

# PILOT WORKSHOP ON SYNERGIZED STANDARD OPERATING PROCEDURES (SSOP) FOR COASTAL MULTI- HAZARDS EARLY WARNING SYSTEM

*Bangladesh*

A highly successful two-day pilot workshop was conducted at the Bangladesh Meteorological Department, Dhaka, Bangladesh on 6 – 7 October 2013. The purpose of the workshop was to identify Standard Operating Procedures (SOP) best practices, gaps and needs, recommendations, and an action plan to meet the needs of Bangladesh and of the project for the other 12 beneficiary countries involved.

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11/18/2013



## Acknowledgments

This workshop was conducted as Activity 1.2 of Project Synergized Standard Operating Procedures for Coastal Multi-Hazards Early Warning System. The lead organizations for the project are the ESCAP/WMO Typhoon Committee and the WMO/ESCAP Panel on Tropical Cyclones in association with a wide cross section of partner agencies. Very kind appreciation is expressed to ESCAP Trust Fund for Tsunami, Disaster and Climate Preparedness in Indian Ocean and Southeast Asian Countries who have funded this project; to the Bangladesh Meteorological Department (BMD) for their vital assistance, support, and active participation in this successfully workshop; and to Asia Disaster Preparedness Center, Asia-Pacific Broadcasting Union, Typhoon Committee Secretariat, and to the Panel on Tropical Cyclones Secretariat who provided excellent support and insights as part of the team who visited the pilot countries.

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## 1. Introduction

The Economic and Social Commission of Asia and Pacific (ESCAP) / World Meteorological Organization (WMO) Typhoon Committee (TC) and the WMO/ESCAP Panel on Tropical Cyclones (PTC) in cooperation with other agencies recognized that there was a strong need to create synergies among different types of coastal hazard early warnings, including for tsunami, storm surge, high tide, high wave, strong wind, flood, and sediment disasters by reviewing existing Standing Operating Procedures (SOPs). They believed these synergies could be achieved through identifying best practices and specific gaps and needs for making existing Early Warning Systems (EWSs) fully operational for use in a multi-hazards context. Thus the Typhoon Committee and the Panel on Tropical Cyclones formulated, with the collaboration of other entities, and submitted the project Synergized Standard Operating Procedures (SSOP) for Coastal Multi-Hazards Early Warning System to ESCAP for funding through the ESCAP Multi-Donor Trust Fund for Tsunami, Disaster and Climate Preparedness in Indian Ocean and South East Asia. The final version of the Letter of Agreement between ESCAP and TC to fund this project was signed on 1 August 2012. Unless otherwise agreed upon, the project termination date is 31 July 2014.

## 2. Project Overview

The long term goal of the project is to promote community resilience to coastal multi-hazards, including impact from land falling tropical cyclones, through effective SOPs for multi-hazards EWSs. The project is a collaboration with the Asia Disaster Preparedness Center (ADPC), Asia-Pacific Broadcasting Union (ABU), Global Alliance on Accessible Technologies and Environments (GAATES), Intergovernmental Oceanographic Commission (IOC) of UNESCO, Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES), and United Nations Development Programme (UNDP) Asia-Pacific Regional Centre and involves thirteen beneficiary countries in TC and PTC regions. In addition, the project will coordinate with WMO, Asia Disaster Reduction Center (ADRC), and other TC and PTC countries in the region. The designated target groups include National Meteorological and Hydrological Services, National Tsunami Warning Centres, and National Disaster Management Offices in TC and PTC Members' countries.

The synergized SOPs are intended to be easily understandable and interpretable for decision makers, forecasters, and dwellers, like fishermen.

Activity 1 under this project is to collect, review, analyze, and synergize the existing SOPs for coastal multi-hazard EWS in Members' countries of TC and PTC. Based upon the analysis and synergizing, the project will develop a Manual/Handbook of Synergized Standard Operating Procedures for Coastal Multi-hazard Early Warning Systems.

The first item, 1.1, under this activity was to conduct a workshop for collecting and exchanging the performance status of coastal multi-hazard EWS in TC and PTC Members' countries at high risk. This was held on May 8-9, 2013 and was attended by 12 of the beneficiary countries, ESCAP, and the collaborating and coordinating agencies mentioned above.

The second item, 1.2, was to pilot the SSOP project in 3 selected countries. The three selected pilot countries selected were the Bangladesh, the Philippines, and Pakistan. The

Pilot Workshop held in the Bangladesh on 6 – 7 Oct 2013 was the first of several visits to this country as part of the pilot activity.

### **3. Purpose of the Workshops**

Sub-Activity 1.2 of the project was to pilot the SSOP project with a focus on institutional capacity building from the national level to the local level - main emphasis on meteorological, hydrological, and disaster management services. Therefore based upon this, the workshop purpose was to:

- ▶ Review existing SOPs for coastal multi-hazards EWS for Hydro-meteorological, disaster management, media, elected official, and others from national to local levels
- ▶ Identified best practices, gaps and needs, and recommendations in both an agency's internal SOPs and also integrated SOPs among different agencies.
- ▶ Develop a plan of action to build upon the best practices, fill the gaps and needs, and to review the recommendations to build institutional capacity.

Based upon the Bangladesh in-country visit and the other two in-country workshops, to then develop a manual/handbook draft of synergized SOPs required in Sub-Activity 1.3.

### **4. The Three In-Country Pilot Workshops and Team Members**

The three in-country pilot workshops were held:

- ▶ October 3-4, 2013 Manila, Philippines
- ▶ October 6-7, 2013 Dhaka, Bangladesh
- ▶ October 10-11, 2013 Islamabad, Pakistan

The team members for the Philippines and Bangladesh in-country visits were:

- ▶ Jim Weyman, Project Manager/Technical Advisor
- ▶ Olavo Rasquinho, Meteorological Expert, TCS
- ▶ Atiq Kainan Ahmed, Disaster Response Expert, ADPC
- ▶ Mr. Walter Welz, Media Expert, ABU
- ▶ Ahmed Said Al Barwani, Hydrology Expert, PTC

Since Mr. Weyman was unable to obtain a visa to Pakistan in time for the visit and Mr. Welz had a previously scheduled meeting, the team members for the Pakistan in-country visit were:

- ▶ Olavo Rasquinho, Meteorological Expert, TCS
- ▶ Atiq Kainan Ahmed, Disaster Response Expert, ADPC
- ▶ Mr. Nadeem Ahmed, Media Expert, ABU
- ▶ Ahmed Said Al Barwani, Hydrology Expert, PTC

Mr. Weyman did participate on several different occasions in the Pakistan workshop, especially during the groups' presentations following the breakout sessions, via Skype from his home.

### **5. Workshop Programme Overview**

The programme for the workshop was jointly developed by members of Bangladesh Meteorological Department (BMD) and the Project Manager (see Appendix I). Approximately 24 people attended all or part of the workshop (see Appendix II for list of attendees).

After the welcoming remarks by Mr. Md. Shah Alam, Director, BMD and a message by Mr. Olavo Rasquinho, Secretary, Typhoon Committee, the Programme was broken down into five sessions on the first day and four sessions on the second. These included:

### **5.1 Day 1:**

*Session 1:* Roles and Responsibilities in Coastal Multi-hazards Early Warning System at national, district, and local levels.

*Session 2:* Identification of Issues, Gaps, and Challenges in Early Warning System.

*Session 3:* Roles of Standard Operating Procedures (internal, external, and integrated) for Early Warning System including Development Procedure and Annual Review

*Session 4:* Identification of Issues, Gaps, and Challenges in Early Warning System Standard Operating Procedures.

*Session 5:* Plans and Thoughts for the Future.

### **5.2 Day 2:**

*Session 1:* Bridging the Gaps in the SOPs for Early Warning System – The Road Ahead

*Session 2:* Challenge to Issue Effective, Understandable Forecasts, Advisories, and Tropical Cyclone Bulletins

*Session 3:* Building Relationships

*Session 4:* Goals and Completion Dates

*Summary:* Gaps, Needs, and recommendations

**NOTE:** The Typhoon Committee Secretariat will establish a web page at the Typhoon Committee web site (<http://www.typhooncommittee.org>) which will include the presentations given at the pilot workshops, the project documents and reports, and a possible blog for comments and discussions.

**NOTE:** During the workshop, some items were presented and discussed which were not directly related to this SSOP project. However, many of these were kept and could be used in the future as part of an overall needs analysis in this area.

## **6. Workshop Day 1 – 6 October 2013**

**6.1.** Session 1: Roles and Responsibilities in Coastal Multi-hazards Early Warning System at national, district, and local levels.

This session started with Mr. Weyman giving a presentation on the overall SSOP Project: its strategy, framework, expected outcomes, structure, objectives, goals, and activities; collaboration and coordination partners; and the steering committee, project manager, and task team associated with the project. He then discussed the three in-country pilot workshops, the team members, and the purpose of the workshops. At the end, he presented the conclusions and recommendations from the 8 – 9 May 2013 Initial Workshop in Bangkok, Thailand in the areas of the proposed SSOP Manual/Handbook; training and human capacity building; infrastructure capacity building; and gaps and needs in dissemination, warnings, and coordination.

This presentation was followed by 5 presentations on the roles and responsibilities in coastal multi-hazard EWS in the areas of:

**6.1.1 Hydro-meteorological** -Mr. Shamsuddin Ahmed, Deputy Director, BMD discussed the Meteorological services, followed by Mr. Md. Amirul Hossain, Executive Engineer, FFWC on Hydrological services in the coastal multi-hazards EWS.

Mr. Ahmed began with a discussion of the various significant weather events Bangladesh experiences (such as tropical cyclones and associated storm surge; nor' westers and tornadoes; floods and heavy rainfall; drought; river erosion; earthquakes; and others) and related this to possible savings of multiple billions of dollars if advanced science and technology could be implemented in operations. Bangladesh is a delta of about 144,000 square kilometers most of it very low lying. He described BMD Severe Weather Center's warnings and time frames for different weather phenomenon and their dissemination system. He then listed what he considered to be 10 principles to which successful early warning systems generally adhere. These were strong political recognition; the 4 basic components of EWSs; EWS stakeholders are identified and their roles identified; supported by adequate resources (e.g., human, financial, equipment, etc.); risk assessments are preformed; clear, concise, understandable warnings; excellent dissemination mechanisms; emergency response plans developed; training on risk awareness and hazard recognition; and effective feedback and improvement mechanisms.

At the end Mr. Ahmed commented in his view gaps include improved, faster EWS to get the information out quicker; improved BMD website which is slow and sometimes doesn't work; and single, official source of information with regular press conferences and release of data (sometimes media causes panic by making the cyclone sound very severe). After his presentation, there was discussion concerning the changing the color scale which had been used previously and points made supporting both the old and new system. There was also a discussion of risk awareness (hazard X vulnerability = risk) and it was explained that there was an ongoing project funded by the World Bank to determine multi-hazard risk. The comment was made that we must move from vulnerability only to risk which also considers the hazard.

Mr. Hossain discussed in detail Ministry of Water Resources down to the Flood Forecasting and Warning Center. Location, topography, and population density make Bangladesh vulnerable to severe weather and floods. From 1954 – 2012, 87% of the people who have died from major disasters have been caused by cyclone and/or storm surge and 6% from floods. These are heavy influenced by the 300,000-500,000 people killed in 1970 and the 140,000 killed in 1991. During the same period 76% of the people have been impacted by floods and 16% by cyclone and/or storm surge. Due to BWBD Act in 2000, strong structure and non-structural actions are required. Then Mr. Hossain showed examples of significant past floods in different areas, their improved structured, deterministic forecasting capabilities through 72 hours and in some areas through 120 hours (5 days), and experimental 10-daily probabilistic flood forecast for 18 locations. He mentioned that email is the major communication method for their forecasts and that all of the water level gages are manual and must be read and transmitted to them.

Mr. Hossain ended his presentation with suggested structural and non-structural improvements which could be made. Structural ones are: improved disseminate to get the information and forecast to where it is needed; redundant dissemination systems are needed; automation of gages for better access to and timelessness of data; improved access to other government tide gages and other gages (such as the Navy's one) without going to many web sites; new flood control/management structures; improve maintenance of existing structures;



river bank protection/stabilization; flood/cyclone shelters (building/earthen killas); strengthening of coastal polders/embankment; dredging/ silt removal; afforestation along coastal belt; and land reclamation and resettlement programme. For non-structural ones, they include (some national and some international): improved flash flood forecast; more area coverage under FFWS; medium and long range (seasonal) probabilistic forecasts; medium range/seasonal dry season flow prediction for irrigation and navigation; salinity intrusion forecast in coastal belt; drought prediction; use of satellite based technology for increase FFWS; regional cooperation/data sharing; and basin wide flood forecast. He suggested the following for future priorities: tidal flood forecast; expanding flood forecast area coverage; increase lead time and improve accuracy; erosion prediction; seasonal flood forecast; dry season long range water availability prediction in the major rivers; salinity intrusion prediction; and it may be useful to consider having just one flood forecast center. He commented that their flood forecasting computation is based on the rivers within their boundaries, and if this could be extended further, flash flood lead time would increase and may often the opportunity for basin wise FF, both of which would certainly benefit the people of Bangladesh.

**6.1.2 Disaster Management – Mr. Netai Chandra Dey Sarker, AD (GIS).** Mr. Sarker first presented Bangladesh vulnerability profile, key factors/reasons for this vulnerability, major disaster that have occurred in the past, and the economic losses in the last three decades (1987-2012) which have been US \$11.6B. He said Bangladesh has an excellent national disaster management capacity with a specialized Ministry for Disaster Management and Relief (MoDMR). They created a Department of Disaster Management (DDM); shifting focus from relief to disaster management/to risk reduction and to assist communications; a Cyclone Preparedness Programme with 50,000 volunteers with vital roles at local level; a revised Standing Orders on Disaster which establishes clear roles mechanisms, and procedures at all levels of government; Disaster Management information Centre (DMIC); initiated ‘comprehensive disaster management framework’ involving all disaster stakeholders; and the presence of vibrant NGO communities. DDM is the technical arm of MoDMR to oversee and coordinate all activities related to disaster management from national down to the grass-root level. DDM aim is to contribute to sustainable benefits to the country and communities through prompt and collaborative approach to risk and loss reduction, avoidance of indecision and effective utilization of resources.

The Revised Standing Orders on Disaster (SOD) is an excellent, coordinated manual. The standing order creates the opportunity to establish disaster management committee at every level. These standing orders provide ample scope for the Government, NGOs and private sectors to think locally and plan need-based program involving the community. The SOD was revised in April 2010 to change in the focus from conventional relief and response to DRR culture; more focused on DRR; earthquake, tsunami, landslide and fire are included; regulative framework are in placed; national mechanism for policy guidance and coordination was amplified and clarified; gender, children, disable and elderly people issues are addressed; and multi-agency disaster incident management system was specified. The SOD also specifies the various committees needed and the coordination, collaboration. He then mentioned the National Plan for Disaster Management (NPDM) 2010-2015 which specifies vision, mission, goals, and strategic direction. He mentioned that after a disaster DDM writes a report of actions and disseminates to others.

He went on to state the importance of DMIC and its role in dissemination and the roles and mechanisms of others, especially the CPP, in dissemination which is contained in SOD. A

major new initiative is a pilot project on early warning dissemination through Cell Broadcasting System (CBS). In this project two message formats consists of maximum 20 characters have developed. One is for flood at Sirajgonj and other is for cyclone at Cox'sbazar. It is planned to expand CBS at 14 coastal districts of Bangladesh and ultimately all over the country. IVR has pilot tested through Teletalk for disaster information and daily weather bulletin. Finally all mobile operators have agreed to be part of this initiative.

Lastly, Mr. Ahmed stated what he thought the long range challenges were: improvement of early warning system; expansion of the operation areas of the Cyclone Preparedness Program; expansion of disaster management information network; strengthening linkage with regional and international organizations involved in DRR in line with HFA; and establishment of Pole Fitted Megaphone Siren in the disaster prone areas.

### **6.1.3 Media – Mr. Junaid Ali Saque, Staff Reporter, SA TV.**

Mr. Saque started by emphasizing the importance of the coastal areas because one-fourth of the population (40 million people) live there. Local community of coastal area faces many natural calamities like depression, cyclone, storm surge, and salinity around the year. So early warning is very important to the coastal community. This population can be effectively reached by different types of media like radio, television etc. The media has the ability to interact from top to bottom, locally to internationally and can react with people at every stage. Media have many roles in early warning at any kinds of disaster. But media should not be the subject or chief source of information. The media would like to play a more objective role. Media works best when affiliated responsible people perform their roles properly. On aspect of media is that they can avoid their own responsibility and have many chances to blame others in case of early warning situations. People must believe and watch/buy the media for it to work properly.

If BMD issues a warning or alert, electronic media like TV, news portal or online agency can promptly broadcast that information, but there is extensive, heavy competition going on between different media. So every media will try to grab the latest news. Currently, there is extensive media competition in Bangladesh with 25 TV channels and over 500 news on line services. Most of the material of interest and the main part of media presentations is local.

Mr. Saque noted that after the warning, the media send extensive concentration of resources to the region affected (staff reporter or special correspondent with special equipment such as DSNG, 3G, back pack, etc.) so they have more resources in the area than BMD. The media gives priority to these local correspondents and not BMD. Based on that, sometimes the local correspondents provide incorrect information in an attempt to keep ahead of their competition on other channels. This type of situation creates confusion concerning what is the correct information. BMD has fixed time schedules for updates, but media can't wait and fill in with their own information and this may create misunderstandings between BMD and the media. However, the media uses BMD information when available and relations between BMD and the media are okay.

Mr. Saque made the following suggestions: 1) BMD should be more specific about the time of the next bulletin or update; 2) it would be helpful to have a guide book or reference manual for the media on bulletins; 3) there may be a need to give a brief explanation about the signal level for the public to understand; 4) throughout the year, BMD should have notes or informational sheets about seasonal disasters; and 5) BMD should prepare information and notes for media and public following a disaster.

In the discussion that followed, it was emphasized that there is no media control. There is guidance in the SOD but not mandatory. Mr. Welz commented that the media must obtain a license from the government to broadcast and possibly one condition for the license would be to attend hazard training. Mr. Welz also commented that media needs to fill in programming so the ability to broadcast can sometimes outpace reliable sources. If the official source doesn't provide a constant flow of data and information, the media will fill in the time with something. It was suggested that media workshops be held to train local media people at a "familiar" level not to a detail level.

**6.1.4 Other Government Roles – Mr. Bashir Ahmed, Deputy Director (Admin), CPP.** Mr. Ahmed stated that after the severe cyclone in 1970, Cyclone Preparedness Programme (CPP) was established in 1972 with the help of the league of Red Cross. However, the league of Red Cross decided to withdraw from the program and the government made a decision to continue the programme beginning 1 July 1973. From 1973 CPP has been working in Early Warning System, search and rescue, evacuation, sheltering, first aid, relief distribution and rehabilitation activities. CPP is considered a model programme in the disaster management field in the world and has won several awards. CPP has 203 Officers/ Staff and 49365 Volunteers. Its vision is to minimize the loss of lives and damage of properties in cyclone by strengthening the capacity in disaster management of the coastal people of Bangladesh. Its objectives are to build up smart, skilled and dedicated volunteers' teams with a humanitarian and social welfare spirit; to develop and strengthen disaster preparedness activity; to increase the efficiency of the CPP volunteers, officers and staffs; to develop a prompt disaster response network; and to establish and strengthen weather warning signals and ensure prompt and effective response from the community people concerning cyclone signals.

CPP is run by two bodies namely the Policy Committee headed by the Honorable Minister, the Ministry of Disaster Management and Relief and by the Implementation Board headed by the Secretary of the Disaster Management & Relief. CPP has a Head Office in Dhaka under which there are 7 zonal offices. Each zonal office has some upazila offices, each upazila office has some unions, and each union has some units. In each unit, CPP has 15 volunteers (10 men and 5 women) for 5 posts which are Warning Signal, Shelter, Rescue, First Aid and Relief. All volunteer at every level receive extensive training. The Cyclone Preparedness Programme operates an extensive telecommunication network with HF and VHF radio sets (backup and redundant if needed) that directly link Headquarters of CPP with coastal area of Bangladesh. They receive weather bulletin from the Bangladesh Metrological Department through this network, then CPP transmits the message of warning signals to the CPP command area. In this way volunteers receives the message of warning signals and then they disseminate the warning signals among the community people to make them conscious what to do and when to do necessary activities. They have three different levels of alert. For level one it is done orally and one flag is hoisted. For level 2, it is done by mike and megaphone and a second flag is hoisted. At level three, mike, megaphone, siren and PA system are used and a third flag is hoisted. When the order for evacuation and sheltering is given, they help in the most vulnerable risky area and with vulnerable people specially the disabled, pregnant, children, and women to reach the shelters. Following an event, there are CPP people trained in search and rescue and in first aid. The post disaster activities are to assist in relief distribution, rehabilitation of the affected people, and in health and sanitation management. In normal times, they can build up awareness about cyclonic storm and its preparedness activities through talks, drills, publicity, dramas, and folk songs. The programme continues

to expand into new areas and with various grants they have acquired some digital cameras, computer resources, and equipment.

**6.1.5 Other Related Fields – Commander Minarul Huque, BN.** Commander Huque stated that the Armed Forces fall directly under the control and coordination of the National Disaster Management Council. The Navy depends upon BMD's forecasts and warnings but also collect and review data from open sources on the internet. The Navy has the responsibility for all coastal areas. Commander Huque broke the Navy's role into three parts. In Normal times, their ships and estabs remain ready to undertake long term relief operations at short notice; maintain contact with BMD and MoFDM for receipt of Warning Signals and required arrangements in advance; arrange training for naval personnel on rescue and rehabilitation activities; develop preparedness plan; establish/develop overall communication system; examines the strength and weakness of own disaster management contingency plan through annual exercise; formulates plan to safeguard own ships, equipment, materials and personnel from disaster. In the Alert and warning stage, the BN promulgates warning signal to all units; collect and exchange information on regular basis; assist in establishing communications where needed; establishes Disaster Control Cell at NHQ in Dhaka and also Chittagong and Khulna; takes adequate preventive measures to safeguard naval ships, establishments, personnel and equipment; and maintain liaison with various coordination Cell and sister services. In the disaster stage, they deploy required officers and men in control cells at NHQ in Dhaka and also Chittagong and Khulna; keep all ships and naval bases ready for deployment in immediate relief operations; maintain close and constant liaison with PM's Coordination Cell and EOC at MoFDM; carries and distributes relief goods to the affected areas; assists in establishing communications where needed; and renders all possible assistance to civil authority using all resources. In the Rehabilitation stage, the BN assesses the damage of affected areas and arrange necessary relief and rehabilitation activities; render all possible assistance to the civil administration for relief and rehabilitation activities in the affected area; assist civil administration in distributing relief goods to the distressed people; and continues rendering assistance to local authority and civil administration till the situation becomes normal.

## **6.2 Session 2: Identification of Issues, Gaps, and Challenges in Early Warning System.**

- Mr. Shamsuddin Ahmed mentioned the need for improved, faster EWS to get the information out quicker; improved BMD website which is slow and sometimes doesn't work; single, official source of information with regular press conferences and release of data (sometimes media causes panic by making the cyclone sound very severe).
- Mr. Hossain ended his presentation with suggested structural and non-structural improvements which could be made. Structural ones are: improved disseminate to get the information and forecast to where it is needed; redundant dissemination systems are needed; automation of gages for better access to and timelessness of data; improved access to other government tide gages and other gages (such as the Navy's one) without going to many web sites; new flood control/management structures; improve maintenance of existing structures; river bank protection/stabilization; flood/cyclone shelters (building/earthen killas); strengthening of coastal polders/embankment; dredging/ silt removal; afforestation along coastal belt; and land reclamation and resettlement programme. For non-structural ones, they include (some national and some international): improved flash flood forecast; more area coverage under FFWS; medium and long range (seasonal) probabilistic forecasts; medium range/seasonal dry season flow prediction for irrigation and navigation; salinity intrusion forecast in coastal belt; drought prediction;

use of satellite based technology for increase FFWS; regional cooperation/data sharing; and basin wide flood forecast. He suggested the following for future priorities: tidal flood forecast; expanding flood forecast area coverage; increase lead time and improve accuracy; erosion prediction; seasonal flood forecast; dry season long range water availability prediction in the major rivers; salinity intrusion prediction; and it may be useful to consider having just one flood forecast center. He commented that their flood forecasting computation is based on the rivers within their boundaries, and if this could be extended further, flash flood lead time would increase and may often the opportunity for basin wise FF, both of which would certainly benefit the people of Bangladesh.

- Mr. Dey stated what he thought the long range challenges were: improvement of early warning system; expansion of the operation areas of the Cyclone Preparedness Program; expansion of disaster management information network; strengthening linkage with regional and international organizations involved in DRR in line with HFA; and establishment of Pole Fitted Megaphone Siren in the disaster prone areas.
- Mr. Saquee made the following suggestions: 1) BMD should be more specific about the time of the next bulletin or update; 2) the need for quick, accurate information in simple language to broadcast. This should be in the form where they can take what they receive and quickly convey to the public without much editing or changes; 3) it would be helpful to have a guide book or reference manual for the media on bulletins; 4) there may be a need to give a brief explanation about the signal level for the public to understand; and 5) BMD should prepare information and notes for media and public following a disaster.
- Mr. Bashir Ahmed cited a need for increased funding of the CPP program to purchase equipment and support items for the volunteers.

Several people reiterated that challenges associated with a successful early warning system require active, integrated participation at all levels: national, regional, local governments and agencies, private, professional and civil society organizations, communities, families, and individuals.

### **6.3 Session 3: Roles of Standard Operating Procedures (internal, external, and integrated) for Early Warning System including Development Procedure and Annual Review.**

**6.3.1 Hydro-meteorological Services, Mr. Shamsuddin Ahmed, Deputy Director, BMD.** Mr. Ahmed began his presentation with the statement that early warning systems are well recognized as a critical life-saving tool for floods, droughts, storms, bushfires, and other hazards. He then discussed the 4 components that make up a EWS. He then discussed the forecast process including observation system (instruments/manual observations), communication (collection/dissemination), analysis and forecasting (manual, NWP, different aspects to consider), and dissemination. He mentioned the movement from persistence and climatology utilizing synoptic pattern and time series analysis of climatological data and information to NWP technique and the various models and guidance available, including BMD's local WRF model. He also commented on the increased use of satellite and radar data and information from other internet sites including JTWC and RSMC New Delhi. He discussed the Cyclone warning product and the dissemination process.

Then he said that BMD has no well documented SOP except for the aviation program and the national Standing Orders on Disasters. He indicated a strong need for SOPs for the observational system (instruments/manual observations.), communications (collection/dissemination), analysis and forecasting (manual/NWP), and dissemination.

### 6.3.2 Earthquake and Tsunami Services, Mr. Md. Momenul Islam, Meteorologist, BMD.

Mr. Islam stated that BMD is the responsible organization in Bangladesh for monitoring earthquake and tsunami and his presentation would indicate the status of seismic monitoring, tsunami early warning communication and interim SOPs for tsunami of BMD. He first described the seismic data network, communications, along with a description of the sites and the equipment used. He then presented information concerning the Dhaka Seismic Observatory and Research Center and its operations. He then presented the tsunami warning system in Bangladesh with information from RTH New Delhi and RTSP India, Indonesia, and Australia to BMD who then disseminates out to others and then to the general public. Mr. Islam then described NTWC (BMD) Tsunami Bulletin Types. For distance tsunami these include:

- ▶ NTWC (BMD) Bulletin Type 1: Earthquake Occurrence and Tsunami Information  
It is issued within 10-20 minutes of earthquake based upon RTSP Bulletin-1 and local data analysis and contains earthquake details qualitative tsunami threat assessment.
- ▶ NTWC (BMD) Bulletin Type 2: Potential Tsunami Threat Bulletin (Potential Tsunami Watch Bulletin). It is issued within 30-45 minutes of earthquake after receiving RTSP Bulletin-2 and contains earthquake details, model prediction time of RTSP (arrival time of first wave and maximum beach height). Related agencies are advised to be watchful.
- ▶ NTWC (BMD) Bulletin Type 3: Tsunami Warning Bulletin. It is issued after RTSP Bulletin-3 (Confirmed tsunami generates) and contains all Bulletin-2 information, observations of tsunami waves and advice to evacuate coast and beach area.
- ▶ NTWC (BMD) Bulletin Type 4: Tsunami Withdrawn Bulletin. This is issued 2 hours after the last arrival T4 time on the basis of RTSP Bulletin and contains information that the tsunami threat has passed and no further bulletin will be issued.
- ▶ For near field or local tsunami, NTWC (BMD) Bulletin Type 1: Earthquake Occurrence and Tsunami warning message is issued within 10-20 minutes of earthquake if earthquake magnitude 7 or more and also if it occurs in shallow depth.

Mr. Islam stated that he believed SOPs were very important because they: provide timely warnings; allow fast action without confusion; clearly detail what, when, and how to do things in emergency situation; they serve as the foundation of effective, reliable warning systems; all warning systems require SOPs, but for tsunami rapid evaluation, warning and response, SOPs are essential to save lives; in an end-to-end system, communications links between stakeholders must be strong or warning chain will be broken and SOPs can help; and SOPs should be developed, practiced (tested, exercises, drills) and modified as necessary – a “living document”. Then he provided a sample of interim SOPs for tsunami.

At the end, Mr. Islam included his suggested plans for improvements to the tsunami warning and mitigation program. Although these are outside the scope of this project, they are included for future reference. These include: improvement in the capacity building of human resources by improving the advance and updated knowledge on seismology, seismic data analysis, hazard assessment, tsunami early warning capacity development, and risk mitigation; increase seismic observational network; within the existing network include auto analysis software and sea level monitoring system; additional training facilities; and multi-lateral study between Bangladesh and neighbor countries.

### 6.4 Session 4: Identification of Issues, Gaps, and Challenges in Early Warning System Standard Operating Procedures.

Some of the important ideas discussed during this session were:

- BMD has no well documented SOP except for the aviation program and the national Standing Orders on Disasters. There is a strong need for SOPs for the observational

system (instruments/manual observations.), communications (collection/dissemination), analysis and forecasting (manual/NWP), and dissemination.

- Continued development of clear, easily understood warnings.
- To refine and finalize the interim SOP for tsunami

Other items mentioned which are outside the scope of this project, but are important insights are: improvement in the capacity building of human resources by improving the advance and updated knowledge on seismology, seismic data analysis, hazard assessment, tsunami early warning capacity development, and risk mitigation; increase seismic observational network; within the existing network include auto analysis software and sea level monitoring system; additional training facilities; and multi-lateral study between Bangladesh and neighbor countries.

## **6.5 Session 5: Plans and Thoughts for the Future.**

This session included 4 presentations by 4 of the Pilot In-Country Team on meteorological, disaster management, media, and hydrological insights.

**6.5.1 Meteorological Insights into SOPs, Mr. Olavo Rasquinho, Secretary, Typhoon Committee.** Mr. Rasquinho first discussed the 4 components of a people centered EWS (according to the United Nations International Strategy for Disaster Reduction (ISDR) Secretariat: risk knowledge, monitoring and warning service, dissemination and communication, and response capability. He then covered the definition of a SOP which is a prescribed set of steps to be followed routinely when certain defined conditions arise. It contains a written procedure of individual, often sequential, tasks that need to be undertaken. By documenting these steps, in the form of a checklist or other appropriate framework, operational staff has a ready reference of what is expected and can avoid the risk of missing key actions. If SOPs are written down and documented simply, anyone can follow the instructions to make sure the procedure is completed. The main objectives of SOPs is to provide, in a concise and convenient form, a list of major actions involved to ensure that all concerned ministries, departments and all other stakeholders are informed clearly about their respective roles and responsibilities; to ensure a systematic early warning system is clearly outlined for all major hazards; to ensure there is an integrated early warning system in the overall disaster risk management system. SOPs are important because they capture the most efficient and effective ways to perform an operation. They help an agency produce predictable, reproducible results and maintain the quality and consistency of its service. SOPs are particularly useful between organizations. A NMS can use SOPs to ensure consistent delivery of services and products to partner agencies and provide a baseline on which the service standards can be reviewed.

Mr. Rasquinho then discussed the different styles of SOPs which include simple steps or a checklist; hierarchical steps; linear graphic flow chart; annotated pictures; and branching flowchart. Each has good and useful aspects in different situations or for different items. He then provided a general SOP format which can be considered.

Memorandum of Understanding (MoU) between NMHSs and partner agencies are highly recommended (e.g., Disaster Management Agencies, Media organizations) and SOPs can be used to describe in detail how the two agencies will routinely work together during a real-time event. There is a WMO document which may be useful which "Guidelines for Creating a Memorandum of Understanding and a Standard Operating Procedure between a National

Meteorological or Hydro-meteorological Service and a Partner Agency”, WMO-No. 1099, PWS-26. These guidelines include a generic template that describes the important parts of a MOU. The template should be used as a guide, rather than as a prescriptive recipe. The particular circumstances of a NMHS and its partner agency will determine which components of the template should be included and what provisions should be addressed. Instructive examples of MOUs are included between a NMS and a Disaster Management Agency and between a NMS and a media organization.

**6.5.2** Disaster Management Insights into SOPs, Mr. Atiq Kainan Ahmed, Programme Specialist, ADPC. Mr. Ahmed began by discussing that disaster risk management (DRM) is commonly seen as a ‘cyclical process’ composed of prevention and mitigation, preparedness, response and recovery. But DRM can also be seen through low and high resilience lens which is part of the “Coastal Community Resilience” Initiative. SOPs are comprised of written essential protocols and procedures and varies at various layers and can include procedures for the EWS information source providers/ met offices (e.g. observers, forecasters, meteorologists, PWS officers); emergency operation centers; national agencies, sub-national and local governments for EW provisions, dissemination and response; community EWS agents (e.g. village agents, volunteers and communities); operations and maintenance of EWS equipment; humanitarian response coordination (e.g., ICSs, Clusters procedures); integrated or interoperable systems, and implementation Of Standing Orders (e.g., with national level legal bindings).

SOPs help in critical decision and trigger points of DRM where timely decision making is critical and actions are pre-agreed in a ‘procedural manner.’ A decision point is usually a point in time where the evolving situation reaches a geographic or financial milestone that was deemed to be significant and the cause for some type of decision. (Examples: decision to evacuate, decision to close schools, beaches, roads, etc.). A trigger point is usually a point in time where the evolving situation reaches a geographic, financial, or response milestone that was deemed to be significant and the cause for a pre-determined action.

Mr. Ahmed suggested some areas of procedure development with DRM insights which included: 1) ‘seamless integration’ of science based observations and forecasting, warning generation and dissemination is desirable; 2) consideration of not only the extreme events but also the regular times as well which relates the time line of weather events and forecasts with DRR activities and applications; 3) there are some good examples from tsunami procedures for ‘end-to-end’ integration of regional-national-local components of EWS (from detection to preparedness and response.....); 4) ‘last mile warning dissemination’ is critical for rapid notification; 5) procedures for risk which includes hazard x exposure x vulnerability should include physical and social risks, enhancement of risk knowledge, risk modeling, and long term changing patterns of risks; 6) procedures for ‘evacuation’ are needed and should be coordinated; SOPs can help for systematic coordination and to deal with limited supply vs. large need during ‘disaster relief and response coordination’; and 7) procedures for ‘vulnerable group’ inclusiveness (e.g., disable, child, elderly, people of special needs) can range from universal design, accessibility to information and structures to other needed measures.

Mr. Ahmed emphasized that SOPs must be coherent and integrated among different agencies such as Regional Tsunami Watch Centers, National Tsunami Watch Centers, Disaster Risk Reduction and Management Offices, and evacuation SOPs of coastal communities for



tsunami events. Timing of different actions and communications are very important and therefore must be coherent and integrated.

In the specific area of SOPs, Mr. Ahmed suggested that SOPs should be synergized from existing good practices on each of the 4 elements of a proposed EWS. SOPs in DRM have been shown as key preconditions of DRM system efficacy and functioning through: mainstreaming the procedures into the DRM component and cycle; seamless integration of EWS through process is an essence of time, particularly in the changing climate; inclusive of science, systems and societal integration; targeted to link with the DRM-CCA plans, resilience plans and processes from the beginning of development; development of policy and legislative backing of the procedures; and incorporation of procedures for innovative mechanisms for financing DRM-CCA.

**6.5.3 Media Insights into SOPs, Mr. Walter Welz, Consultant, ABU.** Mr. Welz began with a brief background on the Asia-Pacific Broadcasting Union. It was formed in 1964 and has 255 members in 63 countries. The ABU promotes the collective interests of television and radio broadcasters and encourages regional and international co-operation between broadcasters. A EWS should have a redundancy mechanism, however this can be cost prohibitive. Thus, an efficient alternative is the usage of the broadcast media as the primary EWS. The broadcast media is a well-placed, cost efficient and sustainable medium to serve that role. The 2010 World Telecommunication/ICT Development Report states that 82% of Arab and Asia household have televisions whereas Pacific households had 75 per cent. However, radios continue to play an important role in LDCs and in Africa, particularly in rural areas where incomes tend to be relatively low and where electricity is limited. In LDCs, radios are also more prevalent than TVs – about a third have a TV, compared to two-thirds with a radio.

It is better if the media voluntarily adopt and adhere to a SOP, however, in some national broadcast media markets, SOPs in the broadcast industry will work better if developed within a regulatory binding framework. Equally important is the formalization of linkages and information flows from early warning authorities to broadcasting outlets through some type of agreement such as a MOU. MOU's also may be more effective within a regulatory framework. For the media, the basic concepts and elements of an SOP should: be clear, concise and simple; be written; be timeline based, especially for rapid onset disasters such as a near-field tsunami; emphasize different types of disasters may require different SOPs; assign responsibilities to a position(s), with a back-up for each responsibility; contain modes of primary and back-up communications (i.e. phone, email, fax, SMS) with early warning authorities as well as information resource persons; append resource contact list; and be reviewed frequently and updated when necessary. (HINT: To develop an SOP, begin with BREAKING NEWS processes then adjust accordingly.)

Other broadcast EWS and SOP considerations might include: 1) an “Organizational Chart” which has departments and/or personnel names and contacts who are responsible for early warning alerts; 2) a diagram of organization decision processes; 3) technical capabilities to receive and broadcast early warning messages; 4) a designated transmitter of information or a “provider of information”; understanding “the demographics” of the viewing or listening audience (i.e. broadcast area, languages, principal livelihoods, specific vulnerable groups within that viewing/listening audience, such as women, children, PWD, extremely impoverished, etc.; and understanding and complying with the public service obligations.

It cannot be expected, nor is it desired that the broadcast media re-word or translate alerts issued by early warning authorities. Thus it is incumbent upon early warning authorities to issue alerts in a manner that is clear, concise, and understood by the intended “end-audience” (those segments and locations of the populations for whom the alert was issued).

When a broadcast media outlet receives an early warning alert, there should be an immediate verification process to ensure that the alert was officially and accurately issued, before broadcasting the alert. However, with 24-hour international news services and a plethora of sources official and unofficial, it is highly likely that news of a potential threat will be aired well-before any early warning authority has time to properly analyze data and issue an alert. Though the distinction may not be clear-cut, the “news” of a potential threat should be considered as news, while the early warning alert is official information. However, in the absence of a timely early warning alert verification, the broadcast media should broadcast the alert, perhaps with “qualifying language,” if the alert and the origin of the alert is deemed credible, or has been confirmed through reliable secondary sources, which may include other broadcast media outlets. The ability to broadcast information often out paces the ability to produce information that is based upon sound data and analysis.

The competitive nature of commercial/private broadcasters should be recognized. Though no broadcaster should reword or translate an early warning alert, many will want to “go beyond” the alert to provide additional information to their viewing or listening audience. Government early warning agencies should position itself to take advantage of the “journalistic zeal” of commercial/private broadcasters. For example, early warning or authorities should make more frequent use of “press conferences” when alerts are issued where the authority not only issues a statement, but fields questions from the media/press corps.

Many time people do not immediate act on first news of warning or alert even with sufficient lead time. Many chose to further clarify and assess their risk by waiting for, actively seeking, and filtering additional information. They don’t act until they receive and process additional, credible confirmation of the threat and its magnitude from a non-routine trigger such as: 1) physical observation of the environment (seeing the tornado approach); seeing or hearing confirmation of the threat on radio or television, seeing the large tornado on the air, or hearing on-air instructions to “take cover now”; hearing a second, non-routine, siren or radio/loudspeaker alert.

Radio broadcasting may be critical for early warning in the aftermath of a disaster for such things as rescue and relief. Radio would allow government emergency agencies to issue information, guidance, and advice to tens or hundreds of thousands of people affected by a natural disaster. Of course, the problem is obvious - the same coastal hazard that has just affected thousands, has probably negatively impacted electrical service and radio broadcasting capabilities. Stakeholders should identify the coastal areas of highest risk as well as the most vulnerable populations, and “correspond” them to the pre-eminent radio broadcasters that serve these “high risk - most vulnerable areas.” Stakeholders should explore methods to “reinforce” these broadcast facilities that are “too important to fail,” so that they can withstand the impact of the disaster, or possess the capability to be on the air again a few hours after the disaster.

During the discussion following this presentation, there were several key issues discussed. One was that the government can control what the media does or says, but the media must

obtain and renew their broadcast license each year and this may be one way to commit to training and better knowledge of EWS. It was also mentioned that early warning is considered news like other news and will be handled similarly. Media can be an important partner in disseminating information to the lowest levels, but also to get reports from many different areas during and after an event. If possible, consideration could be given to signing a MOU with one large TV and one large radio station in which they would agree to training and transmitting the official information and the government would agree to refer people to these stations for the latest information. But other stations might object but could be included. Workshops and training session could be held several times a year. It was suggested to start action and information flowing well before an event to increase awareness and preparation. After an event, if there were negatives, discovered where the problems were and correct them, and then make a report to the media. Proactive is much better to be in than reactive. A good way to disseminate information is to have fixed times when the media knows they will get updates. Also document and educate them on the correct people to talk to or to interview. Not only BMD, but all agencies should have media trained people who represent the agencies professionally, instill confidence, and also get people to act.

**6.5.4 Hydrological Insights into SOPs, Mr. Ahmed Said Al Barwani, Water Resources Expert, Ministry of Regional Municipalities and Water Resources, Oman.** Mr. Barwani began with a description of hydrology as the science of water. It is the science that deals with the occurrence, circulation and distribution of water of the earth and earth's atmosphere. A good understanding of the hydrologic processes is important for the assessment of the water resources, their management and conservation on global and regional scales. Floods occur most commonly when water from heavy rainfall, from melting ice and snow, or from a combination of these exceeds the carrying capacity of the river system, wadis, lake, or the like into which it runs. It is important when considering floods warnings to in cooperate the whole catchment area from the mountains to the ocean or desert. Flood frequency is the likelihood that a large flood will happen and can be classified as a 100-year flood, flood that is exceeded, on average, once every 100 years but has probability of 1 per cent each year. Similarly with a 10-year flood with a probability of occurring 10 per cent ear year or a mean annual flood with a probability of 50 per cent.

He then described catchment's response to floods as a set of characteristics which determine the response of the catchment to rainfall and listed 10 to consider. These were: catchment area; soil type(s) and depth(s); vegetation cover; stream slopes and surface slopes; rock type(s) and area(s); drainage network (natural and man-made); lakes and reservoirs; impermeable areas (e.g. roads, buildings, etc.); rainfall (depth, duration and intensity); and evaporation potential (derived from temperature, humidity, wind speed and solar radiation measurements or from evaporation pan records). Mr. Barwani quickly reviewed the causes of floods and flood damage such as heavy rain; dam and levee failure; low absorption or no soilpercolation; business and residential growth in flood areas. He then stated six of some of the challenges associated to better monitor and forecast flood conditions in Oman which included: identification of catchment area and it characteristics; monitoring networks –gauging stations availability; telemetry systems connecting rain and gauges stream (wadi gauges); historical data; data quality and data analysis; and selection of models for flood predictions. He emphasized the need for spatial digital data and maps and that these should include: digitized stream network data (evaluation/verification of delineation); digitized country catchment boundaries data (evaluation/verification of delineation); land-use and land-cover data (parameterization of hydrologic models); soils data to include soil texture or FAO soil classification or soil properties data (parameterization of hydrologic models); local stream

cross-sectional survey data for streams draining 10-2000km<sup>2</sup> (estimation of threshold runoff); reports of regional relationships between channel cross-sectional characteristics and catchment characteristics; and population Distribution (if available).

As input data requirements for flash flood and flood models, he encouraged the use of:

- ▶ Reports such as flood frequency analysis (regional and local), flash flood occurrence (regional and local), stream geometry studies for small streams, and climatological precipitation and flood studies;
- ▶ Historical data such as precipitation data (hourly, daily, monthly, climatology), air temperature data (hourly, daily, monthly, climatology), pan evaporation data (daily, monthly, climatology), soil moisture data for top 1 meter of soil (weekly, monthly, climatology), stream flow discharge data for local streams with drainage areas less than 2000 km<sup>2</sup> (hourly, daily, monthly, climatology), spring discharge data, stream stage data (hourly, daily, monthly, climatology) and associated stage-discharge curves (rating curves), also for local streams, radiation data for computation of potential evapotranspiration (daily, monthly, climatology); wind, humidity data for computation of potential evapotranspiration (daily, monthly, climatology), radar data, once radars become operational and satellite data, and groundwater recharge rates and groundwater level data for surficial aquifers;
- ▶ Real time data such as surface precipitation and weather data (hourly and daily), radar data in mutually agreeable gridded format, satellite data in mutually agreeable formats, and river stage data; and
- ▶ Logistical data (metadata) such as longitude and latitude coordinates of all sensors providing real time data and historical data, type of data and sensor (geo-referencing of data), longitude and latitude coordinates of dams and reservoirs (accounting for contributing area in threshold runoff estimation), evaluation of basin delineation: initial delineations based on hydrologic processing of the Shuttle Radar Topography Mission (90-m) resolution digital elevation data and hydrographic information from the digital chart of the world, evaluation of the delineation results with local knowledge and expertise is required for final quality assurance, and delineation maps may be provided in GIS format (ArcView shape files), or in image format (e.g., jpeg) for sub-regions within the delineated region.

## **7. Workshop Day 2 – 7 October 2013**

### **7.1 Session 1: Bridging the Gaps in SOPs for Early Warning Systems – The Road Ahead.**

During this session, the meeting participants were broken into two groups. They were asked to identify best practices, gaps and needs, and recommendations regarding the Bangladesh EWS and SOPs. This proved to be one of the most beneficial session of the workshop. Each group was given about 1 hour and 30 minutes to discuss among themselves and then to go back and brief the entire group on their ideas.

#### **GROUP 1:**

Best Practices:

- There is a national Standard Orders on Disaster for relevant 39 Ministries and Organizations which serves as an excellent policy and guidance document.

**Gaps, Needs, and Challenges:**

- a. There is no National SOPs, except the Armed Forces most likely them for three services
- b. BMD has no well-documented SOP excepting for Aviation

**Recommendations:**

- a. Guide-line to prepare SOP should be provided from National level
- b. Ministry of Disaster Management should ask for SOPs from all agencies and that they must comply with SOD and describe specific actions needed to meet the items in SOD.
- c. On receiving the draft SOP from different agencies, the Ministry of Disaster Management and Relief should have all relevant agencies meet, discuss, identify short comings, and make recommendations/suggestions for preparing National SOP.
- d. On finalizing, all SOPs should be available to all concerned agencies, possibly through an electronic data base, so that everybody understands what each other are doing and also so the SOPs can be changed as required. Also flow charts or diagrams might be helpful.
- e. All agencies should have multi-hazards SOP with different parts for different hazards i.e., tropical cyclone, tsunami, storm surge, earthquake, land slide, etc.
- f. Seminars/workshops may be arranged to provide ideas/orientation to the media personnel. In this regard, media personnel should be asked from each media to place high priority on attending these seminars/workshops. Some type of government seal of approval could be given to those who attend regularly and updated yearly.
- g. Technical and financial assistance will be required to prepare these SOPs efficiently and funds should be requested from UNESCAP and donor agencies.

**GROUP 2****Best Practices**

- Standing Orders on Disaster (SOD)
- Cyclone Preparedness Program (CPP) with extensive volunteers
- MOU with Media (Government Broadcasters)
- MOU with the BMD, Department of Disaster Management (DDM), and CPP
- Projected MOU with Coastal Inundation Forecasting Demonstration Project – Subproject Bangladesh
- Armed Forces operation link to Directorate of Relief and Rehabilitation
- BMD for generating EW in regards to Meteorology and Seismology for coastal area
- Flood forecasting system by Flood Forecast and Warning Center, Bangladesh Water Development Board, FFWC, and BMD
- Various committees are working well at different level under the umbrella of DDM
- Awareness Building among the mass population
- Government Authority
- Government owned Media (BTV & BETAR/RADIO)

**Gaps, Needs, and Challenges**

- No written SOPs for most agencies for implementation of SOD
- Inadequate involvement in the community level dissemination
- Time lag between EW communication and disaster coordination

- Inadequate implementation of different government offices' activities in the local level
- Inadequate national EW system of tsunami
- No mechanism for tsunami warning along the coastal areas
- Inadequate funding for equipment and support items for volunteers
- Inadequate risk assessment
- Inadequate involvement of some NGOs

#### Recommendations Involving Bangladesh

- a. Modernization of the technical aspects of EW system
- b. Establishment of viable tsunami warning system
- c. More coordination among the government offices and organizations should be established (local CPP personnel may be able to assist in this)
- d. Adequate fund mobilization
- e. Multi-hazards risk assessment should be done
- f. Each sector should have their own action plan and then activate it when there is a disaster

#### Recommendations for SSOP Manual/Handbook

- Guidance on SOP writing with templates
- Checklist of issues
- Different styles
- Ideas for SOPs at different levels
- Good examples from other countries
- Ideas and examples for pre-, during, and post-disaster phases.
- Ideas for cross-cutting, integrated SOPs could be included
- Ideas on coordination with other agencies
- Suggested ways to share information
- Suggested education and training on SOPs, for meteorology, hydrology, disaster reduction, physicist, stakeholders and others

### **7.2 Session 2: Challenges to issue effective, understandable forecasts, advisories, and tropical cyclone bulletins.**

Due to time constraints, the workshop was unable to spend very much time on this, but it has been covered in various forms and ideas in previous sections. The idea is to use simpler language in its weather bulletins to make them understandable to more people and to avoid using technical terms that may only confuse people.

One of these recommendations was for the weather bulletin for the website to be detailed in conformity with the WMO standards, while the weather bulletin for broadcast reporting can be simplified with less technical terms

Therefore some items to consider are:

- Profile of end-users – Some people are generally familiar with technical terms, but simplified bulletins are targeted at the grassroots level or local level.

- In bulletins and warnings, do not state the obvious, such as clouds in the sky. Be concise and direct to the point.
- Be careful in the choice of some words, because some have positive connotations and some have negative ones.
- Do not aim for literacy writing/award-winning weather bulletins. The general public will easily understand a conversational-type of reporting. Aim for a clear communication of information.
- The effects, impacts or corresponding hazards should be emphasized, not the technical terms such as the amount of rainfall in millimeters.
- Essential impacts of the storm signals should be clear and easy to find.
- Forecasters/technical people should undergo a regular writing and communications training so that they can also relate well with the media and go beyond being technical.
- Warnings and bulletin should be in a near final state where the media can “rip and read” them.

### **7.3 Session 3. Building Relationships.**

Due to time constraints of the meeting and also because of the evident strong relationships of the various key members of the EWS and their regular coordination meeting, it was felt that this session was not needed and was not discussed.

### **7.4 Session 4. Setting Goals and Completion Dates.**

The group agreed that the first draft of this report and discussion would be available by November 15, 2013 so it could be discussed at the PTC IWS at the end of November and the TC 8th IWS/2<sup>nd</sup> TRCG form in early December and then would be edited and finalized at a later date.

Mr. Weyman also informed the group that there would be four reports done, one for each of the pilot countries and then a shorter combined report of all of the visits containing only the high level information.

## **8. Summary of Strengths, Gaps, Needs, and Recommendation**

The In-Country Pilot team would like to thank all of the participants and local organizing committee, especially Mr. Md. Shah Alam, Ms. Mahnaz Khan, and Mr. Shamsuddin Ahmed, and all of the other members, for the excellent workshop. Everyone was very gracious and provided valuable assistance during our visit. Also it was very evident that all participants cared deeply to serve their people and fully dedicated to improving the quality of life through the protection of life and property in hazardous situations. The Bangladesh government and people are very fortunate to have such a talented group working for them.

### **8.1 Strengths.**

During the course of the workshop, many strengths were identified which will help determine some of the best practices for this project. Some of these were comments of one person and others by a group, so each need further review for their validity. These have not been officially endorsed or approved and are for discussion at this time. Some of these were SOP-

related and some were not related to SOPs directly, but were kept as part of an overall needs analysis in this area. These included:

### **SOP Related**

- a. A national Standard Orders on Disaster for relevant 39 Ministries and Organizations which serves as an excellent policy and guidance document.
- b. MOU with Media (Government Broadcasters)
- c. MOU with the BMD, Department of Disaster Management (DDM), and CPP
- d. Projected MOU with Coastal Inundation Forecasting Demonstration Project – Subproject Bangladesh
- e. BMD for generating EW in regards to meteorology and seismology for coastal area
- f. Flood forecasting system by Flood Forecast and Warning Center, Bangladesh Water Development Board, and BMD
- g. Various committees are working well at different level under the umbrella of DDM

### **Non-SOP Related**

- a. Cyclone Preparedness Programme with 50,000 volunteers
- b. Awareness building among the mass population
- c. Government authority
- d. Government owned media (BTV & BETAR/RADIO)
- e. Armed Forces operationally link to Directorate of Relief and Rehabilitation

## **8.2 Gaps and Recommendations.**

Some of these were comments of one person and others by a group, so each need further review for their validity. These have not been officially endorsed or approved and are for discussion at this time. The following will try to capture the essence of each. Some of these were SOP-related and some were not related to SOPs directly, but were kept as part of an overall needs analysis in this area.

### Gaps

#### **SOP Related**

- a. Nowritten SOPs (except the Armed Forces most likely have them for three services) for most agencies for implementation of SOD.
- b. BMD has no well-documented SOP excepting for Aviation
- c. Inadequate implementation of different government offices' activities in the local level
- d. Inability to get EWS information out in sufficient time;
- e. Need for single, official source of information with regular press conferences and release of data (sometimes media causes panic by making the cyclone sound very severe).
- f. BMD should be more specific about the time of the next bulletin or update
- g. Need for quick, accurate information in simple language to broadcast. This should be in the form where they can take what they receive and quickly convey to the public without much editing or changes
- h. Inadequate guide book or reference manual for the media on bulletins
- i. No after action report by BMD on event and actions for media and public following a disaster.
- j. Inadequate involvement in the community level dissemination
- k. Time lag between EW communication and disaster coordination



## 1. Understanding of signal level in bulletins by the public

### **NON-SOP Related**

- a. No mechanism for tsunami warning along the coastal areas
- b. Inadequate national EW system of tsunami
- c. BMD website is slow and sometimes doesn't work;
- d. Inadequate funding for equipment and support items for volunteers
- e. Inadequate risk assessment
- f. Inadequate involvement of some NGOs
- g. Inadequate disseminate to get the information and forecast to where it is needed
- h. Inadequate multi-hazards risk assessment
- i. Improvement, modernization of technical aspects of early warning system to make it a viable, sustainable tsunami warning system
- j. Expansion of the operation areas of the Cyclone Preparedness Program
- k. Expansion of disaster management information network
- l. Strengthening linkage with regional and international organizations involved in DRR in line with HFA
- m. Establishment of Pole Fitted Megaphone Siren in the disaster prone areas
- n. Increased funding of the CPP program to purchase equipment and support items for the volunteers.
- o. No redundant dissemination systems
- p. All water level gages are manually read. Automation of gages required for better access to and timelessness of data
- q. Inadequate access to other government tide gages and other gages (such as the Navy's one) without going to many web sites
- r. The following came from Mr. Md. Amirul Hossain presentation (structural):
  - 1) Insufficient flood control/management structures
  - 2) Insufficient maintenance of existing structures
  - 3) Need for river bank protection/stabilization
  - 4) Insufficient flood/cyclone shelters (building/earthen killas)
  - 5) Insufficient strength of some coastal polders/embankment
  - 6) Built up of silt in many rivers need to be dredging
  - 7) Lack of nature coastal protection such as afforestation along coastal belt
  - 8) Inadequate land reclamation and resettlement programme
- s. The following came from Mr. Md. Amirul Hossain presentation (non-structural):
  - 1) Improved flash flood forecast
  - 2) More area coverage under FFWS
  - 3) Medium and long range (seasonal) flood probabilistic forecasts
  - 4) Medium range/seasonal dry season flow prediction for irrigation and navigation
  - 5) Salinity intrusion forecast in coastal belt
  - 6) Drought prediction
  - 7) Use of satellite based technology for increase FFWS
  - 8) Regional cooperation/data sharing
  - 9) Basin wide flood forecast
  - 10) Tidal flood forecast
  - 11) Expanded flood forecast area coverage
  - 12) Increase lead time and improve accuracy
  - 13) Erosion prediction
  - 14) Comment on the possibility of one flood forecast center

- 15) Increase flood forecasting computation beyond their boundaries, flash flood lead time would increase and may often the opportunity for basin wise FF

## Recommendations

### **Non-SOP Related**

- a. More coordination among the government offices and organizations should be established (local CPP personnel may be able to assist in this)
- b. Each sector should have their own action plan and then activate it when there is a disaster

## Recommendations for Manual/Handbook

### **SOP Related**

- a. Guide-line to prepare SOP should be provided from National level
- b. Ministry of Disaster Management should ask for SOPs from all agencies and that they must comply with SOD and describe specific actions needed to meet the items in SOD.
- c. On receiving the draft SOP from different agencies, the Ministry of Disaster Management and Relief should have all relevant agencies meet, discuss, identify short comings, and make recommendations/suggestions for preparing National SOP.
- d. On finalizing, all SOPs should be available to all concerned agencies, possibly through an electronic data base, so that everybody understands what each other are doing and also so the SOPs can be changed as required. Also flow charts or diagrams might be helpful.
- e. All agencies should have multi-hazards SOP with different parts for different hazards i.e., tropical cyclone, tsunami, storm surge, earthquake, land slide, etc.
- f. Seminars/workshops may be arranged to provide ideas/orientation to the media personnel. In this regard, media personnel should be asked from each media to place high priority on attending these seminars/workshops. Some type of government seal of approval could be given to those who attend regularly and updated yearly.
- g. Technical and financial assistance will be required to prepare these SOPs efficiently and funds should be requested from UNESCAP and donor agencies.
- h. Include examples from other countries; provide baseline standard requirements; SOPs for different types of events and different levels of threat; protocols to use with different levels of government; a possible matrix – if you see this, then do that; trigger points of actions.

## Appendix I

### Pilot Workshop on SSOP 6 - 7 October 2013 Bangladesh Programme

**Synergized Standard Operating Procedures (SSOP) for Coastal Multi-hazards  
Early Warning System  
Bangladesh/Typhoon Committee Pilot Workshop  
06 - 07 October 2013, Dhaka, Bangladesh**

#### PROGRAMME

VENUE: BMD Conference Room (4<sup>th</sup> Floor).

Time	Topic	Speaker
<b>DAY-1: 06 October (Sunday)</b>		
<b>Registration 09:00-09:30 am</b>		
<b>Opening Session</b>		
<b>Recitation from the Holy Quran, 09:30-09:45 am</b>		
<b>Opening remarks and Introduction</b>		
09:45-10:00	Welcome Address	Mr. Md. Shah Alam, Director, BMD.
10:00-10:15	Opening Remarks	Mr. Olavo Rasquinho, Secretary, Typhoon Committee
10:15-10:30	Tea Break & Photo Session	
<b>Session 1: Roles and Responsibilities in Coastal Multi-hazards Early Warning System</b>		
10:30-10:45	Workshop orientation, objectives, and goals	Mr. James Weyman, Project Manager/ Technical Advisor
10:45-11:15	Hydro-meteorological services roles and responsibilities at national, district, and local levels in EWS for coastal multi-hazards.	Mr. Shamsuddin Ahmed, Dep Dir, BMD Md. Amirul Hossain Exec Engineer FFWC
11:15-11:30	Disaster management roles and responsibilities at national, district, and local levels in EWS for coastal multi-hazards.	Mr. Netai Chandra Dey Sarker, AD (GIS)
11:30-11:145	Elected Officials roles and responsibilities at national, district, and local levels in EWS for coastal multi-hazards.	Bashir Ahmed, Deputy Director (Admin), CPP
11:45-12:00	Media (TV, radio, and print) roles and responsibilities at national, district, and local levels in EWS for coastal multi-hazards.	Mr. Junaid Ali Sagee, Staff Reporter, SA TV
12:00-12:15	Others roles and responsibilities at national, district, and local levels in EWS for coastal multi-hazards.	Commander Minarul Huque, BN.

<b>Session 2: Identification of Issues, Gaps, and Challenges in Early Warning System</b>		
12:15-12:45	Group discussion of issues, gaps, and challenges in early warning system for coastal multi-hazards.	All participants. Moderated by Mr. James Weyman
<b>12:45-01:30 Lunch break &amp; Prayer</b>		
<b>Session 3: Role of Standard Operating Procedures</b>		
01:30-01:45	Role of Standard Operating Procedures – Introduction and review	Mr. James Weyman
01:45-02:15	Hydro-meteorological service internal, external, and integrated SOPs for EWS, including procedures for development and annual review.	Mr. Shamsuddin Ahmed, Dep Dir, BMD Md. Amirul Hossain Exec Engineer FFWC
02:15-02:30	Disaster Management internal, external, and integrated SOPs for EWS, including procedures for development and annual review.	Mr. Netai Chandra Dey Sarker , AD (GIS)
02:30-02:45	Media internal, external, and integrated SOPs for EWS, including procedures for development and annual review.	
02:45-03:00	Elected officials internal, external, and integrated SOPs for EWS, including procedures for development and annual review.	Bashir Ahmed, Deputy Director (Admin), CPP
03:00-03:15	Others internal, external, and integrated SOPs for EWS, including procedures for development and annual review.	
<b>Session 4: Identification of Issues, Gaps, and Challenges for Early Warning System SOPs</b>		
03:15-03:45	Group discussion of issues, gaps, and challenges in SOPs for EWS for coastal multi-hazards.	All participants. Moderated by Mr. James Weyman
<b>03:45-04:00 Tea Break</b>		
<b>Session 5: Plans and Thoughts for the Future</b>		
04:00-04:15	Meteorological Insight into SOPs	<b>Mr. Olavo Rasquinho</b> Secretary, Typhoon Committee
04:15-04:30	Disaster Management Insight into SOPs	<b>Mr. Atiq Kainan Ahmed</b> Programme Specialist, ADPC
04:30-04:45	Media Insight into SOPs	<b>Mr. Walter Welz</b> ABU
04:45:05:00	Hydrological Insights into SOPs	<b>Mr. Ahmed Said Al Barwani,</b> Water Resources Expert, MRMWR, Oman
<b>Day 1 Ends</b>		

**VENUE:** BMD Conference Room (4<sup>th</sup> Floor).

<b>Time</b>	<b>Topic</b>	<b>Speaker</b>
<b>DAY-2: 7 October 2013 (Friday)</b>		
<b>Session 1: Bridging the Gaps in SOPs for Early Warning System - The Road Ahead</b>		
0900-0945	Participants discuss the following topics: What are needed Standard Operational Procedures for the Bangladesh: Government officials, Hydro-meteorologists, Disaster management, Broadcasters, Others In the event of an emergency, who should speak to whom? How often? By what means? What communications are necessary to reduce impact of coastal floods, tropical cyclones, tsunamis, and other coastal hazards?	All participants. Moderated by Mr. James Weyman
0945-1030	Breakout in groups to determine initial steps to fill the gaps and meet the challenges for improved/ revised SOPs for early warning system. The participants identify missing links and brainstorm ideas how to fill the gaps.	Three breakout groups each with representatives from all agencies.
<b>10:30-10:45                      <i>Tea Break</i></b>		
1045-1200	The groups report on their work and discuss an Action Plan for improvements	All participants. Moderated by Mr. James Weyman
<b>12:00-13:15                      <i>Lunch &amp; Prayer</i></b>		
<b>Session 2: Challenge to issue effective, understandable forecasts, advisories, and tropical cyclone bulletins</b>		
1315-1345	Group Discussions: What are the warning/advisory needs of: Elected officials, Disaster Managers Media Public	
1345-1430	Group Discussion: How to make weather/tsunami bulletins effective, clear, understandable, and public-friendly with specific weather information with time and expected impacts.  What would “public-friendly” versions look like? Focus on specific and clear information on rain, wind, and flood situations delineating specific areas that will be affected, the timeline and the expected impacts What terminologies are best to describe typhoon path, where it will pass and the specific time lines? What type of graphics are needed of forecasts to make them easily understandable and attractive What should be highlighted in bulletins What plots or graphics are needed for extent and height of	

	inundation and for flood forecasts and warnings What frequency should updates be made	
1430-1445	Action Plan for meeting challenges and gaps	
<b><i>Session 3: Building Relationships</i></b>		
1445-1500	Importance of Relationships among members involved in the Early Warning System	
<b><i>15:00-15:20 Tea Break</i></b>		
1520-1535	How to build, foster, and maintain relationships among Early Warning System participants	
1535-1550	Future plans for developing and maintaining relationships	
<b><i>Session 4: Setting Goals and Completion Dates</i></b>		
1550-1610	Setting an operational strategy for the future – taking the theory into practice.	
1610-1645	Workshop Summary and documenting goals and completion dates	
1645-1700	Closing Remarks	

## Appendix II

### Pilot Workshop on SSOP 6 – 7 October 2013 Bangladesh Attendees

Attendance List of Participants for the “Workshop on Identification and Development of Synergized Standard Operating procedures (SSOP) for Coastal Multi-Hazards Early Warning System” being held at the Bangladesh Meteorological Department (BMD), Dhaka from October 06-07, 2013.

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10.	SM Najmus Sakib Reporter	The Daily Star	nsnafsanju@gmail.com	01927629203		
11.	Zunaid Ali Saeed	SA TV	saeedju@gmail.com	01910-514709		

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