Multi-Hazard Early Warning System in Bangladesh with Emphasis on the Cyclone Preparedness Programme

Bangladesh

Second Experts' Symposium on
Multi-Hazard Early Warning Systems
With focus on the Role of National Meteorological and Hydrological Services
5-7 May 2009, Toulouse, France

Bangladesh a Short Description

- Location and features.

- Extends from 20° 45´N to 26° 40´N and from 88° 05´E to 92° 40´E. Having the Himalayas to the north and Bay of Bengal to the south. It has borders with India to west to east through north and with Myanmar to southeast.
- Bangladesh is a delta of about 144,000 sq. km. of area most part of which is low-lying plain land made up of alluvial soil with hills in the southeastern and northeastern parts.
- 230 rivers flow over the country into the Bay of Bengal 57 of which originate from outside (India, Myanmar). The main rivers are the Ganges (Padma), the Brahmaputra and the Meghna.
- The coastline of Bangladesh is about 710 km long along the continental shelf which has a shallow bathymetry.


Panchagarh
Domar
Thakurgaon
Nageshwari
Lalmanir Hat
Pirganj
Saidpur
Kurigram
Rangpur
Dinajpur
Futbari
Chilmari
Gaibandha
Brahmaputra
Jaipur Hat
Rajshahi
Sherpur
Sunamganj
Chhatak
Jamalpur
Netrakona
Sylhet
Naogaon
Bogra
Mymensingh
Sylhet
Shibganj
Nawabganj
Sarishabari
Gopalpur
Fulbaria
Baniachang
Habiganj
Ganges
Sirajganj
Kishorganj
Nator
Tangail
Dhaka
Rajshahi
Shahjadpur
Ishurdi
Srimangal
Bhairab Bazar
Pabna
Brahmanbaria
Kushtia
Narsinghdi
Tongi
Alamdanga
Gazipur
Dhaka
Faridpur
Narayanganj
Chuadanga
Comilla
Jhenida
Dohar
Magura
Munshiganj
Jessore
Chandpur
Laksham
Narail
Madaripur
Rajbari
Feni
Khagrachari
Jhikargachha
Abhaynagar
Khulna
Begamganj
Noakhali
Ramgarh
Barisal
Fakirhhari
Rangamati
Satkhira
Bhola
Sandwip
Bagerhat
Pirojpur
Barguna
Kaptai
Khulna
Morrelganj
Patuakhali
Barisal
Chittagong
Patiya
Mongla
Char Fasson
Satkania
Kutubdia
Lohagara
Chittagong
Ramu
Cox's Bazar
Bay of Bengal
INDIAN OCEAN
Teknaf

Natural Disasters in Bangladesh

(a) Tropical Cyclones and associated Storm Surge

(b) Nor'westers and Tornadoes

(c) Floods, Heavy Rainfall and Drought

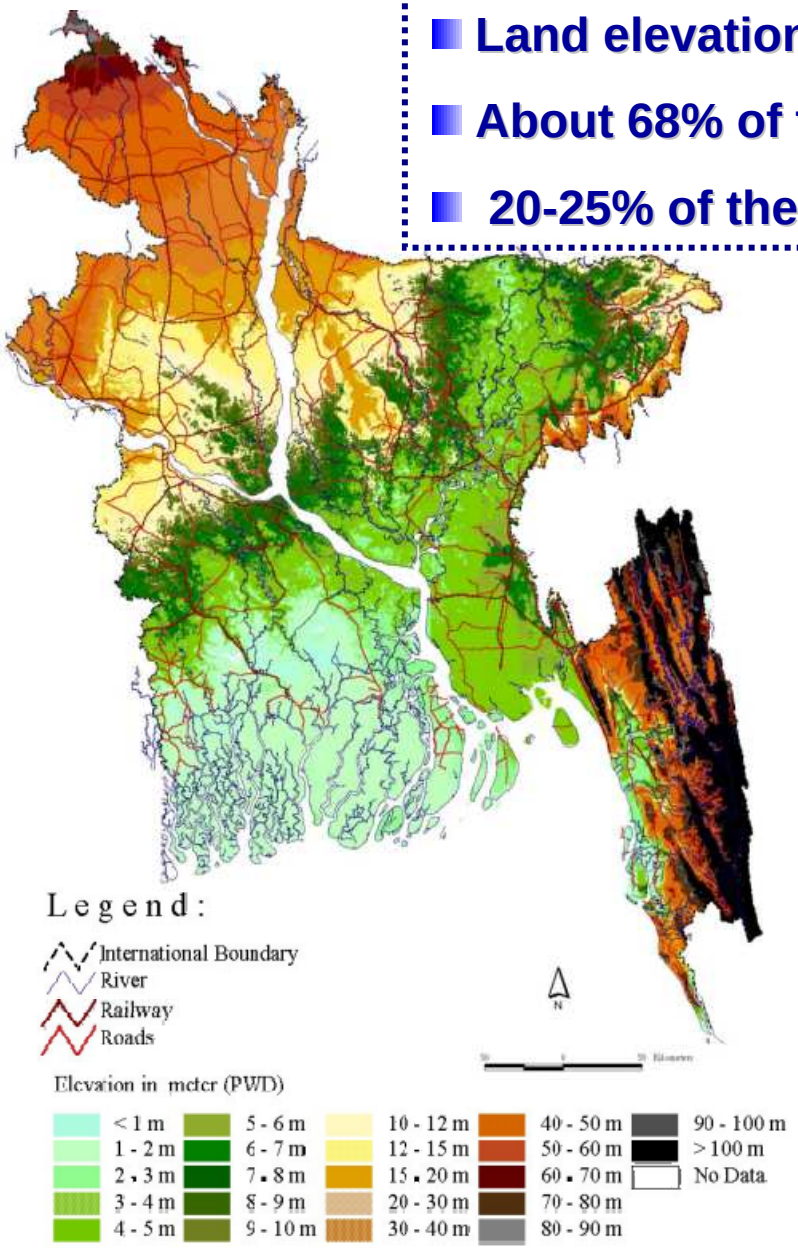
(d) River Errosion and Earthquakes

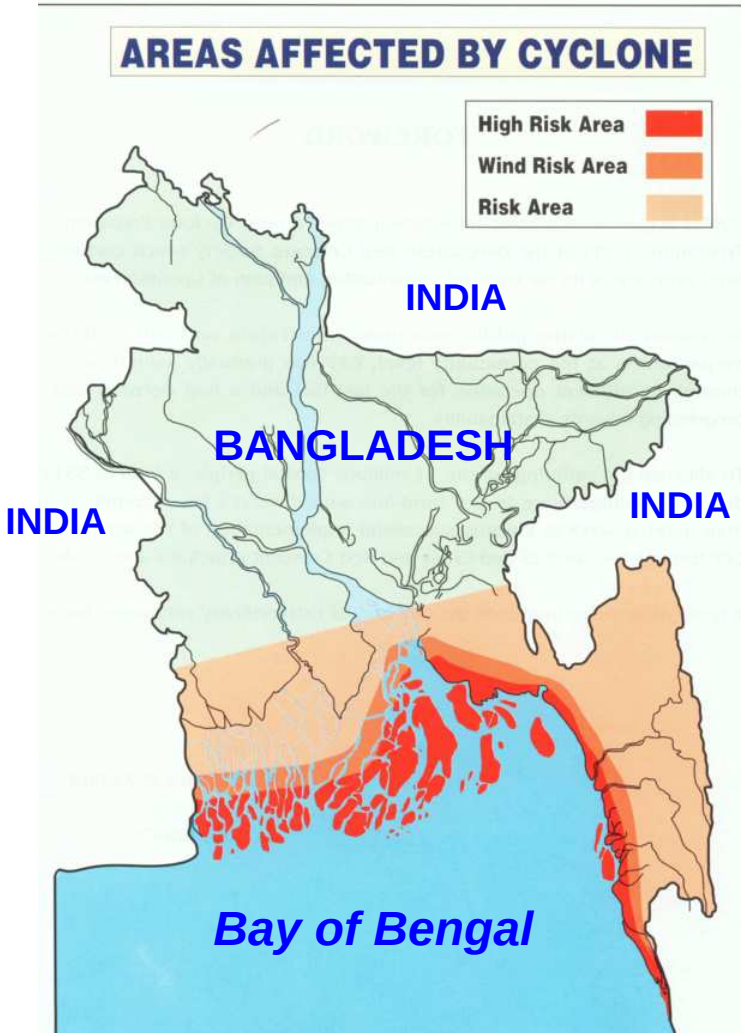
Bangladesh Meteorological Department deals with

- **Prediction of formation and movement of Tropical Cyclones and associated Storm Surge**
- **Issuance of early warnings**
- **Dissemination of warnings to the recipients like CPP (Cyclone Preparedness Programme), DMB, Ministry of Food , Disaster and Relief, Other concern Ministries, Port Authorities, BTV, Bangladesh Betar etc.**
- **Forecasting of Nor'westers and Tornadoes and issuance of related warnings to the inland river ports.**
- **Forecasting of Heavy Rainfall and deficit rainfall causing drought.**
- **Dissemination of rainfall forecast to FF&WC and DAE.**
- **Monitor and records of Earthquakes**

Topography of Bangladesh

- Land elevation of 50% of the country is within 5 m of MSL
- About 68% of the country is vulnerable to flood
- 20-25% of the area is inundated during normal flood





- The Bay of Bengal makes a shape of funnel in the Meghna estuary which is believed to be the main cause of high storm surges.
- Bangladesh is one of the most disaster prone countries in the world. Most of the disasters are meteorological and hydrological in nature. E.g.,

  - Cyclones and storm surges
  - Thunderstorms/Tornadoes/Hailstorms
  - Floods
  - Droughts
  - Heavy rain/Land slides
  - Heat waves/Cold waves/Dense fog
  - Earthquakes and Tsunami

Development of EWS in Bangladesh

- British Colonial Rule

- After the great Bakerganj cyclone of 1876 The Indian Meteorological Department was eshtablised.
- The main objective of the of the meteorological services were focused to military expeditions and commercial shipping. But the initiation of the meteorological service enhanced later development of modern weather services in the region.
- It had little contribution to the public benefit in the risk of disasters.

- Pakistan Era

- In 1966 with the help of International Federation of Red Cross and Red Crescent Societies and Swedish Red Cross Society initiated Cyclone Preparedness Programme (CPP) on request of the National Red Cross Society.
- But relief and rehabilitation were the notion of the government rather than preparedness and mitigation.
- In 1970 the most devastating cyclone caused no less than 300,000 deaths and enormous economic loss. Maybe it caught less attention of the government because of political turmoil in the part of the country.

EWS in Bangladesh

- Bangladesh got independence in 1971.
- Bangladesh Meteorological Department reorganized.
- Cyclone centers were built but the approach to disaster management remained almost same during the 70's and 80's.
- In 1991 a cyclone killed about 138,882 people and made a colossal economic loss.
- In the 80's and 90's some remarkable floods occurred. Specially the flood of 1998 which stayed longest period and flooded the largest area in the history.

- After these two catastrophic disasters the government had come to a point we may call 'the phase of paradigm sift'.
- In 1993 the GoB established the Disaster Management Bureau (DMB), Disaster Management Council and Disaster Management Committees from national to field levels and rename the Ministry of Relief and rehabilitation as Ministry of Disaster Management and Relief.
- DMB performs its professional support function in collaboration with administrative authorities at different levels and concerning ministries under the overall authority of Inter-Ministerial Disaster Management Co-ordination Committee.

- The DMB has responsibilities:
  - To create public awareness on hazards and preparedness.
  - To formulate programs and projects for vulnerable communities and public officials disaster preparedness.
  - To coordinate all activities related to disaster management from national to grass-root level.
  - To maintain liaison with government agencies, donors and NGOs.

- The Ministry of Disaster Management and relief was renamed as the Ministry of Food and Disaster Management (MoFDM) in 2004. It has responsibilities:
  - Food management;
  - Planning, coordination, monitoring and evaluation of all activities related to disaster management;
  - Coordination among other organizations during disaster period;
  - Assisting other ministries and organizations in disaster related works;
  - Formulation of policy and its implementation for food assisted projects and programmes management of external food aid and other relief assistance; and,
  - Management of all other food and disaster related activities on the government side.

- In 2003 a Comprehensive disaster Management Programme (CDMP) of MoFDM was designed to help upgrade capabilities for all disaster management agencies with the help of UNDP and DFID.

- After liberation of Bangladesh from Pakistan in 1971 the International Federation of Red Cross and Red Crescent withdrew from direct implementation of the CPP.

- CPP became a joint venture programme of the government and Red Crescent society. CPP implementation is maintained through its community based preparedness programme.

Governance and Institutions

Legal Framework.

Bangladesh Government's legislative Framework is aimed at fostering the activities for Disaster Risk reduction and Emergency Management in Bangladesh. Which includes:

1. Draft Disaster Management Act.

Enactment of this law provides the legal basis for activities and actions which are identified, undertaken and managed during the periods of disasters and are designed to increase and enhance the capability of preparedness and management.

2. National Plan for Disaster Management (Policy: 2010-2015)

The National Plan for Disaster Management is prepared by Ministry of Food and Disaster Management (MoFDM). This plan incorporates public awareness building and development of planning procedures from top level to grass root levels in a community based participatory manner.

~~3. National Disaster management policy.~~

~~It is a strategic Framework which reflects the national perspective and principle of risk reduction and emergency and disaster management.~~

4. Standing Orders on Disaster (SOD).

SOD describes in detail the roles and responsibilities of different committees, ministries and other organizations involved in disaster related activities. It is key document which is followed by all concerned organizations in Bangladesh.

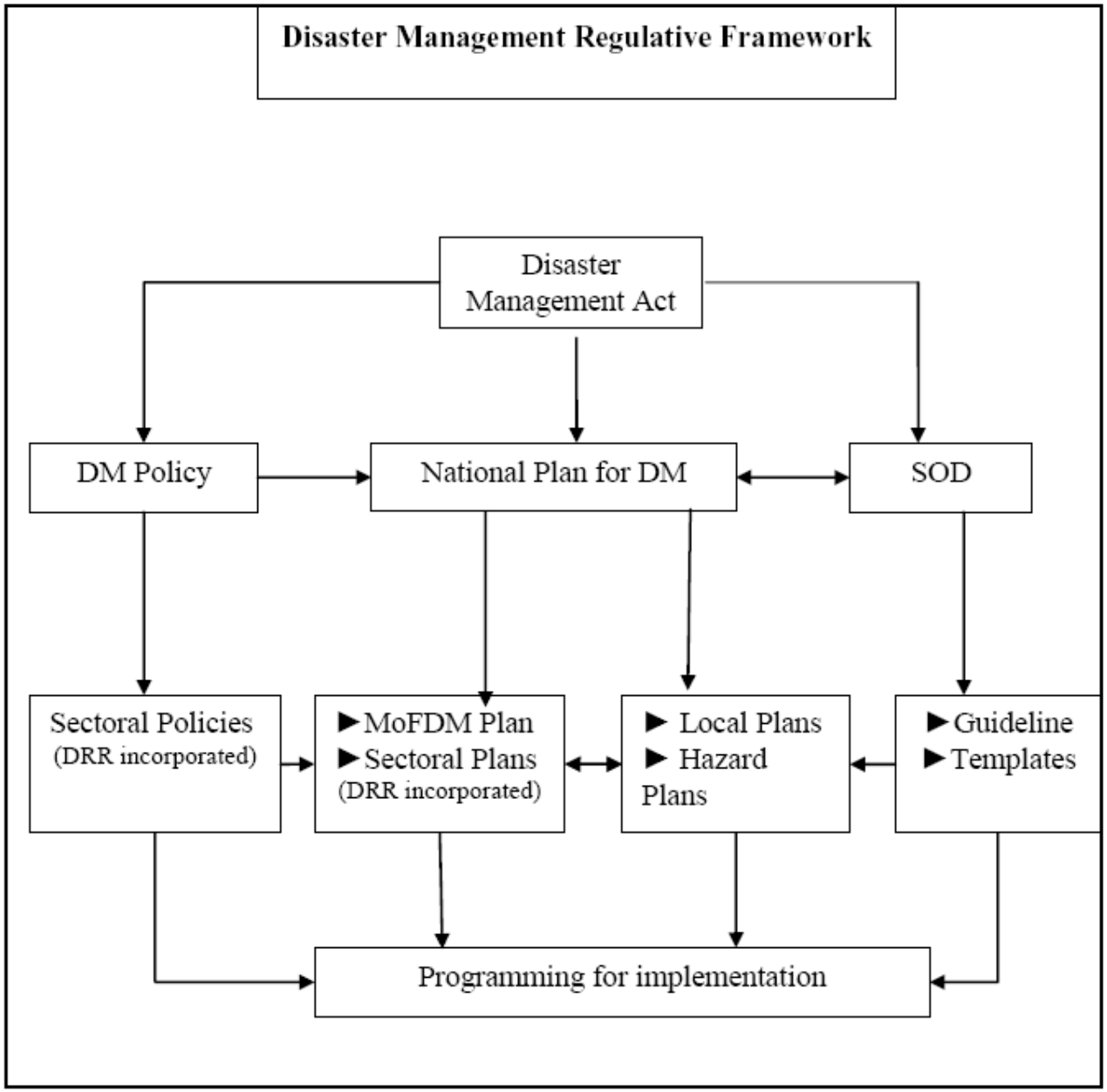
5. Guidelines for government at all Levels.

Guidelines for Government are implemented and used and are used to assist Ministries and all other organizations (Govt. & NGOs) for disaster risk management.

A list of national policies and legal documents as well as various agreements that govern the MHEWS

Corrected

Name	Type	Date Enacted
Cyclone Preparedness Programme	**Policy**	**July 1973**
Standing Order on Disasters	**Policy**	**2010**
Draft of the Disaster Management Act	**Law**	**2010**
National Plan for Disaster Management	**Policy**	**2010-2015**

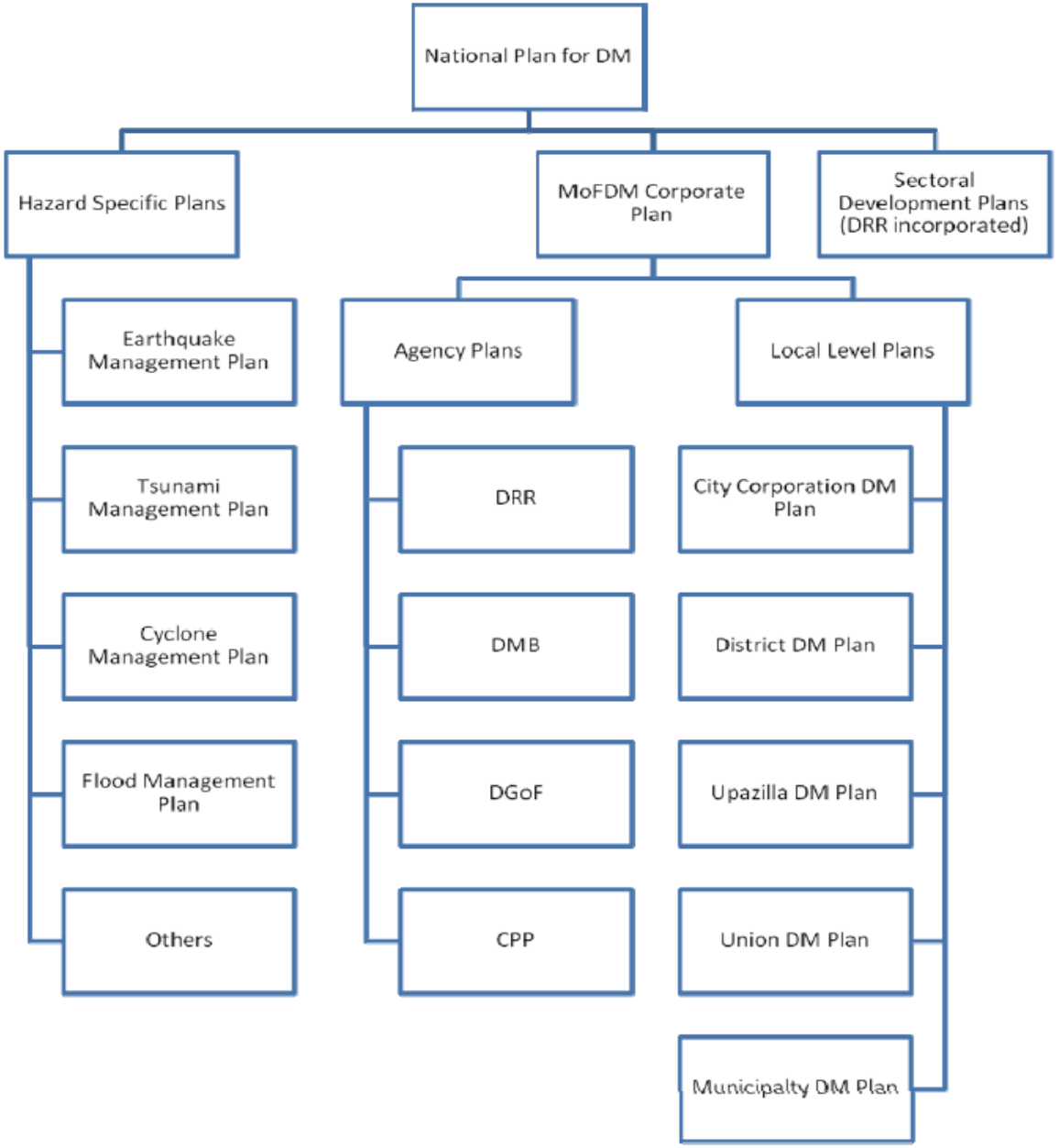

Disaster Management Regulative Framework
Disaster Management Act
DM Policy
National Plan for DM
SOD
Sectoral Policies (DRR incorporated)
▶MoFDM Plan
▶Sectoral Plans (DRR incorporated)
▶ Local Plans
▶ Hazard Plans
▶Guideline
▶Templates
Programming for implementation

6.National to local emergency planning.

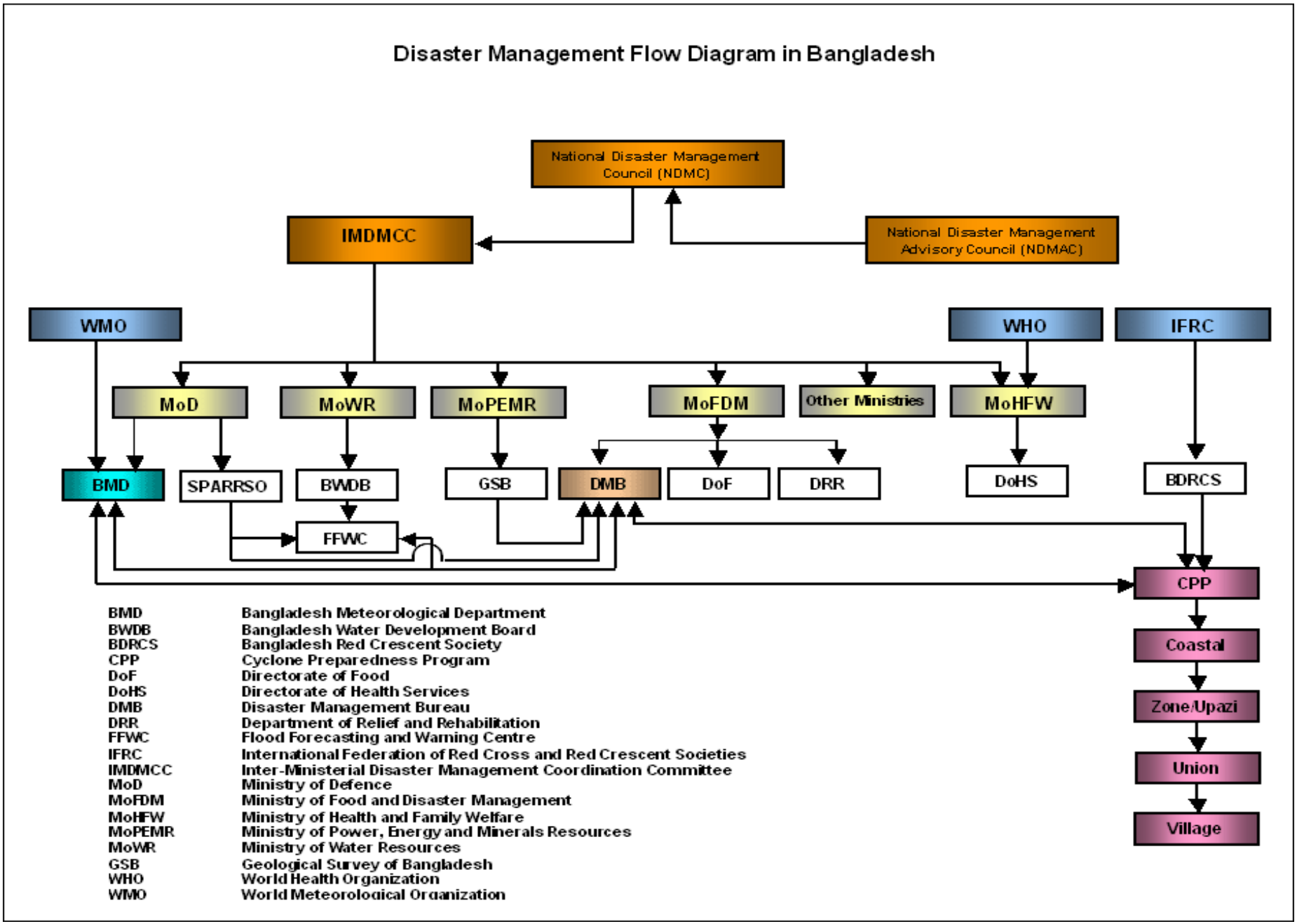
It is an umbrella plan which provides overall guideline for all concerned sectors and institutions at all levels to prepare and implement their area of roles specific plans. The MoFdM takes the lead role in disaster risk reduction and emergency management planning. There would be

a. Hazard specific plans.
b. Area at different levels (administrative unit) specific plans.

7. Disaster Management Plans



8. Organizational structure for implementing the plans.



Risk Information in emergency Planning and Warning.

- Currently there is no proper disaster risk map in use in EWS in the country. But the NDMC understands the utility of risk information and is developing risk map for using in EWS.
- Mainly information of vulnerability and potential exposure are used widely in EWS & DM.
- BMD & BWDB keep hydro meteorological and climatological data and information and send to BBS which is mandated to all maintain national data including demographic and other data.

Hazard Monitoring, Forecasting and Mandates of Warning Generation.

Hazard Rank	Hazard	National Agency for Mandate	Type of the Hazard	Remarks
1	Cyclones	BMD	I	
2	Storm surge	BMD	I	
3	Thunderstorm (Nor'wester), Lightning	BMD	I	
4	Tornado	BMD	I	
5	Hailstorm	BMD	I	
6	River flooding	FFWC (BWDB), BMD, SPARRSO	II	
7	Flash flood	FFWC (BWDB), BMD, SPARRSO	II	
8	Coastal flooding (due to storm surge/tsunami)	BMD	I	
9	Drought	BMD, BWDB, DAE	II	
10	Heat Wave	BMD	I	
11	Cold Wave	BMD	I	
12	Dense Fog	BMD	I	
13	Landslide/Mudslide (due to heavy rain)	BMD	I	
14	Earthquake	BMD	I	
15	Tsunami	BMD	III	Tsunami Watch Information (TWI) Bulletins are received from PTWC and JMA
16	Turbulance/Icing	BMD	I	
17	Strong winds	BMD	I	
18	Wind driven surge	BMD	I	
19	Air pollution	DoE, AEC	II	
20	Waterborne hazards	ICDDRB, DoE	II	
21	River Erosion	BWDB	I	

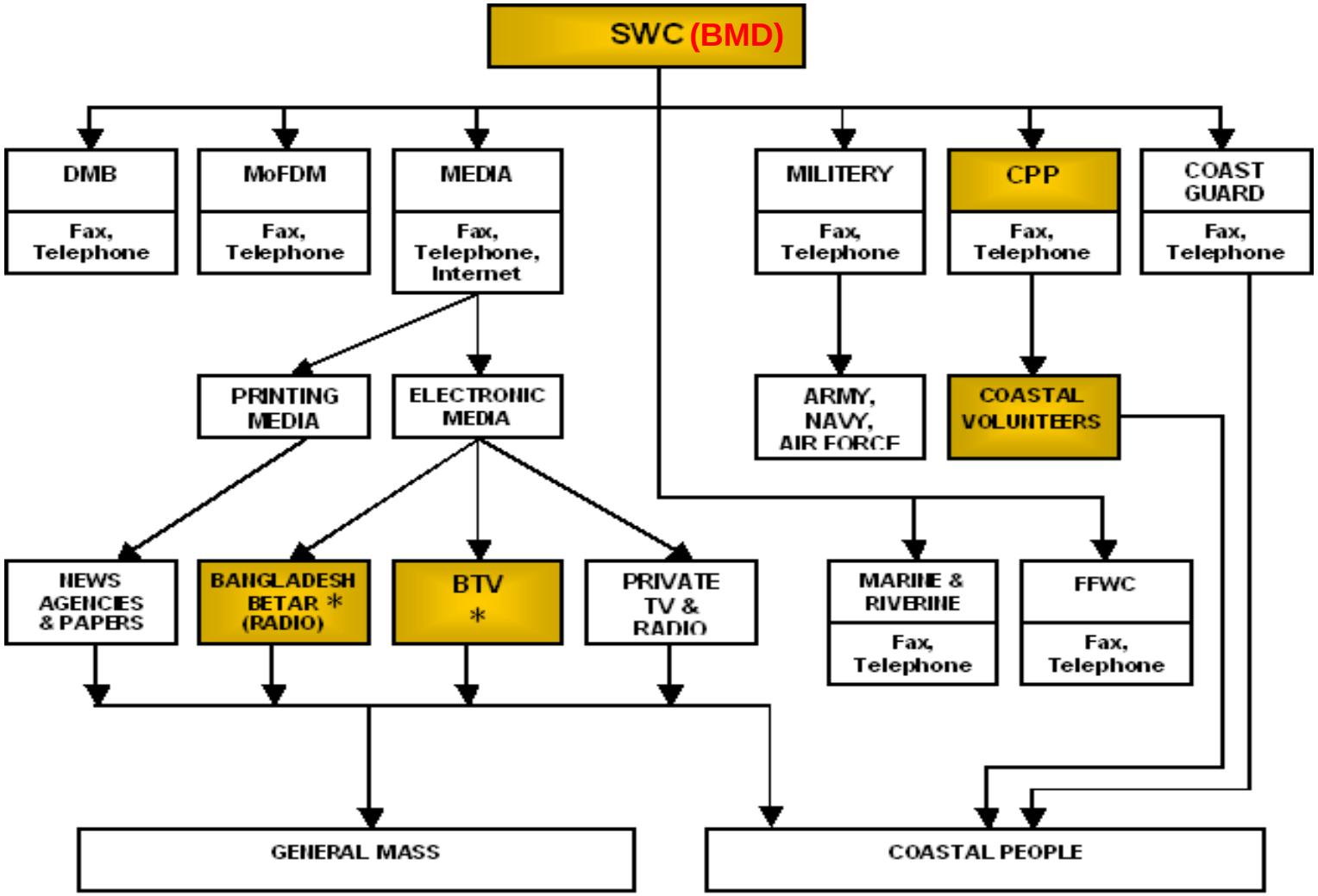
Note: Hazard rank is based on the historical figures of casualties and economic losses attributed to the respective hazards.

AEC Atomic Energy Commission
BMD Bangladesh Meteorological Department
BWDB Bangladesh Water Development Board
DAE Department of Agriculture Extension
DoE Department of Environment
FFWC Flood Forecasting and Warning Centre
ICDDRB International Centre for Diarrheal Diseases Research, Bangladesh
JMA Japan Meteorological Agency

- Hazard Warning programme by SWC (BMD)

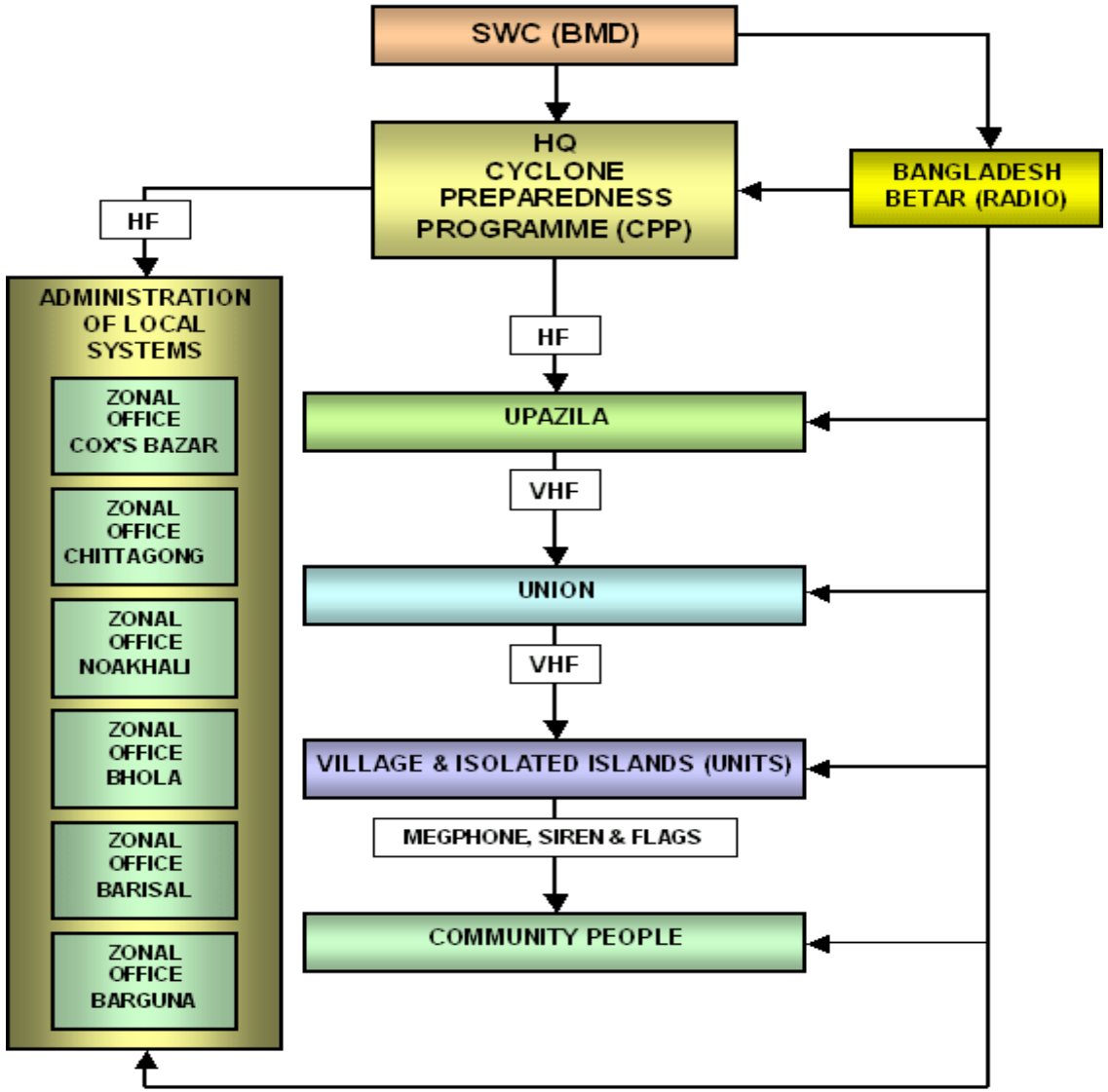
Warnings for		Issued before				
		As needed	12 Hrs	24 Hrs	18 Hrs	10Hrs
Cyclone	Alert	X				
	Warnings			X		
	Danger				X	
	Great Danger					X
Storm Surge						X
Heavy Rainfall/Heat Wave & Cold Wave		X				
Inland River port		X				
Thunderstorms/Squalls		X				

Warning dissemination mechanisms



* Mandated to continuous broadcasting of Special Weather Bulletins containing Warning round the clock in case of Cyclones

Dissemination by CPP



Emergency Preparedness and response activities

ACTIVITIES OF CPP

1. Disseminate cyclone warning signals issued by the Bangladesh Meteorological Department to the community people.
2. Assist People in taking shelter.
3. Rescue distressed people affected by a cyclone.
4. Provide First Aid to the people injured by a cyclone.
5. Assist in relief and Rehabilitation operations.
6. Assist in the implementation of the BDRCS Disaster Preparedness Plan.
7. Assist in participatory community capacity build-up activities.
8. Assist in the co-ordination of disaster management and development activities.

Volunteers Organization :

CPP is a volunteer based organization having 49,365 volunteers spread out 3291 unit (village) of 37 upazilas under 13 coastal districts.

- Recruited within the community following criteria.
- Well accepted in the community.
- Motivated & trained

Early Warning saves millions

In respect of raising public awareness, motivation and effective early warning dissemination at the community level the loss of lives and properties of the community could reduced.

During the November 1970 cyclone, with a wind speed of 224 km/hr, almost 300,000 people lost their lives in the coastal area. Whereas, in April 1991 cyclone , with a wind speed of 225 km/hr, only 138,882 people lost their lives although the population in the coastal area has doubled since 1970. In November 2007 a similar cyclone 'SIDR' hit the coastal region with a wind speed of 223 km/hr and out of that only 3,363 people lost their lives.

Conclusion

- Very recently the GoB has taken DMS in a comprehensive way.
- Which includes MDG and Climate Change Issues in every step of strategic planning.
- We have to go a long way to make EWS for DMS which might adjust to the sustainable economic development efforts.

Thank You