Water Related Disaster Management in Bangladesh: Roles of BWDB

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Bangladesh: River System

• Largest delta in the world, 405 rivers of which 57 Trans-boundary
• 93% catchments lies outside Bangladesh
• Abundance of water in wet season & scarcity of water in dry season
• Annual Sediment load 1.0 to 1.4 billion tons
• 710 km coastline

Bangladesh Setting

Flooded Area from 1954 to 2010

Severe flood frequency increasing twice during 1954 – 1986 period (55 & 74) (33 years)

above 30% area affected

1998 is the most severe flood

5 times since 1987 (23 years)
### Damages from Major devastating floods

<table>
<thead>
<tr>
<th>Flood Event</th>
<th>Return period years</th>
<th>Asset losses (million US$)</th>
<th>Fatalities</th>
<th>Affected area (1000 sq km)</th>
<th>Affected area (1000 sq km)</th>
<th>Houses damage (1000s)</th>
<th>GDP current (million US$)</th>
<th>Asset losses as % GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>90</td>
<td>2128</td>
<td>918</td>
<td>31</td>
<td>100</td>
<td>2647</td>
<td>44092</td>
<td>4.80%</td>
</tr>
<tr>
<td>1988</td>
<td>55</td>
<td>1424</td>
<td>2379</td>
<td>47</td>
<td>90</td>
<td>2880</td>
<td>26034</td>
<td>5.50%</td>
</tr>
<tr>
<td>2007</td>
<td>40</td>
<td>1067</td>
<td>1100</td>
<td>16</td>
<td>70</td>
<td>1085</td>
<td>68228</td>
<td>1.6%</td>
</tr>
<tr>
<td>1987</td>
<td>13</td>
<td>1167</td>
<td>1657</td>
<td>30</td>
<td>57</td>
<td>989</td>
<td>23969</td>
<td>4.90%</td>
</tr>
<tr>
<td>2004</td>
<td>12</td>
<td>1860</td>
<td>285</td>
<td>33</td>
<td>56</td>
<td>895</td>
<td>55900</td>
<td>3.30%</td>
</tr>
<tr>
<td>1974</td>
<td>9</td>
<td>936</td>
<td>28700</td>
<td>30</td>
<td>53</td>
<td>-</td>
<td>12459</td>
<td>7.50%</td>
</tr>
<tr>
<td>1984</td>
<td>2</td>
<td>378</td>
<td>1200</td>
<td>30</td>
<td>-</td>
<td>-</td>
<td>19258</td>
<td>2.00%</td>
</tr>
</tbody>
</table>

### Cyclone and Storm Surges

- Occurs almost every year
- 1970, 1991, 2007 and 2009 were worst and devastating

### Historical Cyclone Damage

<table>
<thead>
<tr>
<th>Date and Year</th>
<th>Maximum Wind speed (km/hr)</th>
<th>Storm Surge Height (meter)</th>
<th>Death Toll</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 May, 1965</td>
<td>161</td>
<td>3.7-7.6</td>
<td>19,279</td>
</tr>
<tr>
<td>14 Dec, 1965</td>
<td>217</td>
<td>2.4-3.6</td>
<td>873</td>
</tr>
<tr>
<td>01 Oct, 1966</td>
<td>139</td>
<td>6.0-6.7</td>
<td>850</td>
</tr>
<tr>
<td>12 Nov, 1970</td>
<td>224</td>
<td>6.0-10.0</td>
<td>300,000</td>
</tr>
<tr>
<td>25 May, 1985</td>
<td>154</td>
<td>3.0-4.6</td>
<td>11,069</td>
</tr>
<tr>
<td>29 Apr, 1991</td>
<td>225</td>
<td>6.0-7.6</td>
<td>138,882</td>
</tr>
<tr>
<td>19 May, 1997</td>
<td>232</td>
<td>3.1-4.6</td>
<td>155</td>
</tr>
<tr>
<td>25 May, 2009</td>
<td>120</td>
<td>6.5-7.5</td>
<td>190</td>
</tr>
</tbody>
</table>

### River Bank Erosion

- Total Length of River: 24000 km
- 1200 km bank line under active erosion
- 500 km bank line under severe erosion
- Annual Rate of River Bank Erosion: 6,000ha
- Annual Displacement: 50,000 person
Impact on Population in the High Risk Areas

High Risk Zone will increase

<table>
<thead>
<tr>
<th>Coastal Zone</th>
<th>Exist (Hm²)</th>
<th>SRES A2 Scenario</th>
<th>SRES B1 Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1 (Teknaf to Cox's Bazar)</td>
<td>2,031</td>
<td>2,349</td>
<td>2,250</td>
</tr>
<tr>
<td>Zone 2 (Cox's Bazar to Chittagong)</td>
<td>3,722</td>
<td>5,235</td>
<td>4,999</td>
</tr>
<tr>
<td>Zone 3 (Chittagong to Noakhali-Bhola)</td>
<td>1,472</td>
<td>2,261</td>
<td>2,157</td>
</tr>
<tr>
<td>Zone 4 (Bhola to Barguna)</td>
<td>500</td>
<td>628</td>
<td>600</td>
</tr>
<tr>
<td>Zone 5 (Barguna to Sylhet)</td>
<td>1,178</td>
<td>1,310</td>
<td>1,254</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8,903</strong></td>
<td><strong>11,783</strong></td>
<td><strong>11,260</strong></td>
</tr>
</tbody>
</table>

Change in percentage: 32% 26% 43% 32% 34% 29% 38% 30%

Population Density (‘000/sq km) 0.93 1.22 1.22 1.63 1.63 1.22 1.22 1.63 1.63

Population Exposed (million) 8.3 14.00 13.00 20.00 19.00 14.00 13.00 20.00 18.00

Note: The population in the coast area (39,436 sq km) 36.83 million, 47.92 million and 64.35 million in the year 2001, 2020 and 2050 respective, as estimated by ICZMP/WARPO (2005).

Adaptive Protection and Permanent Wave Protection: an example

GPS control dumping and monitoring

Stocking of Geo-bags at Bera

On site Implementation work

Cyclone Disaster Management

Ayla affected Homesteads & Infrastructures

Monitoring and Continuous Development
Rehabilitation of Ayla damaged BWDB Structures

- Mass involvement of local people
- Inter-agency coordination
- Livelihood promotion

FFWC Output

- Daily Rainfall Situation
- Rainfall Surface Map
- Daily River Situation
- Flood Inundation Map
- Dhaka City Flood Inundation Map
- Daily Situation Summary & Warning Message
- 24, 48 & 72 hrs. Forecast
- Experimental 10 days forecast of certain places
- Reports, Study and Evaluation

Flood Forecasting

Data Collection
- Field Observation
  - Water Levels
  - Precipitation
  - Evaporation
- Satellite Image Collection

Preparation
- Computer Room
  - Data Preparation and Model Run
- FFWC Wireless Center

Output
- Daily Output
  - (10:00-15:00) River Situation
  - (12:00-15:00) Model Forecast
- Flood Map

Dissemination
- President’s Secretariat
- News Media
- Newspaper
- Donors & Foreign Mission
- NGO’s & others

Warning Dissemination by Cell Broadcasting

- National DMC
- CDMP/DMB
- FFWC/BWDB

- Mobile Service Provider (District Level)
  - District DMC
  - Upzila DMC
  - Union DMC
  - Union Info. Center

- Citizens

- Union level warning/evacuation order, etc by human, through speaker at mosque, etc
Dissemination of FF Information

- **Printed Copy and Fax**: Limited, policy makers and top officials
- **E-mail**: Over registered 600 address in different groups, BWDB, Disaster agencies, NGO, Research Organization, Development partners, DC, Media
- **Web-site**: www.ffwc.gov.bd
- **Phone**: Continuous response
- **Cell Phone Broadcast**: Started from July, 2011, dial 10941 from Teletalk, Banglalink for Voice Message (charge applicable)

National Mechanism for Policy Guidance and Coordination

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

Local Level Coordination

- City Corporation Disaster Management Committee (CCDMC)
- District Disaster Management Committee (DDMC)
- Upzilla Disaster Management Committee (UzDMC)
- Union Disaster Management Committee (UDMC)

Strategic Goals:

- Goal-1: Professionalizing the Disaster Management System
- Goal-2: Mainstreaming Risk Reduction
- Goal-3: Strengthening Institutional Mechanism
- Goal-4: Empowering at Risk Community
- Goal-5: Expanding Risk Reduction Programming
- Goal-6: Strengthening Emergency Response System
- Goal-7: Developing and Strengthening Networks
Disaster Management Policy 2012
Under preparation

Three Chapters
Chapter-1: Background of Policy Preparation
Chapter-2: Description of Disaster Management Policy
Chapter-3: Monitoring and Evaluation

Roles and Responsibilities of all Relevant sectors defined
Considered almost all the relevant policies
Conflict among policies avoided

Flood Booklet/ Flood Preparedness at Community Level

Future Structural Programme
- Coastal Embankment Improvement (CEIP) under Emergency Cyclone Recovery and Restoration Project (ECRRP)
  - Upgrading the height of the coastal embankment considering Climate Change for protecting cyclone damage, adaptation to climate change
- Capital Dredging with River Training work for revival of River System
  - River narrowing, deepening, land reclamation, sediment management, quick drainage and drought protection
- Continuation of Tidal River Management in Coastal Area
  - Restore the river conveyance capacity naturally
- Main River Flood and Bank Erosion Management
- Expansion of Surface Water Irrigation by FCDI Project, Barrage etc.
Future Non-Structural Programme

- Extending the lead time of forecast
- Expanding flood forecasting in the coastal zone of Bangladesh
- Upgrading collection and transmission of rainfall and water level data
- Developing and implementing flash flood forecasting tool
- Establishing network of key stakeholder for disseminating information
- Establishing monitoring, evaluation and feedback system
- Developing people centered flood warning dissemination

Multilateral cooperation and collaboration are required in these areas

Combination of Structural and Non-Structural Measures

Thank you