dredging of rivers around the Metro Dhaka	G1-014, G2-049	24	BWDB/BIWTA		20	ADB/WB/GoB	
G4-047	Construct retention ponds by acquiring land and maintain these properly		48	DWASA/DoE	Consultants/Contractor	30	ADB/WB/GoB/ JBIC	Construction on a pilot basis
G4-048	Construct all structures including shelters, schools, health centres above the maximum flood level	G1-046	12	MoEdu/DoEE/ MoHFW/DoHS/ MoHPW/PWD	Consultant	0.25	GoB	Formulation of area specific Guidelines required
G4-049	Update Building Construction Act 1952 with punitive provision for hill cutting. Implement Wetland Act 2000 and Town Improvement Act 1953		12	PWD				Immediate action needed
G4-050	Construct school buildings with vertical expansion in order to ensure optimum use of land		12	PWD/LGED/MoP EDn/MoEDn/ MoH&PW				Formulation of Guidelines
G4-051	Ensure that building construction considers all disasters, including flood, cyclone, storm surge, earthquake and land slide		12	PWD/ all concerned agencies				Formulation of Guidelines

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
G4-052	Explore innovative technologies such as floating construction			PWD/HBRI	Consultants/ Contractor	1.0		Research programme
Structural Measures								
G4-053	Develop an emergency preparedness plan		12	MoFDM/DMB	Consultant	0.5	UNDP/ DFID/JICA /USAID	May be incorporated in CDMF
G4-054	Increase manpower of DPHE including capacity building		24	MoE			GoB	Institutional Development and Capacity Building
G4-055	Build awareness through dissemination of IEC materials on water and sanitation		24	DPHE/DWASA/ CWASA	Consultants	2	UNDP/ UNICEF/ WHO	
G4-056	Strengthen information management system of DPHE to ensure prompt emergency mitigation (e-mail, fax, mobile phone, etc at Upazila level)		24	DPHE	Consultants	5	UNDP/ UNICEF/ WB	May be taken up in the Bangladesh Water Supply Programme of WB
G4-057	Activate Dhaka City Disaster Management Committee		6	MoFDM/ MoLGRDC/ DCC/ DMB		0.1	GoB	Immediate steps should be taken

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
G4-058	Formulate and implement appropriate and comprehensive national land use plan		24	MoL/ MoFP/ Planning Commission	Consultant	2.0	UNDP/ ADB/ WB/ JICA/ SIDA	Immediate action needed
G4-059	Make urban land use planning mandatory		12	MoHPW/ RAJUK/ DUP/ LGRDC/ LGIs			UNDP/ ADB/ WB/ JICA/ SIDA	Enforcement of law necessary
G4-060	Enforce Wetland Act properly. Update the Act in order to minimize legal loop holes.		12	DoFE/ DoE/ and all concerned agencies			UNDP/ ADB/ WB/ JICA/ SIDA	Enforcement necessary
G4-061	Strengthen legal provisions for land use control		12	MoL/RAJUK/Municipalities				Formulation & enforcement of law & regulations
G4-062	Use more local expertise in urban planning and address local situations			MoFP/ MoHPW				Policy Formulation
G4-063	Impose restriction on dense industrialization			MoI/ MoFP/MoFE/ DoE/ BB				Formulation of Guide lines
G4-064	Made adequate provision for open space and water bodies in residential area development plans (both private and public)			City Corporations/Municipalities/ RAJUK/ MoFE/ Planning Commission				Immediate action needed

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
G4-065	Prepare an urban area plan for each city and implement the plan			MoHPW/ MoFP/DoUP Planning Commission				Immediate action needed
G4-066	Ensure comprehensive EIA before any flood control structure is implemented			DoE				Implementation of Guidelines needed
G4-067	Streamline update of town plans and monitoring of implementation		36	MoHPW/ DoUP/ MoLGRDC/Municipalities	Consultants	5	UNDP/AD B/WB/ JICA/ CIDA	Develop Country wide Master Plan
G4-068	Encourage planned growth of small towns as service centres for the rural areas		24	MoLGRDC/ LGIs/ MoL	Consultants	3	UNDP/ JICA/ WB/ ADB	Promulgation of appropriate Law & Regulation required along with study
G4-069	Promote the idea of compact township in village to reduce indiscriminate & unplanned settlement expansion.		24	MoLGRDC/ LGIs/ MoL	Consultants			Formulation of appropriate law, Regulation needed
G4-070	Legalise the BNBC 1993.			MoHPW/ Cabinet Div.				Necessary Actions may be taken by the Cabinet required
G4-071	Approve and enforce Building Construction Rule 2004			MoHPW/ Cabinet Div.				Necessary action required

Matrix for Implementation of the Recommendation of National Workshop on Flood Risk and Damage Reduction in Bangladesh

Working Group 5: Impact of Flood on Social Services, Law & Order and Mitigation Options

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Flood Preparedness								
Structural Measures								
G5-001	Raise the playground of schools above the highest flood level, wherever possible		12	LGED/LGI/ DoEE/ MoEdu	Consultants			Formulation of Guidelines
G5-002	Construct 3/4 storied Cluster Residential Housing above the highest flood level in flood- prone areas having facilities for schooling, health care, market, etc		36	MoHPW/ MoL / MoLGDRC	Consultants / LGIs	30	GoB/ UNDP/WB /ADB/ CIDA	Existing Ashrayan project may be redesigned and some pilot projects may be taken up
Non-Structural Measures								
G5-003	Carryout impact assessment study for flood damage		12	DMB/BWDB/LGI	Consultants	2	UNDP/AD B/WB	Immediate action needed
G5-004	Prepare guidelines for disaster damage assessment		24	DMB	Consultants	2	UNDP/AD B/WB	Immediate action needed
G5-005	Undertake vulnerability analysis of different communities, structures, etc		24	MoFDM/DMB	Consultants	2	UNDP/AD B/WB	Immediate action needed
G5-006	Prepare a standing order on roles		24	MoFDM/DMB/Mo	Consultants	0.10	UNDP/AD	Policy formulation

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	and responsibilities of education sector officials/ Management Committee/Governing Body office bearers			Edu			B/WB	and Guidelines
G5-007	Install and maintain an effective information system		24	MoFDM/ DMB/ Disaster Management Committees	Consultants		UNDP/ DFID/ USAID	Development and Maintenance of Information System under CDMF
G5-008	Identify schools to be used as flood shelters		12	Dist Admn/ DMB/MoEdu/MoE	Existing resources	0.1		Formulation of Guidelines
G5-009	Organise training programmes on disaster management for heads of institutions and chairmen of school management committees		12	DMB/ MoEdu	Consultants		UNDP/ DFID/ USAID	May be incorporated in the SOD
G5-010	Update disaster education curriculum		36	MoPEd/ DMB	Consultants	2	UNDP/AD B/WB	May be incorporated in CDMF
G5-011	Include health education in the curriculum	G5-010	36	MoPEd/ MoHFW				May be incorporated in CDMF
G5-012	Develop disaster coping strategies		24	DMB/NGOs	Consultants	1	UNDP/ DFID	May be incorporated in CDMF
G5-013	Create awareness and community participation among the flood-prone people		24	DMB/NGOs	Existing resource	2	UNDP/ DFID/ JICA	May be incorporated in CDMF
Flood Response								
Structural Measures								
G5-014	Construct new health facilities above		36	MoHFW/ PWD		5	UNDP/AD	Implementation on a

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	the flood levels.						B/WB	pilot basis may be initiated
G5-015	Construct innovative latrines to avoid contamination of flood water		36	DPHE/LGED		5	UNDP/ADB/WB	Implementation on a pilot basis may be initiated
Non-Structural Measures								
G5-016	Deploy forces as necessary		24	MoD		0.5		Policy formulation and guidelines
G1-017	Involve the community and local administration at district and upazila level; coordinate at Union Parishad level		24	MoE	Existing resource	0.5		Policy formulation and guidelines
G5-018	Introduce community police and employ such police for maintaining law and order		24	MoE	Existing resource/ new recruitment	0.5		Policy formulation and guidelines
G5-019	Develop code of ethics for the print and electronic media		12	MoI		0.5		Policy formulation and guidelines
G5-020	Develop guidelines on disaster management for the electronic media	G5-020	12	MoI	Consultants			Policy formulation and guidelines
G5-021	Ensure regular and timely weather forecasting		12	BMD/BWDB	Consultants	1.0	UNDP/GoN/ADB/WB	Necessary instructions may be issued

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
G5-022	Ensure positive information and reporting in the newspapers	G5-018	12	MoI/BFUI/ DUJ/ PIB	PIB	1.0	UNDP/ GoB	Awareness building through training required
G5-023	Highlight vital instructions in the media for people to follow: safety of life, health, hygiene, mother & child care & safety, availability of medicines, snake bite, diseases etc. Publicise crop damages & rehabilitation programme.	G5-020	12	MoI/BFUI/DUJ		1.0	UNDP/ GoN	Documentary films to be prepared
G5-024	Prepare local contingency plan for flood-prone zones [Components: (a) early warning and quick dissemination of message, (b) evacuation plan, (c) plan for protection of life, community and household resources including live stock, (d) standard guidelines for flood shelters with respect to space per capita, toilet facility for male and female, privacy, cleaning, sanitation, vector control, water supply, facility for medical services and health education, security, special protection for children; (e) food supply plan with respect to cooking, safety, adequacy, balance, age, sex and vulnerability and distribution method, (f) transportation, (g) continuing availability of basic		24	DMB/BMD/BWD B/MoI/LGI/NGOs	Consultants	2	UNDP/ DFID/JICA /UNICEF/ WHO	Immediate actions needed. May be included in SOD

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Human Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	services (health, family planning, nutrition), (h) communication and coordination within and between departments and with higher levels, (i) post-flood rehabilitation plan including special credits for women entrepreneurs							
G5-025	Provide adequate fund and administrative authority to district and upazila health managers for emergency purchase, repair or rental through Shastha Sheba Unnayan Committee.		24	MoHFW		5	UNDP/AD B/WB	Policy formulation and provision of fund reserve
G5-026	Improve inter-sectoral coordination among different departments (viz. with customs)	G1-078, G2-023, G4-033	24	MoFDM			GoB	Policy formulation and Institutional Development
G5-027	Provide EPR training to health personnel		24	MoHFW	Consultants	2	UNDP/AD B/WB	Immediate action needed
G5-028	Prepare long-term appropriate and sustainable solutions for water supply, sewerage system and garbage disposal for urban areas		24	DWASA/CWASA/ City Corporations/ Municipalities/	Consultants	5	ADB/WB/ JBIC	Study may be included in the on-going SDF Study
G5-029	Provide health education covering flood and disaster related health problems.	G5-011		MoHFW/MoPEdu/ MoEdu/MoFDM/D MB				Immediate action needed

Matrix for Implementation of the Recommendation
National Workshop on Flood Risk and Damage Reduction in Bangladesh

Working Group 6: Impact of Flood on Economy, Major Infrastructures & Livelihood and Mitigation Options

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Flood Preparedness								
General Measures								
G6-001	Examine the existing development policies and reformulate them in the context of recent flood. Ensure that the initiative is taken by the Ministry of Finance & Planning		6	MoF/MoP	Consultant	2	UNDP/WB /ADB	Immediate action needed
G6-002	Make provision for an emergency special fund in the annual budget for disaster management and rehabilitation and reallocate funds from one area to another if this special fund is found inadequate. Also generate additional funds through lottery or any other legal means and invest the unspent amount of this fund to generate additional fund		12	MoF/MoP	Consultant	0.1		May be implemented from the current years' revised budget or next years' budget
G6-003	Ask Planning Commission to follow simplified project processing mechanism in order to help quick assessment and		24	MoP	Consultant	0.50		May be formulated by the Planning Commission

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	expeditious implementation of disaster rehabilitation activities							
G6-004	Delegate more administrative and financial powers to the local administration and local level officials of different departments through amending the existing Public Procurement Regulation in order to facilitate emergency disaster management and rehabilitation		12	MoE/MoP	Consultant	0.1		IMED may take immediate action
Structural Measures								
G6-005	Construct different installations of important utility service e.g.Power, T&T, Gas, Water Supply, etc at an elevation higher than the maximum flood level		24	PDB/T&T/All Agency Planning Commission	Consultant	5	UNDP/AD B/WB	Policy directives may be issued
G6-006	Revise vertical clearance for distribution lines in the flood-prone areas		36	All Agency	Consultant	1	UNDP/AD B/WB	Necessary planning and design guidelines may be formulated
G6-007	Connect all Upazilas and Growth Centres in the flood prone areas with the district H/Q through digital radio links		36	MoTC	Consultant	10	UNDP/AD B/WB	May be studied on an urgent basis

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Non-Structural Measures								
G6-008	Develop an appropriate economic policy that incorporates Disaster Risk Management best practices.		36	MoFDM/DMB/ Planning Commission	Consultant/ Research Organisations	2	UNDP/ADB/WB	Work may be initiated soon
G6-009	Develop in house capacity through BBS for rapid assessment of macroeconomic losses caused by natural disasters. Conduct household income and expenditure survey as frequently as possible.		12	BBS/BIDS Planning Commission/IMED	Consultant/ Research Organisations	5	UNDP/ADB/WB	Work may be initiated soon
G6-010	Involve private sector in the risk analysis & risk reduction studies.		12	MoI/MoComm/BB	Consultant	1.0		Necessary guidelines may be formulated
G6-011	Ensure separate specifications for electrical service connections in the flood-prone areas.		12	PDB/REB/ MoEnergy	Consultant	0.5		Guidelines may be formulated
G6-012	Ensure capacity building for emergency infrastructure e.g. Gas, Power, T&T etc. maintenance work.		12	PDB/T&T/ Titas Gas/DWASA/ CWASA/DESA	Consultant	0.5		May be taken up under CDMP
G6-013	Ask BTTB mobile network to give priority to flood-prone areas.		24	T&T	Consultant	5	GoB	May be given priority
G6-014	Allocate funds for emergency restoration and rehabilitation works at the local administrative level.		24	MoF&P and all concerned Ministries		10		Provision of fund in the budget may be made

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
Flood Response								
Non-Structural Measures								
G6-015	Build an effective and timely flood warning and flood forecasting system based on modern technology. Ensure dissemination of Early Warning to all stakeholders		12	MoWR/BWDB/D MB/BMD/NGOs/ Disaster Management Committees		1.0	DANIDA/ UNDP/ DFID/JICA	May be taken up under CDMP and FFWS
Post- Flood Reconstruction and Rehabilitation								
Non-Structural Measures								
G6-016	Speedily implement rehabilitation projects and ensure transparent use of funds.		24	MoF&P		0.1		Formulation of Guidelines urgently necessary
G6-017	For facilitating income generation for the rural poor, start rehabilitation in the rural areas immediately.		24	MoF&P/BB/PKSF/ SDF/NGOs/PC	NGOs/ LGIs	5	UNDP/AD B/WB/JIC A/CIDA/W FP/SIDA	Programme approach needed
G6-018	Ensure the availability of adequate critical inputs to farmers such as seeds, fertilizer, agricultural credit, power, diesel and equipments through appropriate institutional mechanism.		24	MoA/DAE/MoI		0.1		Necessary actions needed
G6-019	Re-introduce of KABIKHA and similar types of programmes		24	MoFDM	NGOs	5	WFP/CID A/JICA	Restoration of programme

Code No.	Recommendations	Linkage	Time Frame (month)	Responsible Ministry/Dept/Org.	Resource	Fund Million US\$	Probable Dev. Partners	Remarks
	during the post-disaster period.							necessary

Annex

Acronyms And Abbreviations

ADB	Asian Development Bank
ADPC	Asian Disaster Preparedness Centre
BB	Bangladesh Bank
BDPC	Bangladesh Disaster Preparedness Centre
BGMEA	Bangladesh Garment Manufacturers and Exporters Association
BIDS	Bangladesh Institute of Development Studies
BIMSTEC	Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation
BIWTA	Bangladesh Inland Water Transport Authority
BMD	Bangladesh Meteorological Department
BPDB	Bangladesh Power Development Board
BR	Bangladesh Railways
BRAC	Bangladesh Rural Advancement Committee
BRTA	Bangladesh Road Transport Authority
BSMMU	Bangabandhu Sheikh Mujib Medical University
BUET	Bangladesh University of Engineering and Technology
BUP	Bangladesh Unnayan Parishad
BFUJ	Bangladesh Federal Union of Journalist
BWDB	Bangladesh Water Development Board
CAAB	Civil Aviation Authority of Bangladesh
CDM	Clean Development Mechanism
CDMP	Comprehensive Disaster Management Programme
CEGIS	Center for Environment and Geographical Information System
CFAB	Climate Forecast Application in Bangladesh
CIDA	Canadian International Development Agency
CWASA	Chittagong Water Supply And Sewerage Authority
DEM	Digital Elevation Model
DFID	Department for International Development
DGoF	Director General of Foods
DIA	Disaster Impact Assessment
DLS	Department of Live Stocks
DMB	Disaster Management Bureau
DMDP	Dhaka Metropolitan Development Plan
DNA	Damage Need Assessment
DoE	Department of Environment
DoEdu	Department of Education
DoPEdu	Department of Primary Education
DAE	Department of Agriculture Extension
DCC	Dhaka City Corporation
DoF	Department of Forest
DOHS	Department of Housing and Settlement
DPHE	Department of Public Health Engineering
DUJ	Dhaka Union of Journalist
DTCB	Dhaka Transport Co-ordination Board
DWASA	Dhaka Water Supply And Sewerage Authority
EIA	Environmental Impact Assessment
EU	European Union
EWS	Early Warning System
FAO	Food and Agriculture Organization
FBCCI	Federation of Bangladesh Chamber of Commerce and Industry
FCD	Flood Control and Drainage
FFWC	Flood Forecasting and Warning System

FRS	Flood Response System
GaTech	Georgia Institute of Technology
GEF	Global Environmental Facility
GIS	Geographical Information System
GoB	Government of Bangladesh
GTS	Global Telecommunication System
HBFC	House Building Finance Corporation
HBRI	Housing and Building Research Institute
ICT	Information and Communication Technology
IEC	Information, Education and Communication
IMED	Inspection, Monitoring and Evaluation Department (Planning Commission)
IWM	Institute of Water Modelling
IWFM	Institute of Water and Flood Management
IWT	Inland Water Transport
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
JMBA	Jamuna Multi purpose Bridge Authority
JRC	Joint Rivers Commission
LGED	Local Government Engineering Department
LGI	Local Government Institutions
MoFE	Ministry of Forest & Environment
MoWR	Ministry of Water Resources
MoA	Ministry of Agriculture
MoC	Ministry of Communication
MoCA	Ministry of Civil Aviation
MoD	Ministry of Defence
MoFDM	Ministry of Flood and Disaster Management
MoI	Ministry of Industries
MoIn	Ministry of Information
MoPEdu	Ministry of Primary Education
MoEdu	Ministry of Education
MoEst	Ministry of Establishment
MoS	Ministry of Social Welfare
MoFA	Ministry of Foreign Affairs
MoF& P	Ministry of Finance & Planning
MoHFW	Ministry of Health and Family Welfare
MoHPW	Ministry of Housing & Public Works
MoL	Ministry of Land
MoLGRDC	Ministry of Local Government, Rural Development and Co-operative
MoSIWT	Ministry of Shipping and Inland Water Transport
MoTelcom	Ministry of Telecommunication
MoWCA	Ministry of Women and Children Affairs
NGO	Non-Government Organization
NIPSOM	National Institute for Preventive and Social Medicine
NWP	National Water Policy
PC	Planning Commission
PMIS	Program Management Information System
PKSF	Palli Karma Shahayak Foundation
PWD	Public Works Department
RAJUK	Rajdhani Unnayan Kartripakkha
RBO	River Basin Organization
REB	Rural Electrification Board
RHD	Roads and Highways Department
RRI	River Research institute
SAARC	South Asian Association for Regional Cooperation
SoB	Survey of Bangladesh

SOD	Standing Orders on Disaster
SPARRSO	Space Research and Remote Sensing Organization
SRI	Soil Research Institute
UNDP	United Nations Development Programme
USAID	US Agency for International Development
WARPO	Water Resources Planning Organization
WB	World Bank

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- 206.Ms. Ismat Jahan, Director General, Ministry of Foreign Affairs.
- 207.Mr. Zahirul Haque, Director General, Ministry of Foreign Affairs

Ministry of Women and Children Affairs

- 208.Dr. Yamin Akbari, Project Director, Ministry of Women and Children Affairs

Cabinet Division

- 209.Commissioner, Dhaka Division
- 210.Commissioner, Sylhet Division
- 211.Deputy Commissioner, Dhaka.
- 212.Deputy Commissioner, Sunamganj.
- 213.Deputy Commissioner, Chandpur.
- 214.Deputy Commissioner, B. Baria.
- 215.Deputy Commissioner, Hobiganj.
- 216.Deputy Commissioner, Netrakona.
- 217.Deputy Commissioner, Narayanganj.
- 218.Upazila Nirbahi Officer, Nagarpur, Tangail
- 219.Upazila Nirbahi Officer, Tarail, Kishoreganj
- 220.Upazila Nirbahi Officer, Sadar, Narsingdi
- 221.Upazila Nirbahi Officer, Jamalganj, Sunamganj
- 222.Upazila Nirbahi Officer, Ajmiriganj, Hobiganj
- 223.Upazila Nirbahi Officer, Rupganj, Narayanganj
- 224.Upazila Nirbahi Officer, Kajipur, Sirajganj
- 225.Upazila Nirbahi Officer, Fulchhari, Gaibandha

Ministry of Establishment

- 226.Mr. Safar Raj Hossain, Secretary (In-charge), Ministry of Establishment
- 227.Mr. Md. Abdur Rob Hawlader, Joint Secretary, Ministry of Establishment

Non-Government Organizations

- 228.Mr. Md. Akhter Hossain, Deputy General Manager, Grameen Bank
- 229.Mr. T. M. Abdus Salam, Sr. Principal Officer, Grameen Bank
- 230.Dr. Fahmida Khatun, Research Fellow, CPD
- 231.Dr. Ananya Raihan, Research Fellow, CPD

- 232.Dr. Uttam Kumar Deb, Research Fellow, CPD
- 233.Mr. Farhad Mazhar, Managing Director, UBINIG
- 234.Ms. Farida Akhter, Executive Director, UBINIG
- 235.Professor Mahmudur Rahman, Coordinator, Dhaka Community Hospital
- 236.Mr. Md. Javed Yusuf, Director, Dhaka Community Hospital
- 237.Ms. Hasna Moudud, Chairperson, CWEE
- 238.Mr. Zakir Hossain, Director, Water Aid
- 239.Mr. Monzu Morshed, Coordinator, DMP, CARE-Bangladesh
- 240.Mr. Rashiduzzaman Ahmed, IUCN-Bangladesh
- 241.Mr. BMM Mozaharul Haque, Consultant, BDPC
- 242.Ms. Farida Shahnaz, IUCN-Bangladesh
- 243.Mr. Farid Hassan Ahmed, Oxfam GB
- 244.Kazi Rafiqul Alam, Executive Director, Dhaka Ahsania Mission
- 245.Mr. Saidur Rahman, Executive Director, BDPC
- 246.Mr. Moloy Chaki, Programme Coordinator, BDPC
- 247.Dr. M. Anwarul Azim, President, The Institution of Engineers, Bangladesh
- 248.Dr. M. A. Hadi, President, Bangladesh Medical Association.
- 249.Kbd. Rafiq Ahmed, President, Krishibid Institution.
- 250.Mr. Eyakub Hossain Sikder, Institute of Diploma Engineers, Bangladesh.
- 251.Mr. A.K.M.A. Hamid, General Secretary, Institute of Diploma Engineers, Bangladesh.

Professional Bodies

- 252.Colonel M M Jahangir psc (retd.), Secretary General, FBCCI
- 253.Mr. Mizanur Rahman Mukul, Deputy Secretary, FBCCI
- 254.Mr. Shamimur Rahman, Assistant Secretary, FBCCI

Media

- 255.Mr. Rahat Khan, Daily Ittefaq
- 256.Mr. Shafiq Rehman, Jaijaidin
- 257.Mr. Mahfuz Anam, Daily Star
- 258.Mr. Md. Bahauddin, Daily Inqilab
- 259.Barrister Moinul Hossain, Daily Ittefaq
- 260.Mr. Golam Sarwar, Daily Jugantor
- 261.Mr. Matiur Rahman Chowdhury, Manbjamin
- 262.Mr. Sadek Khan, Holiday
- 263.Mr. Enayetullah Khan, UNB
- 264.Mr. Matiur Rahman, Daily Prathom Alo
- 265.Mr. Elahi Newaj Khan. President, DUJ
- 266.Mr. Riaz Uddin Ahmed, President, National Press Club
- 267.Mr. Shawkat Mahmud, General Secretary, National Press Club
- 268.Mr. Kazi Siraj, Daily Dinkal

University/Research Institutions

- 269.Prof. Dr. Ahmed Kamal, Dhaka University
- 270.Prof. Dr. Wahiduddin Mahmood, Dhaka University
- 271.Dr. AKM Zahir Uddin Chowdhury, IWFM, BUET
- 272.Prof. Dr. AMM Shafiullah, BUET
- 273.Prof. Dr. Feroze Ahmed, BUET
- 274.Prof. Dr. M. Mujibar Rahman, BUET
- 275.Dr. M. Asaduzzaman, Director General, BIDS
- 276.Dr. Kazi Shahabuddin, Research Fellow, BIDS

- 277.Dr. K. M. Nabiul Islam, Research Fellow, BIDS
- 278.Mr. M. A. Rahim, Associate Professor, BUET
- 279.Prof. Dr. Sk. Sekendar Ali, BUET
- 280.Prof. Dr. Md. Fazlul Bari, BUET
- 281.Mr. Mohammad Abdullah, Editor, SAARC Agriculture Information Centre
- 282.Ms. Eva Benita A Tuzon, Programme Officer, CIRDAP

Bangladesh Red Crescent Society

- 283.Maj. Gen. Z. A. Khan (Retd.), Chairman, BRCS
- 284.Mr. Anthony Ronald Tony Marion, Head of Delegation, IFRC, BRCS

Development Partners

- 285.Mr. Kees Beemsterboer, Ambassador, The Royal Netherlands Embassy
- 286.Dr. Armand Evers, First Secretary, Water Sector, The Royal Netherlands Embassy
- 287.Mr. Zahir Uddin Ahmad, Adviser, Water Sector, The Royal Netherlands Embassy
- 288.Mr. Zafar Iqbal, Sr. Programme Officer, JBIC
- 289.Dr. Michael Nienhaus, Country Director, GTZ
- 290.Mr. Akio Arai, Resident Representative, JICA
- 291.Mr. Takuya Sugawara, Deputy Resident Representative, JICA
- 292.Ms. Dilruba Haier, Assistant Resident Representative, UNDP
- 293.Mr. Tarik-ul-Islam, Sr. Programme Officer, UNDP
- 294.Mr. Paul Edwards, Chief (Water and Env. Sanitation) UNICEF
- 295.Mr. A.K. Masood Ahmed, Project Officer, UNICEF
- 296.Ms. Annemieke de los Santos, Representative, UNFPA
- 297.3 representatives from World Bank
- 298.2 representatives from ADB

Others

- 299.Mrs. Hasna J. Moudud, Chairperson, CWEE
- 300.Syed Rezwana Chowdhury, BELA
- 301.Mr. Kamrul Islam, BEJF
- 302.Mr. Hasan Khaled, Assistant General Manager, PKSf
- 303.Mr. Abu Taher Khan, General Manager, SDF
- 304.Mr. Nazrul Islam, CEO, IIFC
- 305.Mr. Md. Yunus Miah, President, Bangladesh Dairy Farm Owners Association
- 306.Mr. Afzal H. Khan, Advisor, Bangladesh Dairy Farm Owners Association
- 307.Mr. Mafizul Islam, Organizing Secretary, Bangladesh Dairy Farm Owners Association
- 308.Mr. Jayanta Kumar Basu, Programme Officer, Bangladesh Freedom Foundation
- 309. Prof. Mahbub Ullah, Chairman, Sonali Bank & Prof. Department of Economics, Chittagong University.