

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

Bangladesh

Second Experts' Symposium on
Multi-Hazard Early Warning Systems

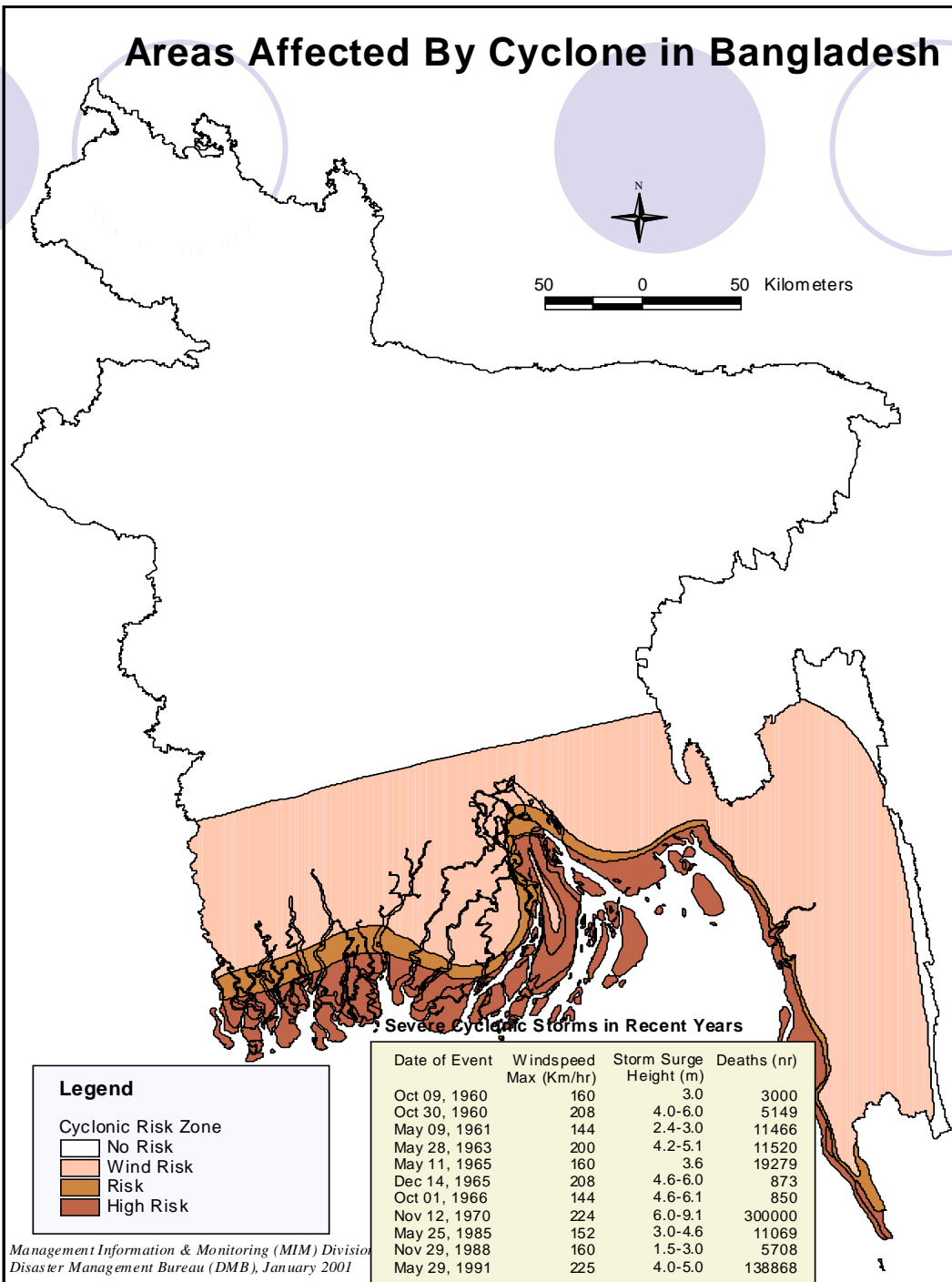
With focus on the Role of National Meteorological and Hydrological Services
5-7 May 2009, Toulouse, France

Bangladesh a Short Description

- Location and features.
- Extends from $20^{\circ} 45' N$ to $26^{\circ} 40' N$ and from $88^{\circ} 05' E$ to $92^{\circ} 40' E$. 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.

- 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

Areas Affected By Cyclone in Bangladesh



Severe Cyclonic Storms in Recent Years

Legend	
Cyclonic Risk Zone	
	No Risk
	Wind Risk
	Risk
	High Risk

Date of Event	Windspeed Max (Km/hr)	Storm Surge Height (m)	Deaths (nr)
Oct 09, 1960	160	3.0	3000
Oct 30, 1960	208	4.0-6.0	5149
May 09, 1961	144	2.4-3.0	11466
May 28, 1963	200	4.2-5.1	11520
May 11, 1965	160	3.6	19279
Dec 14, 1965	208	4.6-6.0	873
Oct 01, 1966	144	4.6-6.1	850
Nov 12, 1970	224	6.0-9.1	300000
May 25, 1985	152	3.0-4.6	11069
Nov 29, 1988	160	1.5-3.0	5708
May 29, 1991	225	4.0-5.0	138868

Management Information & Monitoring (MIM) Division
Disaster Management Bureau (DMB), January 2001

Development of EWS in Bangladesh

- British Colonial Rule
- After the great Bakerganj cyclone of 1876 The Indian Meteorological Department was established.
- 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

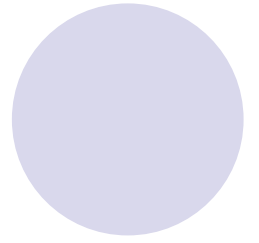
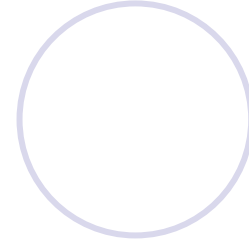
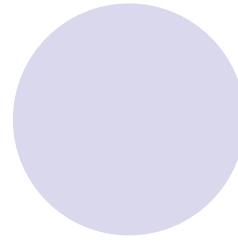
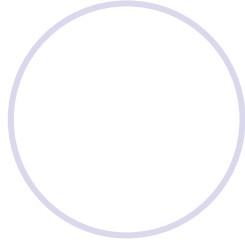
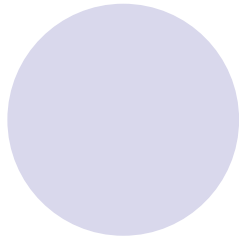
- In 1966 with the help of International Federation of Red Cross and Red Crescent Societies and Swedish Red Cross Society initiated Cyclone Preparedness Programme on request of the National Red Cross Society.
- But relief and rehabilitation were the notion of the government rather than preparedness and 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 140,000 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 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.
 - 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 through CPP.
- CPP turned out to be a joint venture programme of the government and Red Crescent society. In which the implementation part is mainly maintained by CPP 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. 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.

The National Plan for Disaster Management is prepared by 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.

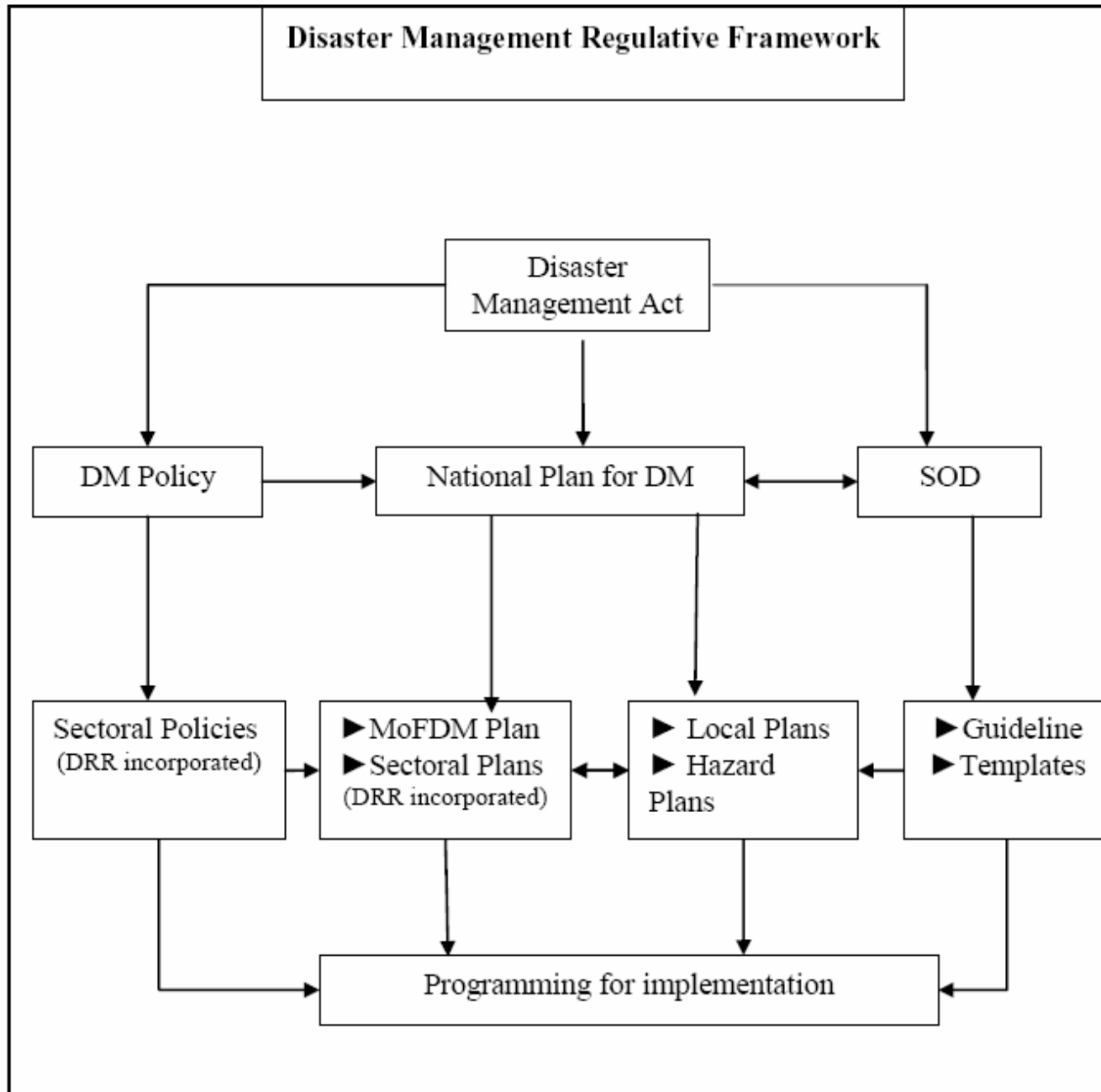
It is a strategic Framework which reflects the national perspective and principle of risk reduction and emergency and disaster management.

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.



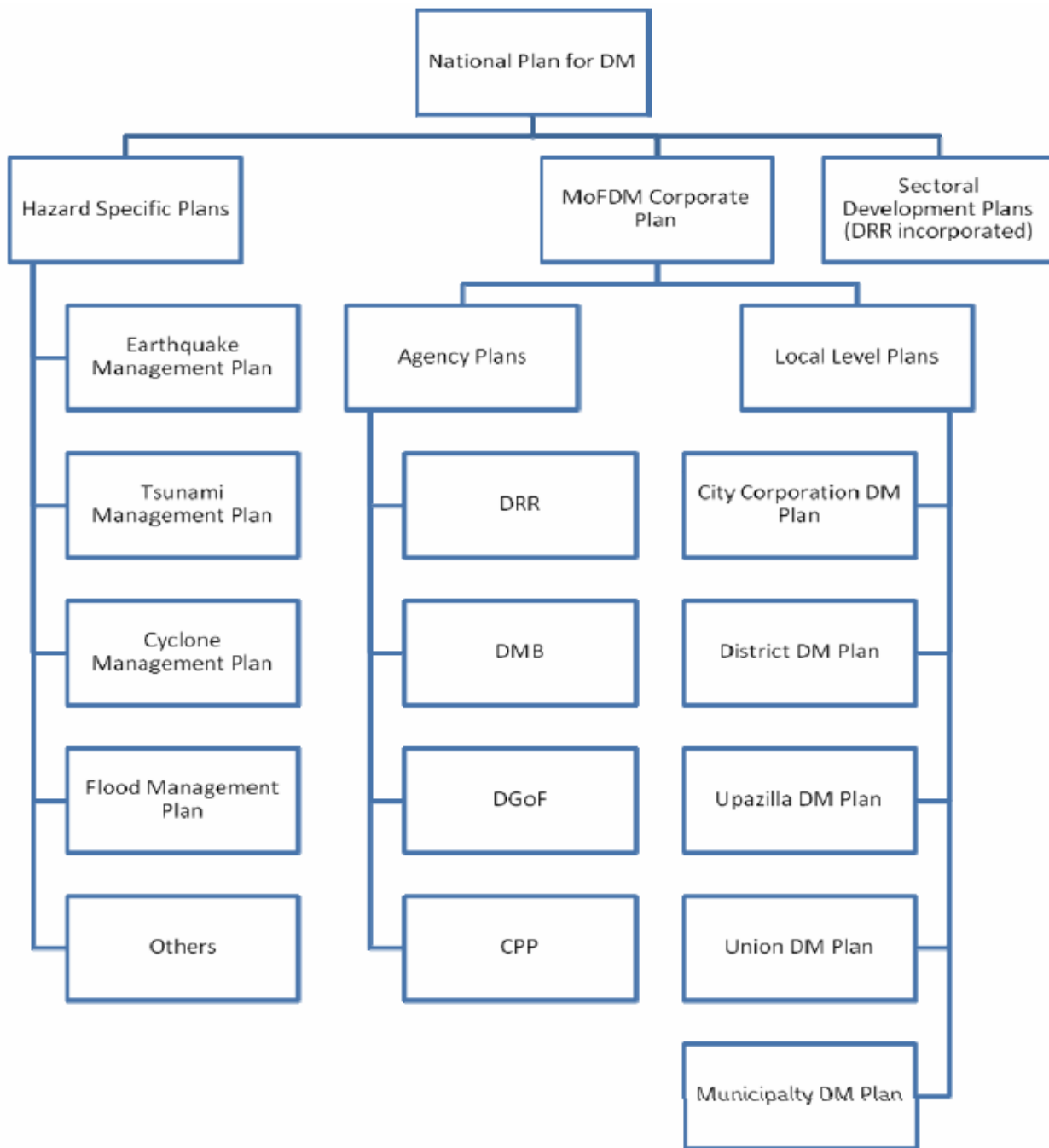


6. National to local emergency planning.

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 MoF&M takes the lead role in disaster risk reduction and emergency management planning. There would be

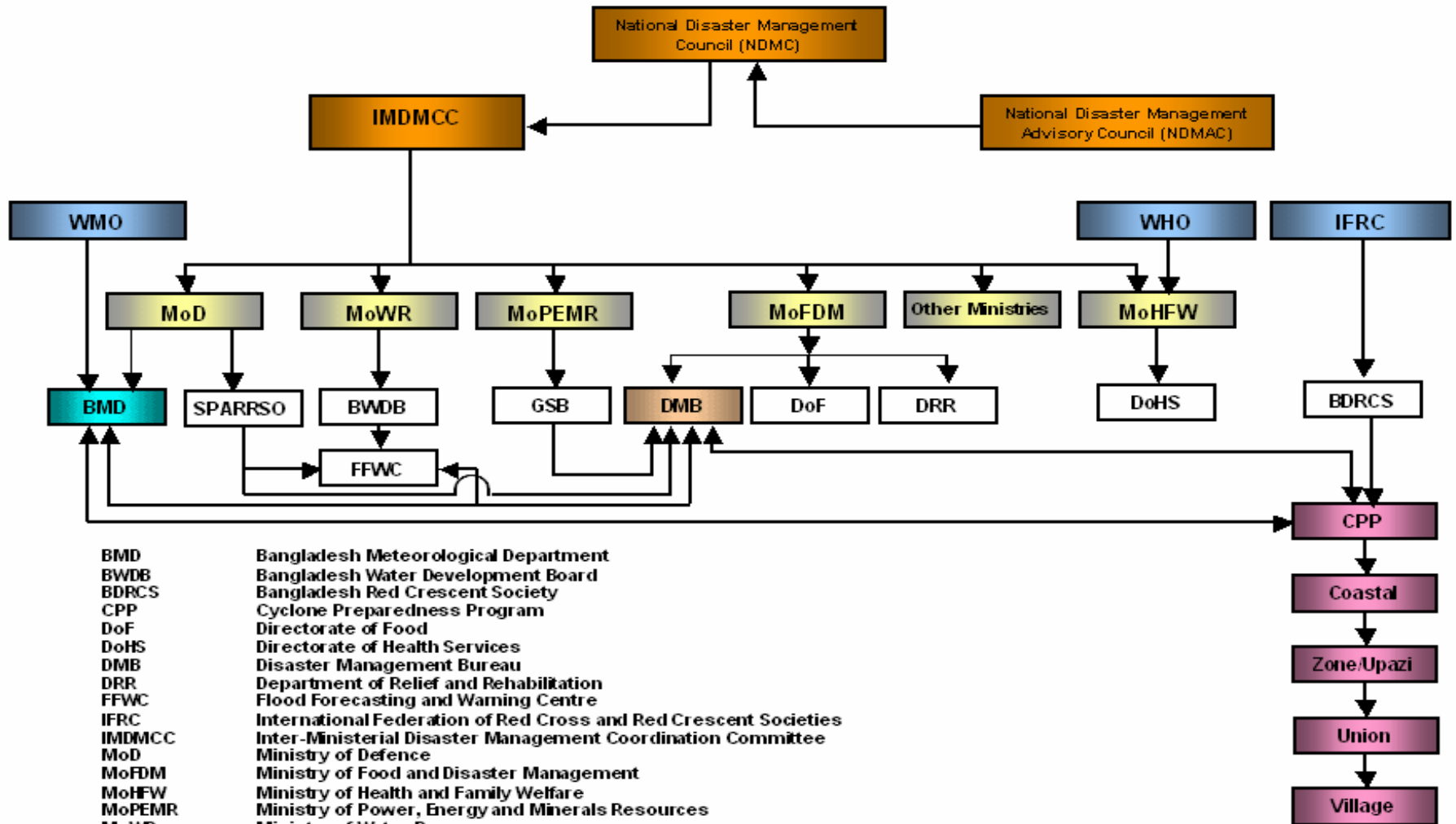
- a. Hazard specific plans.
- b. Area at different levels (administrative unit) specific plans.

7. Disaster Management Plans



8. Organizational structure for implementing the plans.

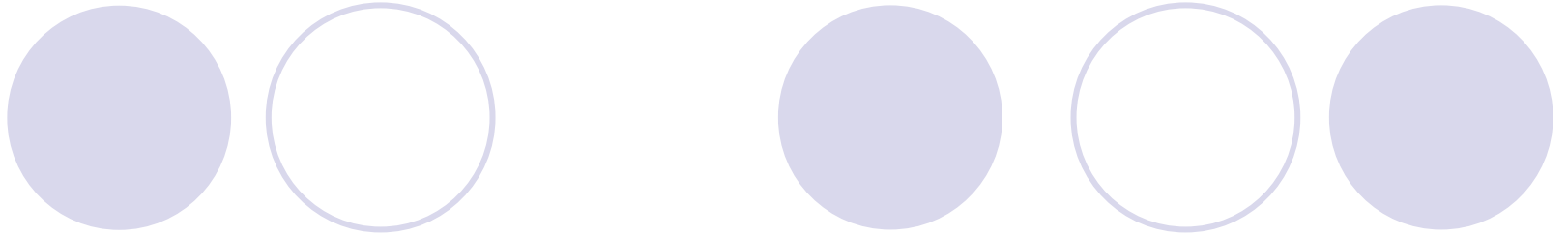
Disaster Management Flow Diagram in Bangladesh



- BMD** Bangladesh Meteorological Department
- BWDB** Bangladesh Water Development Board
- BDRCS** Bangladesh Red Crescent Society
- CPP** Cyclone Preparedness Program
- DoF** Directorate of Food
- DoHS** Directorate of Health Services
- DMB** Disaster Management Bureau
- DRR** Department of Relief and Rehabilitation
- FFWC** Flood Forecasting and Warning Centre
- IFRC** International Federation of Red Cross and Red Crescent Societies
- IMDMCC** Inter-Ministerial Disaster Management Coordination Committee
- MoD** Ministry of Defence
- MoFDM** Ministry of Food and Disaster Management
- MoHFW** Ministry of Health and Family Welfare
- MoPEMR** Ministry of Power, Energy and Minerals Resources
- MoWR** Ministry of Water Resources
- GSB** Geological Survey of Bangladesh
- WHO** World Health Organization
- WMO** World Meteorological Organization

Risk Information in emergency Planning and Warning.

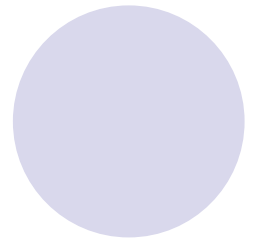
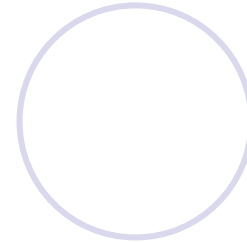
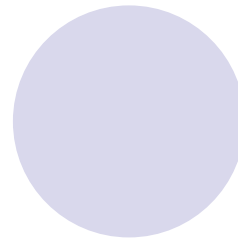
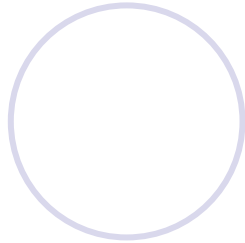
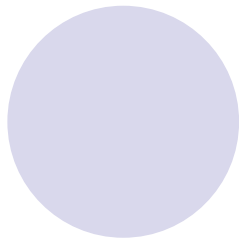
- Currently there is no proper disaster risk map in use in EWS in the country. But the NDMC understands the utility of risk information and is developing risk map for using in EWS.
- Mainly information of vulnerability and potential exposure are used widely in EWS & DM.
- BMD & BWDB keep hydro meteorological 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.

Table : Major hazards that affect Bangladesh

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	ICDDR, DoE	II	
21	River Erosion	BWDB	I	



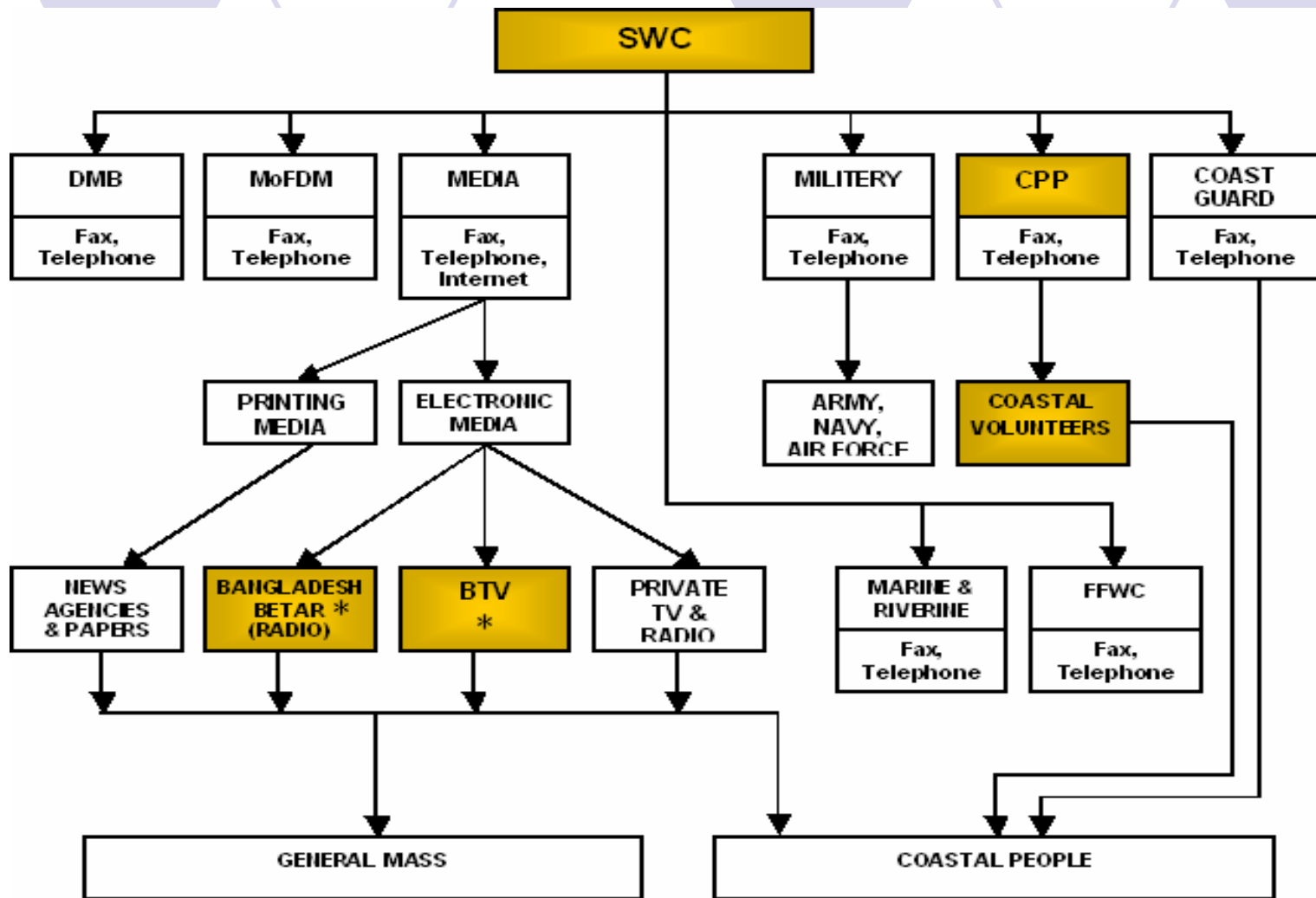
Note: Hazard rank is based on the historical figures of casualties and economic losses attributed to the respective hazards.

- 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

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				

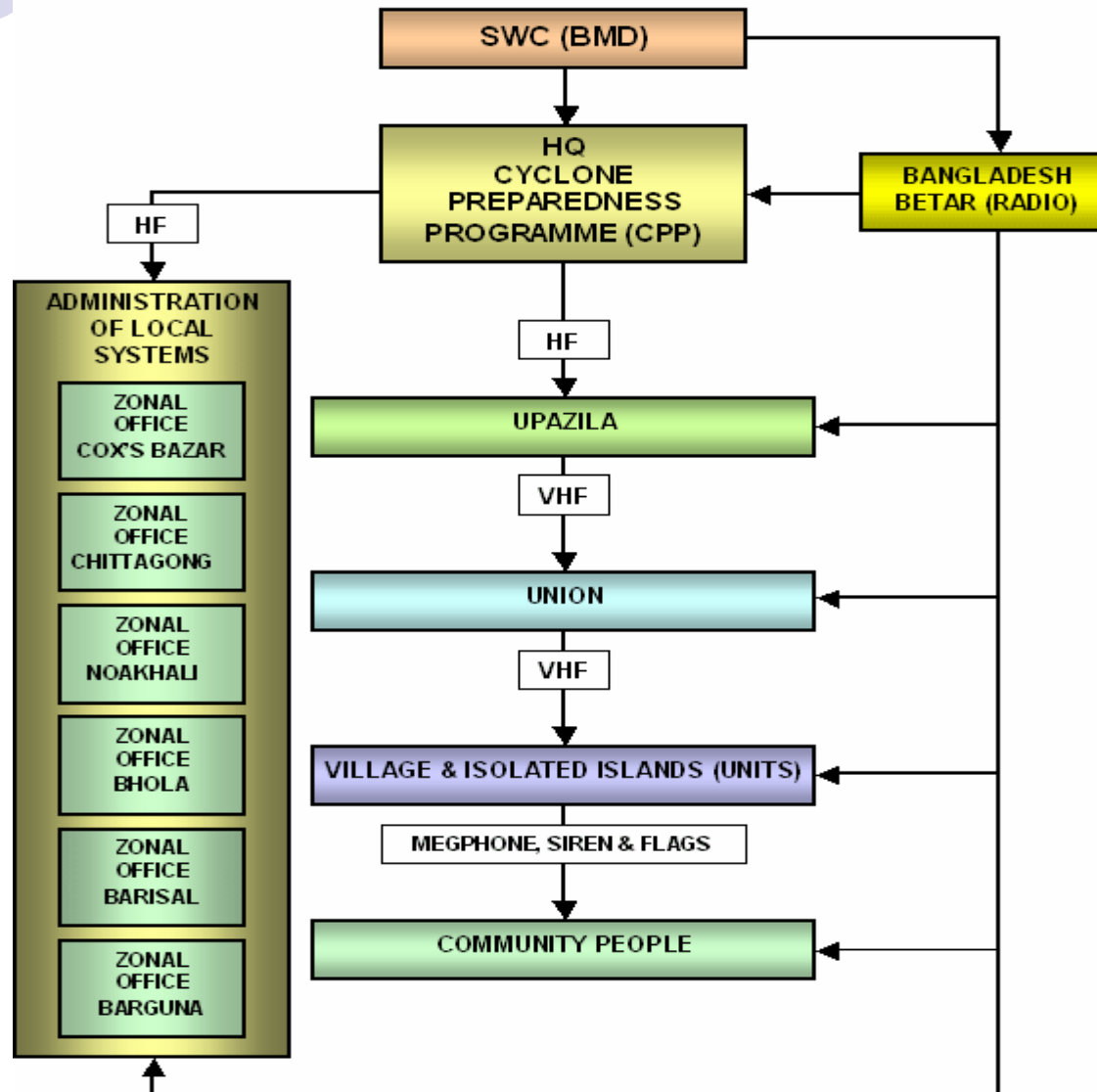
Warning dissemination mechanisms

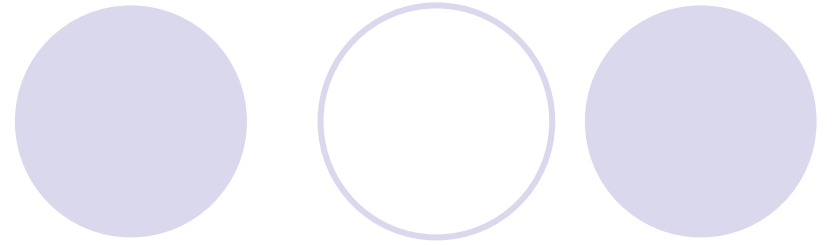
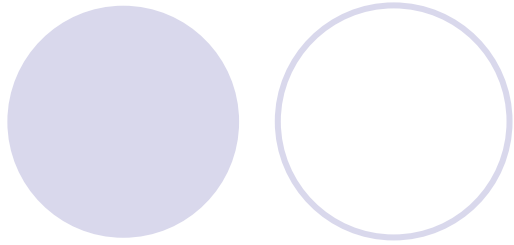


* Mandated to continuous broadcasting of Special Weather Bulletins containing Warning round the clock in case of Cyclones

Dissemination by CPP

DISSEMINATION OF CYCLONE WARNING IN BANGLADESH





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.



CPP is a volunteer based organization having 42675 volunteers spread out 2845 unit (village) of 32 upazilas under 11 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 be reduced.

During the November 1970 cyclone, with a wind speed of 223 km/hr, almost 500,000 people lost their lives in the coastal area. Whereas, in April 1991 cyclone, with a wind speed of 225 km/hr, only 140,000 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 220 km/hr and out of that only 3,347 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