Outline of the Presentation

• Some basic conceptual issues on Floods and Flood mitigation.

• A brief analysis of Flood-2004

• Policy issues

• Summing up
Definition of Flood

• What is flood?
  – An area goes under and remains under water for some times, it is inundation.
  – When inundation causes damage to property and crops, disrupts communication and brings harmful effects to human beings as well as to flora and fauna, we call it flood.
  – Inundation supports fish, navigation, soil fertility, ecosystems, ground water recharge etc.

• Inundation + damage = flood
Is it flooded or inundated
This is Flood

This is not flood
Historical Annual Floods in Bangladesh

![Graph showing days above DL for Hardinge Br, Bahadurabad, and Bhairab Bazar from 1964 to 1998. The graph displays the number of days above the design level for each location over the years.](image-url)
Major debate going on in Bangladesh: Are floods disasters or fact of life?

- Floods are fact of life and we should “live with flood”?
- Does it mean --- do nothing? And flood management infrastructures like dykes etc. are not desirable.
- Is flood a “natural disaster” and it should be brought under “control”? Are floods always natural phenomena? Are floods are on the rise?
- Should we manage flood or we live with flood?
- Will Global warming increase the intensity ad frequency of floods?
What is Flood management

• Is it ‘Flood Control’ or ‘Flood Mitigation’ or ‘Flood Management’

• Flood Management measures are aimed at reduction of damage and harmful effects, and creation of an environment for enhanced economic activity.

• Urban flood vs. flood in rural areas need to be treated differently.

• Total Flood Control is neither possible nor desirable
Damages due to Flood

• In rural areas:
  • timing
  • extent
  • duration
  • depth

• In urban areas
  • duration
  • extent
Crop calendar and water regime of Bangladesh

Surface Water
Ground Water
Aman (monsoon rice)
Aus (premonsoon rice)
Robi/Wheat
Monsoon Rain
Supplementary Irrigation
Irrigation
Premonsoon Flood
Monsoon Flood
Postmonsoon Flood
Boro (dry season rice)
Type of Flood

When we are talking about flood, are we talking about the same physical phenomena.

- Flash Flood
- Monsoon Flood
- Drainage Congestion
- Tidal Flood

Each type of flood demand different approach for its management
Causes of Flood

- Run off in excess of conveyance capacity
- Deterioration of Drainage Channels
- Drainage Congestion. (also due to anthropogenic factors)
- Deforestation
- Rise in Sea Level due to Wind
- Tidal Waves / Tidal effect
- Global Climate Change
- Impact of Embankments constructed elsewhere
Options for Flood Management

- Structural Measures: Protection of the vulnerable area up-to certain level of flooding. Preferred by engineers and local people.
- Non-structural measures: Reduction of loss or damage. Preferred by social scientists and conservationist.
- Integration of structural and non-structural measures is essential for effective disaster management.
What is Structural Measure?

• A measure to control the physical process of flooding. It also prevents inundation.

• Protects vulnerable areas up-to certain level of flooding.

• What is Return Period?

• Structural measures with adequate appurtenant structures and proper water management practices create condition for increasing productivity from land and other developmental activities.
What is Non-structural Measure?

- Measure to reduce loss or damage by administrative measures.
- It does not control or affect the process of inundation.
- It does not foster any economic growth.
- Must be linked up with structural measures and vice-versa.
The Structural Options

- Dams and Reservoirs for impounding excess runoff. Detention basin, Retention Pond to lower the level of flooding downstream. (not feasible due to topographical limitation.)
- Embankment, Dyke, Polder, Levee, Bund, or Flood wall to block the movement of water from rivers to floodplain. (most preferred option)
- Improvement of Conveyance Capacity (planned but not done due to cost element)
- Flood bye pass, flood diversion (not feasible)
- Watershed Management, and afforestation (not practiced.)
### Non-structural measures

- Flood forecasting *(done)* and warning *(poor practice)*
- Flood fighting *(a success around cities)*
- Flood proofing *(traditional practice)*
- Evacuation and shelter management *(a success story, standing order of GoB)*
- Flood insurance
- Floodplain zoning
- Changes in cropping pattern
Flood Forecasting and Warning

• Lead time
  • for urban areas – short term forecast.
  • for rural areas to support agricultural activities---long term forecasts needed

• Dissemination
  • language
  • clarity
  • credibility
  • access to information
Flood map of 1997

Flood Map From RADARSAT
September 10, 1998, 6:05 am
August 3, 2004

At least five different events Happened in 2004
Jamuna River at Aricha

Water level (meter)

RHWL

Danger Level

15 May 1 Jun 15 Jun 1 Jul 15 Jul 1 Aug 15 Aug 1 Sep 15 Sep 1 Oct 15 Oct

Meghna River at Bhairab Bazar

Water level (meter)

15 May 1 Jun 15 Jun 1 Jul 15 Jul 1 Aug 15 Aug 1 Sep 15 Sep 1 Oct 15 Oct

Balu River at Demra (Year 2004)
Planning for Flood Management

- Pre-disaster Mitigation
- Pre-disaster Preparedness
- Response to Disaster
- Post Flood Recovery

Needs Integrated Planning as a part of development process
BANGLADESH’S APPROACH TO FLOOD MANAGEMENT

- Safeguard life and livelihoods;
- Minimize potential flood damage;
- Improve agro-ecological conditions for enhanced crop production;
- Meet the needs of fisheries, navigation, communications and public health;
- Promote commerce and industry; and
- Create flood-free land for a better living environment.
The Eleven Guiding Principles

1. Phased implementation of a comprehensive flood plan aimed at:
   - protection of urban, rural, commercial, industrial and public utility centres and communication networks; and
   - controlled flooding, wherever possible and appropriate, to meet the needs of agriculture, fisheries, navigation, urban flushing, soil productivity and recharging the surface water/groundwater resource with minimum dislocation of the environment.
The Eleven Guiding Principles (contd)

2. Effective land and water management of protected and unprotected areas, involving compartmentalization, drainage, irrigation, drainage decongestion, land-use, cropping patterns, environment, ecology, erosion/sedimentation control, etc.

3. Strengthening and equipping the disaster management machinery including building infrastructure for quick and effective communication and transmission during disasters.
The Eleven Guiding Principles (contd)

4. Improvement of the flood forecasting system and establishment of a reliable and comprehensive flood warning system with adequate lead times and at the same time evolving techniques for dissemination.

5. Safe conveyance of the large cross-boundary flow to the Bay of Bengal by channeling it through the major rivers with the help of embankments.
The Eleven Guiding Principles (contd)

6. Effective river training works for the protection of embankments, infrastructure and population centres, linked wherever possible with the reclamation of land in the active river floodplain.

7. Reduction or distribution of load on the main rivers through diversion of flows into major distributaries or interception of local runoff/local rivers by channeling through major tributaries or special diversions.
The Eleven Guiding Principles (contd)

8. Improvement of the conveyance capacity of the river networks to ensure efficient drainage through appropriate channel improvements and ancillary structures to provide regulation and conservation.

9. Development of floodplain zoning as a flexible instrument to accommodate necessary engineering measures and allocate space for habitation patterns, economic activities and environmental assets.
The Eleven Guiding Principles (cont’d)

10. Coordinated planning and construction of all rural roads, highways and railway embankment with provision for unimpeded drainage.

11. Encouraging maximum possible popular participation by beneficiaries in the planning, implementation, operation and maintenance of flood protection infrastructure and facilities.
Need for a Regional approach
Summing up

• Flood Management are often crisis driven responses. Floods may not occur regularly; if interval between two events is long, a flood may provoke an immediate crisis.

• Bangladesh needs to move from approach of relief distribution to proper disaster management.

• Damage assessment remains a debatable issue.

• Integration of Structural and Non-Structural options is yet to be achieved.