

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

Pakistan

A highly successful two-day pilot workshop was conducted at Marriot Hotel, Islamabad, Pakistan on 10 – 11 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 Pakistan and of the project for the other 12 beneficiary countries involved.

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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 Pakistan Meteorological Department, especially Mr. Arif Mahmood Rana, Mr. Muhammad Touseef Alam, Mr. Imran Akram, and Mr. Jan Muhammad Khan 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 Standard 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 pilot countries selected were the Philippines, Bangladesh, and Pakistan. The Pilot Workshop held

in the Pakistan on 10 – 11 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
- ▶ Identify 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 Pakistan 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 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

Since Mr. Weyman was unable to obtain a visa to Pakistan in time for the visit he was unable to attend this workshop, but he did participate on several different occasions, especially during the groups' presentations following the breakout sessions, via Skype from his home.

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

5. Workshop Programme Overview

The programme for the workshop was jointly developed by members of the Pakistan Meteorological Department (PMD) and the Project Manager (see Appendix I). Approximately 25 people attended all or part of the workshop (see Appendix II for list of attendees).

Mr. Arif Mahmood, Director General, PMD and Secretary of WMO/ESCAP Panel on Tropical Cyclones opened the meeting with welcoming remarks. Then the Programme was broken down into five sessions on the first day and four sessions on the second day. 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 Needs 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 Needs 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: Setting Goals and Completion Dates

Summary: Strengths, 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 – 10 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. Olavo Rasquinho 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 Services – Mr. Muhammad Touseef Alam, Chief Meteorologist, PMD. Mr. Alam began his presentation by stating that monitoring and warning services form a critical component of the NMHs and that continuous monitoring of hazard parameters and precursors is essential to generate accurate warnings. He also emphasized the need for coordinated warning services for all natural hazards where possible to gain the benefit of shared institutional, procedural and communication networks. He then mentioned the importance of the Tropical Cyclone Warning Centre in Karachi for the Arabian Sea area. The centre tasks begin with continuous monitoring for possible disturbances through the stages of assessment, pre-warnings, to tropical cyclone warnings while tracking it, forecasting its path, and alerting people to the dangers. He then covered the broad categories of TC bulletins and warnings issuance for land, sea, air, governmental, and public interests and the dissemination systems and flow for these warnings. Mr. Alam completed his talk with descriptions of past cyclones which have affected the Pakistan coast which included: Tropical Cyclone 02A (16 – 20 May, 1999), Tropical Cyclone 01A (21 – 28 May, 2001), Tropical Cyclone Yemyin (21 – 26 June, 2007), and Tropical Cyclone, “PHET” (31 May – 06 June, 2010) with terrible loss of life and large damage impact.

6.1.2 Disaster Management – Mr. Idress Mahsud, Member DRR, NDMA. At the beginning of Mr. Mahsud’s presentation he stated that he would cover disaster management system, roles and responsibilities at national, provincial and local levels, and future projections and plans. He initially discussed the disaster management structure, the mandates of the National Disaster Management Authority (NDMA), NDMA’s many roles and functions pre-disaster, during disaster, and post disaster. Then he noted the roles and function of the Provincial Disaster Management Authority at the provincial level and the District Disaster Management Authority at the district level.

During the last half of Mr. Mashud’s presentation, he focused on “Future Course” forward. He stated that NDMA has shifted focus from reactive to pro-active policies which emphasize prevention and disaster risk reduction rather than relief and response. They formulated a DRM Needs Report through consultative process, National Disaster Risk Reduction Policy 2012, and National Disaster Management Plan (NDMP) 2012 – 2022 which set the policy framework for national to province to district level and addresses coordinated, integrated, linked activities at all three levels. NDMP (<http://www.ndma.gov.pk/new/preparedness/ndmp.php>) addresses complete spectrum of disasters, identifies key issues and envisages ten disaster management priority areas to be implemented over next ten years. There are 118 interventions and 41 strategies with an estimated cost on US \$1041 M. Volume II of the NDMP focuses on Establish Multi-hazard Early Warning and Evacuation Systems. It aims to reduce societal vulnerabilities to and risks involved with multiple disasters – including floods, GLOFs, landslides, droughts, tsunamis and cyclones with storm surges, fires, and epidemics and defines and identifies 4 key strategies with budget provisions. Proposals for tsunami and cyclones with storm surge include new gages and radars, training, and SOPs.

Following the presentation, there was discussion on gage status, establishment of medium range forecast centers in the provinces (in National Disaster Management Act), and the need to strengthen/update SOPs because of policy coordination required with the definition and plans at the federal and provincial level. It was emphasized the need for redundancy in hazard communications and dissemination when power systems fail or the communication systems are overwhelmed with calls. Mr. Nadeem from ABU mentioned the “radio in a box” and made a short presentation on it later on the agenda.

Mr. Sabbir Ahmed, Baluchistan PDMA made a short presentation. Balochistan has 44% of the country land mass and has an 850 km long coastal area. Balochistan is prone to hydro-meteorological disasters and thus has developed SOPs for multi-hazard contingency planning. They have conducted awareness workshops; simulation exercises; school exercises; mangrove forestation; safe evacuation routes; and UNDP installed an early warning tower for tsunami in collaboration with PMD. There are 7 radar systems in Pakistan none cover Baluchistan, and thus there is a need for radars in this area. He also mentioned the need for elevated towers and possible sea walls.

6.1.3 Elected officials – Mr. Syed Ali Raza Abidi, MNA, Elected Representative of Pakistan National Assembly. Mr. Abidi provided an excellent presentation and provided insights into things that should be considered. First, he made the point that as we develop SSOPs, let's remember a Steve Job's quote. "Design is not just how it looks like or feels like, design is how it works." So design matters. Then he gave some thoughts to consider: 1) what is the role of elected leaders in EWS and do they even know this role; 2) there is a lack of clarity and defining roles with the elected members in the country; 3) resources and management are needed; and 4) do the elected leaders know the situation on the ground. Mr. Abidi indicated that there is a risk ahead with the lack of clarity in defining roles of stakeholders and the result could be devastating if the dynamics on the ground hinder the EWS and humanitarian aid in the response and recovery stage. Elected representatives are the link between the chains because they have to balance the expectations of the people who voted for the party with pushing for the right efforts for service delivery. There is a need for clear expectations from your elected leaders. Mr. Abidi then make suggestions on the needs and methods for consensus building: 1) interconnected problems will help us develop a shared sense of urgency; and 2) we need an effective, unified, multi-hazard disaster warning system. A shared vision will help us see beyond our individual goals, affiliations, and interests. Too many are institutions working independently. He then listed a number of functions, considerations, and questions concerning roles and responsibilities at national, district, and local levels. These were: national level: policy making, pushing for implementations, advocating to public and core groups for consensus building, budgetary allocations, activation of the standing committees and various groups; district level: functioning of DDMA, chairing the DMA, guideline, functioning of the District authority, harmonize the response structures with rescue 1122 (Punjab only) civil defense, fire brigade, army, police PRCS etc., hazard mapping and so forth; and local level: disseminate and convey the EW at local level in a friendly and timely manner, enhance communication, CBO coordination, mobilize local authorities, coordination with media/TV/Radio, proper communication plan, acceptance of EWS, relief coordination and so forth; coordination of action on the ground and planning, policy and EW at national level. He also noted Pakistan need to understand the "social media" communication in a better way now and need a proper department that would handle the growing social media communication. He then referred to a speech he gave and can be found at <http://na251.com>. He believes that working together at local, district, province, and national level as links in a chain, we can achieve more. In EWSs, there are differences for earthquakes, tsunami, floods, landslides, and cyclones and these must be addressed, but there are also some similarities that can be made common, consistent, and tested. Mr. Abidi concluded by saying he was looking forward to working with the group in the SSOP project.

6.1.4 Other Related Fields (Tsunami and Coastal Hazard Mitigation) - Ms. Ghazala Naeem, Project Coordinator, Tsunami and Coastal Hazard Mitigation. Ms. Naeem presentation covered Communities at Risk (Scale and nature), Present Scenario, Transfer of Knowledge

(Interventions), Strengthening TEWS in Pakistan Initiatives, Challenges Addressed, and Need of Time. She described that Pakistan has 1100 km of coast line, five districts with potential impacts, and the possibility of over 25 million people affected. The area is particularly vulnerable because of population density, literacy rate, development, and infrastructure. The last tsunami was in 1945 but cyclones, flash flood, coastal flooding, and heavy rains have been more frequent and thus a multi-hazard approach would be good. An end to end EWS was initiated in 2006 but the current scenario for preparedness includes: 1) consciousness is low at various level including community (inadequate warning and evacuation planning at densely populated coast in urban and rural areas, inattention by provincial and district government towards tsunami risk management, and abrupt development and land use changes by public and private sectors); 2) natural safeguards are depleting rapidly (e.g., mangroves); 3) institutional arrangements are partial, scattered and not integrated (inadequate policy provisions and implementation initiated in 2008); 4) technical and financial resources are limited and improperly planned; 5) lack of research, information sharing and outdated technology; 6) underutilization of available human resources (PMD trained staff is not being used for further capacity building or research); and 7) infrastructure is insufficient and lacking DRR consideration (coastal highway improperly designed, structural development along coast is without DRR considerations, land use management is done without any risk assessment of tsunami, there are limited rescue and relief service in coastal area, and poor communication system in remote coastal communities). She discussed the transfer of knowledge identifying the 2006 and 2008 projects and the strengthening of the TEWS in Pakistan both non-structurally with awareness and capacity building (outreach material, stakeholders events, training in schools and universities, volunteer training, media campaign, and evacuation drills, evacuation sites identification, and simulations and drills but there are language barriers) and structurally with EWS (basic equipment and satellite use), model structure (planning of DRM Park and construction of evacuation route, but more than 700 steps), and Bio Shield (mangrove plantation and conservation). SOPs are needed to strengthen the existing procedures for EWS.

Mrs. Naeem then addressed the challenges she sees ahead and recommendations: 1) security and ethnic conflicts (engaged local stakeholders such as communities, administration, security forces, vendors and media and harmonize with local culture and tradition); 2) institutional challenges such as capacity, coordination, resources and no past experience (investment in capacity building, improved coordination through continuous engagement, adaptation of experiences from other countries, explored multiple funding sources and joint ventures with other public and private partners); and 3) abrupt discontinuation Dec 2011 of support (diverting other resourceful institutions for building upon on work already done such as FOCUS, NED University, WB, UNESCO and PMD). She next identified what she thought was needed in the tsunami warning system: 1) ensuring sustainability of initiatives (development of DRM, extension after evaluation, EQ mitigation initiative, and Bio shield); 2) conservation use of technological advancement: (GIS in urban planning, monitoring mangroves reserves, multilayered EWS, emergency response, research (past event, current observation and context), and modeling tsunami scenarios; and 3) enhanced coordination with stakeholders, DM authorities, PMD, UN agencies, emergency responders, funding sources (avoiding duplication), information available (tide gauges procured in 2010 are still not being installed), and tsunami teacher in URDU is not available on web.

During and after the presentation, some of the discussion mentioned that language barriers (Baluchistan, Sindhi, Urdu etc.) exist and can impact the EWS. Also it was suggested that SOPs are needed to strengthen the existing procedures for the EW and sharing of the

technical warnings as well. In the area of communications, it was suggested that various options exist but there are problems with limited connectivity and communications: HF and VHF communications of the Pakistan Coast Guard is functioning; needs include loud speakers and infrastructural communications; radio or satellite bases communications can be considered but may be expensive; capacity building; and awareness. There are 200 people trained in the public addressing system. It was also mentioned that lack of and poor infrastructure makes it difficult to reach some locations and natural, community or self-based warning training and campaign are needed through media.

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

During these presentations:

- Mr. Alam emphasized the need for coordinated warning services for all natural hazards where possible to gain the benefit of shared institutional, procedural and communication networks.
- Mr. Mashud stated NDMA had shifted focus from reactive to pro-active policies which emphasizes prevention and disaster risk reduction rather than relief and response. They formulated a DRM Needs Report through consultative process, National Disaster Risk Reduction Policy 2012, and National Disaster Management Plan (NDMP) 2012 – 2022 which set the policy framework for national to province to district level and addresses coordinated, integrated, linked activities at all three levels. Volume II of the NDMP focuses on Establish Multi-hazard Early Warning and Evacuation Systems.
- Mr. Abidi provided some thoughts to consider which included: 1) what is the role of elected leaders and stakeholders in EWS and do they even know this role; 2) there is a lack of clarity and defining roles with the elected members and stakeholders in the country; 3) resources and management are needed; and 4) do the elected leaders and other government leaders know the situation on the ground. Mr. Abidi then the need for an effective, unified, multi-hazard disaster warning system. A shared vision will help us see beyond our individual goals, affiliations, and interests. In EWSs, there are differences in hazards and these must be addressed, but there are also similarities that can be made common, consistent, and tested. He also noted the need to understand “social media” communication in a better way.
- Ms. Naeem stated the last tsunami was in 1945 but cyclones, flash flood, coastal flooding, and heavy rains have been more frequent and thus a multi-hazard approach would be good. She stated that an end to end EWS for tsunami was initiated in 2006 but needed reviewed and updated. She discussed challenges and the future needs for the tsunami EWS.

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. Flood Forecasting System of PMD. Mr. Muhammad Riaz, Chief Meteorologist, PMD. Mr. Riaz presentation was on hydro-meteorological service, internal, external and integrated SOPs for early warning system, including procedures for development and annual review Flood Forecasting System of PMD. He first discussed the different types of systems which produce floods and then the three types of flood forecasts: qualitative (advanced information), quantitative (specific values daily), and early warning (significant flooding with inundation impacts). He then covered: the data requisition required for EWS and various systems and instruments used; the flood forecasting models available; analyses required for forecasts; the bulletins issued; dissemination of warnings and

information methods and detailed information on to whom it goes - mostly by fax and phone; and the 3 different categories of floods.

The PMD Flood Forecasting Center SOP regarding hydro-meteorological forecasting contains the procedure of the flood forecast, early warning the stakeholder for data collection, transmission and dissemination of the flood forecast and warning. Classifications of floods, flood limits and travel time (from one headwaters/sites to other headwaters/sites) are mentioned in this SOP. It also contains the responsibility and roll of all the agencies involved in flood management process in Pakistan. Chapter 1 describes the causes of flood in Pakistan and the three categories, which cause flooding in the catchments of the Indus basin river system and its tributaries. The flood management process is also described in this chapter. The early warning and flood forecasting system is covered in chapter 2. The responsibilities of the stake holders involved in the management process are indicated in chapter 3. The process of flood forecast and flood warning dissemination system is described in chapter 4 of this SOP. Mr. Riaz stated that the flood forecasting division has internal SOPs for: 1) pre-flood; 2) duty forecasting officer; 3) issuance of Flood Bulletin-A; 4) issuance of Flood Bulletin-B; and 5) cross border data for eastern and Chanab River and he provided the details for each of these. PMD have external SOPs to ask various agencies to make arrangements for the collection of data. He mentioned that SOPs are needed for making an office efficient. There are some gaps that need to be addressed particularly in dissemination of information and flow.

Later in the agenda, there was also a specific, additional presentation on the internal SOPs in PMD discussed above and one on the complete PMD Flood Forecasting Center SOP regarding hydro-meteorological forecasting.

6.3.2 Hydro-meteorological Services. Master Control Centre of Lai Nullah Flood Forecasting and Warning System. Mr. Mohammad Aslam, PMD. On 23 July 2001 Twin Cities received 610 mm rainfall in 10 hours (average rainfall of whole monsoon rainy season) resulting in 74 deaths and large property and livestock losses. In 2003, JICA assisted in a study and in 2006 installation began on the Lai Nullah Flood Forecasting and Warning System. Mr. Aslam made a presentation on this flood forecasting and warning system composed of a master control centre, flood warning control centre, and flood warning post and procedures developed using 'code system (in three stages)', sirens, zone classification for the 'Lai Nallah' for the twin city of Islamabad and Rawalpindi; and real time data monitoring (rain and water level gages) by PMD which includes. It has increased the lead time of warnings and the quality of the forecast has improved through real-time observation using automated water level gauges in 7 locations upstream. The code system is developed with 3 stages: 1) pre-alert stage (with both rainfall and water level thresholds developed), 2) alert state, and 3) evacuation. This has been a model for urban flood forecasting and warning systems in Pakistan. There is a high demand to replicate this system in other locations including Karachi City and other cities and PMD has devised a proposal with JICA to develop this further nationally in other areas/cities of the country. A video was shared in Urdu.

6.3.3 Disaster Management. Dam Safety and Operations SOPs. Mr. Ahmad Kamal, Chief Engineer, Dam Safety Council, FFC. Mr. Kamal provided a verbal presentation on dam safety and operations. In association with the Hyogo Framework Action (HFA) there was a pre-paradigm to post-paradigm shift. To formulate their SOPs, dam safety parameters were decided first and then SOPs were written in conformance with the dam safety parameters. He

then told about the previous history of their SOPs. For River Jhelom, based upon the super flood of 1992 and previous experiences, they articulated and formulated in 1996 the need for SOPs for dam safety and operations. Since then they have updated them in a stepwise manner in 1998, 2002, 2003, 2009, and 2013 as different levels were set. This was done in collaboration with WAPDA, PMD, Irrigation Department Panjeb, irrigation and others. For the Indus River, in 1973, the SOPs were set for the dams on Indus River particularly in the Tarbella reservoir (downstream) and Chasma reservoir (downstream). After 1992 super flood, a “Dam flood Management Committee” was formed to control the dams, but in 2005 artificial flooding occurred due to management of the dam water release a further mechanism was established. In 2010, an event occurred and there was a need identified to update and revise Tarbella Dam procedures which are being done now. Also proposals for a catastrophic dam break plan is now under way. NDMA is also looking for harmonized procedures for the multi-hazard early warning and in 2010 NDMA developed a national disaster response plan which also support these procedures.

6.3.4 Disaster Management. SOPs for EWS at District Level. Mr. Mir Dostain Hoth, Additional Deputy Commissioner, Gwadar District. Gwadar district has a coastline of 600 km with a population over 300,000 and the Mekran coastline is situated at a subduction zone and is prone to earthquakes, tsunami and other coastal hazards. Mr. Hoth stated that the challenges associated with Gwadar province include: time factor is important because tsunami shelter has limited access; people live in villages which have no easy access; understanding the nature of hazard and issuing warnings accordingly; local administration not knowing whether an earthquake has triggered a Tsunami or not until confirmed by authority; evacuation of the population in case of an emergency as DRM Park/tsunami shelter not developed and has limited access routes; and local population has very little knowledge about tsunami and other coastal hazards. Ways to improve EWS and preparedness include: EWS for coastal hazard should be up-to-date and functional with expert human resource; institutional capacity building is required to minimize the risk of these hazards; coordination among all concerned authorities will help in timely detection of the hazard like PMD, media and district administration; role of media is important in dissemination of information regarding potential coastal hazards and tsunami alerts; preparedness of local administration and communities to deal with emergency (evacuation drill); centralized command to avoid confusion and disorder; training and capacity building of the concerned people (government officers, media, and personnel working at EWS etc.) at national, provincial and district level; and more gages are needed for detection.

Later in the agenda, the Provincial Monsoon Plan (2013) for Balochistan Province was presented and discussed.

6.3.5 Media. Mr. Fahad Bin Arshad, Editor/Producer Abb Takk Television. Mr. Arshad stated that media could benefit from SOPs, depending upon various issues, but are in generally three areas: 1) news landing. These are press release issues from PMD to Media. How these are handled is important; 2) decision making. After receiving certain news, it goes to the higher office of the media and discussions happen for prioritizing the message and the roll out for broadcasting; and 3) news treatment (SOP needs here are major). This would include breaking news, interruption of the regular news, and breaking into normal transmissions. This also involves continual communication with the early warning institutions, learning of possible damage assessment, and communicating information.

During a disaster, media moves teams to the affected areas including cameramen, DNSG staff, and reporters. SOPs could help ensure that the team is informed about the EWS, equipped with the right items to deal effectively with the situation; and given ideas on the risk areas. This could be done with initial information and then special bulletin as needed. SOPs could also be helpful to with procedures for handling of special bulletins, ensuring the most important information is given first, ways to minimize loss, how to avoid creating panic, communicating categories of risk areas, and any special information for fishermen and ports. Media messages should be in simple and understandable language (usually the information received is actually comes from a very complex format and language and common people do not know this). Reporters must understand the power of message, build trust with public, can lobby for political commitments, appeal for relief, report on the anti-social elements of the situation.

Some suggestions and guidance provided for achieving the above issues;

- More proactive in reporting
- Training of journalists
- Data base of disaster prone areas.
- Journalists exchange programs
- PMD use easy terminologies, stay connected to media, and use sample study or drills.

In the discussion following the presentation, there was mention of possible SOPs or MOUs between/among countries to strengthen collaboration. It was noted in the tsunami program SOPs, the media should not only carry breaking news but also educational news on a regular basis. The issue of sensitivity in times of disasters could be address through SOPs with the media. It was also emphasized that the wording of EWS alerts and warnings must be prepared in a way that they can be easily read by the media to the public. They do not have the time to reword or translate. It was also emphasized that there consideration should be given to a fail-safe process to verify to ensure the alert was official. The media must be provided broadcast quality material with proper references.

6.3.6 Related Fields. Sharing on the Tsunami EWS by Navy. Mr. Taufeeque Rauf, Lieutenant Commander, Pakistan Navy, Karachi. Mr. Rauf explained that Pakistan Navy Hydrographic Department (PNHD) has been working since 1949 to meet all hydrographic related national/international requirements. Its traditional role of hydrography has changed into wide range of Digital Hydrographic Services. PNHD has international obligations which include producing ENC's (Electronic Navigational Chart) of major shipping ports and major shipping routes which has been accomplished by PNHD and provide timely and accurate promulgation of navigational warnings in Arabian Sea, Persian Gulf and Red Sea. National obligations include: National Hydrographic Databank for stakeholders being managed in digital format; hydrographic/oceanographic surveys and studies of potential harbor sites, important creeks and estuaries; advises Federal government in delimitation of maritime boundary; and also classified military obligations. Pakistan's coast is approximately 1050 km and is categorized into two types: Sindh coast and Makran coast. Pakistan is a coordinator of NAVAREA IX since 1976 and issues coastal warnings to all ships and concerned national authorities in an area consists of 16 countries. The Navy maintains four satellite tide gages at Gwadar, Ormara, Karachi and KT Bandar. For Navy, there are written documents for operations that exist but often these remain classified within the department and military procedures. Mr. Rauf described PMD tsunami EWS consisting of seismic network and tsunami information from JMA, PTWC, and other sources. He then provided

background on tsunami generation, monitoring, data telemetry, warning systems, run-up modelling, and hazard maps.

During the following discussion, it was indicated that there are some problems with the software for interoperation of the instruments. Awareness creation for the tsunami was discussed in detailed and it was determined that there is a great need to increase awareness across the Pakistan coast.

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

During the presentations, it was noted:

- The PMD Flood Forecasting Center SOP is a complete document which contains a description of causes of floods in Pakistan, flood management, the early warning and flood forecasting system, responsibilities of the stake holders, and the process of flood forecasting and flood warning dissemination.
- Mr. Riaz stated that the flood forecasting division has internal SOPs for: 1) pre-flood; 2) duty forecasting officer; 3) issuance of Flood Bulletin-A; 4) issuance of Flood Bulletin-B; and 5) cross border data for eastern and Chanab River.
- Mr. Aslam said the Lai Nullah Flood Forecasting and Warning System has increased the lead time of warnings and the quality of the forecast has improved. The code system is developed with 3 stages: 1) pre-alert stage (with both rainfall and water level thresholds developed), 2) alert state, and 3) evacuation. This has been a model for urban flood forecasting and warning systems in Pakistan.
- Mr. Ahmed stated Balochistan is prone to hydro-meteorological disasters and thus has developed SOPs for multi-hazard contingency planning. They have conducted awareness workshops; simulation exercises; school exercises; mangrove forestation; and safe evacuation routes.
- Mr. Kamal informed the group that based upon the super flood of 1992, they articulated and formulated in 1996 the need for SOPs for dam safety and operations and they have been updated several times. In 1973, the SOPs were set for the dams on Indus River particularly in the Tarbella reservoir (downstream) and Chasma reservoir (downstream). They were updated after the 1992 super flood, again in 2005, and are being updated further now. Proposals for a catastrophic dam break plan is now under way.
- Volume II of the NDMP focuses on Establish Multi-hazard Early Warning and Evacuation Systems. Proposals for tsunami and cyclones with storm surge include new gages and radars, training, and SOPs. It was suggested that SOPs are needed to strengthen the existing procedures for the EWS and sharing of the technical warnings as well.
- Mr. Hoth indicated ways to improve EWS in which SOPs can assist. These included coordination among all concerned authorities; role of media in dissemination; preparedness of local administration and communities to deal with emergency; and centralized command to avoid confusion and disorder.
- Mr. Arshad stated that media could benefit from SOPs, generally in three areas: 1) news handling; 2) decision making for prioritizing and broadcasting; and 3) news treatment. Also during a disaster, SOPs could help ensure cameramen, DNSG staff, and reporters are prepared with information about the EWS and disaster; equipped with the right items to deal effectively with the situation; and given ideas on the risk areas. SOPs could also be helpful on handling of special bulletins, providing most important information first, ways to minimize loss, ensuring sensitivity, avoiding creating panic, communicating categories of

risk areas, and any special information for fishermen and ports. Media could be helped to do this with training of journalists; data base of disaster prone areas; journalists exchange programs; and PMD using easy terminologies, staying connected to media, and using sample study or drills. It was noted that the media should carry educational news in addition to covering disasters. Wording of EWS alerts and warnings must be prepared in a way that they can be easily read by the media to the public. They do not have the time to reword or translate.

- Mr. Rauf stated that the Navy has written documents and procedures for operations, but these often are classified. During the discussion on tsunami awareness, it was agreed that there is a great need to increase awareness across the Pakistan coast.

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 are 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 milepost 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 milepost 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. Ahmed Nadeem, ABU. Mr. Nadeem 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 outpaces 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 times people do not immediately act on first news of warning or alert even with sufficient lead time. Many choose 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. (Mr. Nadeem had previously made a presentation on the “radio in a box.”) 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.

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 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 each 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 soil percolation; 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 its 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 10-2000km² (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), streamflow discharge data for local streams with drainage areas less than 2000 km² (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 – 4 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 three groups. They were asked to identify best practices, gaps and needs, recommendations regarding the Pakistan EWS and SOPs, and recommendations on the Manual/Handbook. This proved to be one of the most beneficial sessions 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

Good Practices

- National scale – Mangla Dam operations SOPs
- Provincial scale – Monsoon Contingency Plan for Balochistan Province
- City / District scale – Lai Nullah FFWS

Gaps

- Failure of communication modes in case of emergency – non-SOP item;
- Warnings/messages generic/not specific (during the discussion, there was some disagreement with this statement);
- Public awareness deficiency towards SOPs;
- Lack of homogeneity and cross-cutting aspects in various SOPs;
- Lack of coordination top-down/bottom-up end user in the implementation of SOPs
- Lack of regular updating of SOPs;
- More technical nature/language of a particular SOP;
- Last mile dissemination is limited most of the time (good to district level);
- Absence of SOPs/standing orders between disaster managers and media/broadcaster;
- Lack of coherent and clear SOPs on entire spectrum of disaster management

Needs

- Need regular updating of SOPs and organization of mock exercises;
- Fool proof dissemination and communication channels;
- Promotion of self-help, mutual help, and public help concept
- Both top-down and bottom-up approach;
- Capacity building, refresher courses, identified curriculum

Recommendations

- Prioritized updating and formulation of new SOPs in line with NDMP (milestone requirement);
- Requirement of fool proof dissemination and communication channels;
- Expansion of local volunteers
- Both top-down and bottom-up approach;
- Refresher courses

Recommendations – Manual

- Education/public awareness programs including video on disaster preparedness, prevention, mitigation, response in national as well as in local languages (material about DM for school, college curriculum, refresher courses, brief script and color coding);
- Categorization of disasters (meteorological/hydrological/tsunami etc.) in a database;
- Reflection of above through electronic media;
- Meteorological hazard mapping – different levels;
- Introduction of advance communication techniques (net radio, cell phone applications) for first responders
- Designated spokesperson for event

GROUP 2

Good Practices

- Effective EWS for hydro-metrological and geo-physical hazards are in place;
- Flash flood warning system;
- SOPs for tsunami and riverine flood are available;
- Satellite EWS for tsunami is in place in Gwadar;
- TCWC is established for tropical cyclones and SOPs are developed;

Gaps

- Lapses in reliable communication network to disseminate information to vulnerable communities;
- Lack of advance hydro-meteorological and geophysical equipment for monitoring network over land and undersea;
- Data communications from source to station;
- Lack of continuous maintenance;
- Flash flood warning system is not available for coastal areas;
- SOPs among stakeholders are not available;
- Lack of coordination among stakeholders e.g., PMD and Emergency Response Organization;

- Underutilized existing potential communication network/system (except for military);
- Lack of public awareness to understand and respond to EW issued;
- Satellite TEWS is not maintained since last year. Satellite link fee not paid and a formal MOU between NDMA and PMD is awaited;
- SOPs for cyclone EWS is being developed but not yet tested;

Recommendation

- Multi layered two-way communication system;
- Strengthen the existing hydro meteorological and geo-physical network;
- Installation of AWS, radars, tide gauges, broad band seismometers connected through telemetric systems;
- Availability of analytical software;
- Ensure maintenance during cyclone and before season;
- Identify the most vulnerable areas where hill torrents generate flash floods;
- Replication of Nala Lai model for establishment of coastal areas flash flood EWS;
- Improved realistic simulations/ exercise/ drills;
- Incorporation of DM information in curriculum;
- Use of media for increasing awareness;
- Training of stakeholders including communities in flash flood mitigation;
- Urgent need for the formulation of SOPs among various stakeholder (internal as well combined) clearly defining roles and responsibilities;
- Satellite TEWS should be updated and repaired as soon as possible;
- A concrete effort is needed to formulate SOPs for cyclone in consultation with stakeholders.

Recommendation for Handbook

- English and Urdu;
- Clearly defined roles and responsibilities of various concerned organizations for different hazard type;
- Regular updating as and when required and after a disaster;
- Guidance on regulatory framework, byelaws, guidelines, etc.;
- Regular Exercise among stakeholders based on the handbook guidelines.

GROUP 3

Good Practices

- Infrastructure available (well-equipped instruments and gadgets and networking (forward sharing of information with other related public departments);
- Well defined SOPs for river floods, tsunami, cyclone, and earthquake;
- Pre-devised plans - disaster contingency plans;
- Climatological/weather data available;
- Around 200 well established meteorological observatories along with communication facilities;
- Radar Network Available covering 70% of land area of Pakistan;

- Regional cooperation on flood forecasting (HYCOS);
- Sharing of Trans-boundary data (meteorological and hydrological);
- Close cooperation, collaboration among PMD, NDMA, Pakistan Army/Navy, WAPDA, FFC, Irrigation, Pakistan Commission of Indus Water (PCIW) and all other stakeholders.

Needs

- Need for dense networking (observatories/telemetric systems) in northern Area, FATA, and Baluchistan;
- Requirement of satellite based communication products;
- Integration between related organizations;
- Radars for Sindh and Baluchistan;
- Required technical and financial assistance;
- Capacity building of staffers/institutions;
- Capacity building of population/communities;
- Need for legal coverage to discourage encroachments around vulnerable areas;
- Need for inserting early warning and hazard information as part of education curriculum at all levels;
- Centralized information sharing (PMD to media);
- Need for cellular communication for specific disasters (tsunami/cyclone)

Gaps

- Communication gaps (source to end user);
- Focal point data not updated;
- Lack of related training;
- Lack of community education/awareness;
- Lack of equipment and process funding;
- Lack of synchronized SOPs;
- Lack of responsibility when information shared for ground action;
- Litigation issues/red tape;
- Public and private media representatives.

Recommendations

- Institutional capacity must be improved;
- Community based disaster management should be promoted;
- Modern satellites desired products are required;
- Establishing flash flood forum could be generated to greatly enhance the communication and coordination aspect;
- Foreign mission be briefed and to encourage foreign investment and technology transfer;
- A river law to be enacted (to stop unauthorized occupation of river bed residences);
- To use law enforcement agencies to remove illegally occupied river bed in form of encroachment;
- To establish multi-hazard disaster prevention and early warning centers;
- Fresh coastline surveys to be carried out to address the vertical index error;
- Flood insurance to be ensured and available commercially;

- Videos and documentaries to be directed and produced explaining the disasters and early warning systems in regional and local languages;
- Communities to be encouraged and participate actively by constructing green zones and safety shelters;
- Use of cable service providers for dissemination of awareness based on union councils and town level;
- Government should improve forecasting, monitoring and warning capabilities (Hydro-meteorologically);
- Government should promote cooperation between local government and cities, for sharing experience to raise awareness and enhancing capacity to address flood reduction considering the global warming and climate change;
- Local Governments are encouraged to mainstream disaster risk reduction and community-based disaster risk management in urban planning and to continue improvement in early warning and disaster preparedness

Recommendations for Handbook

- Different countries have different disasters levels owing to the fault lines and weather patterns;
- Minimum basic requirements to be outlined with illustrations;
- Standard synergized guideline and checklists for various disaster SOPs;
- Sharing of examples from other countries where governments have taken steps to remove obstacles from hazard prone localities;
- List of available websites, case studies, documents, and links to related videos for information acquiring;
- Usage of social media and its mandatory application for information dissemination and 24/7/365 weather, hazard, and early warning updates;
- Initiation of real time and live assistance of virtual social media groups for discussion/solution suggestions and knowledge sharing;
- Awareness campaigns for politicians, policy makers, communities, and the people at large about the possible threats posed to communities by the natural hazards.

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.

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 meetings, 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 Typhoon Committee 8th IWS/2nd TRCG forum in early December and then would be edited and finalized at a later day.

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 Recommendations

The In-Country Pilot team would like to thank all of the participants and local organizing committee, especially Mr. Arif Mahmood, Mr. Muhammad Touseef Alam, and Mr. Imran Akram, 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 Pakistan 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 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

National scale – Mangla Dam operations SOPs

Provincial scale – Monsoon Contingency Plan for Balochistan Province

City / District scale – Lai Nullah FFWS

PMD Flood Forecasting Center SOP
 Tsunami SOPs
 TCWC Cyclone SOPs

Non-SOP Related

Satellite EWS for tsunami is in place in Gwadar;
 TCWC is established for tropical cyclones;
 Infrastructure available (well-equipped instruments and networking);
 Pre-devised plans - disaster contingency plans;
 Climatological/weather data available;
 Around 200 meteorological observatories along with communication facilities;
 Radar network available covering 70% of land area of Pakistan;
 Regional cooperation on flood forecasting (HYCOS);
 Sharing of trans-boundary data (meteorological and hydrological);
 Close cooperation, collaboration among PMD, NDMA, Pakistan Army/Navy, WAPDA, FFC, Irrigation, Pakistan Commission of Indus Water (PCIW) and all other stakeholders.

8.2 Gaps, Needs, and Recommendations

Since there were three different groups. Each developed their own lists and formats, so the following will try to capture the essence of each. Gaps, needs, and non-manual recommendations have been combined since often they were inter-related. 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.

One overall recommendation was that SOP direction and guidance comes from the highest levels of government to mandate the need to disseminate, consult, and collaborate at all levels of government and mandate participation. One item to mandate is the testing for coastal hazards like tsunami and storm surge.

Gaps

SOP Related

Warnings/messages generic/not specific (during the discussion, there was some disagreement with this statement);
 Public awareness deficiency towards SOPs;
 Lack of homogeneity and cross-cutting aspects in various SOPs;
 Lack of coordination top-down/bottom-up end user in the implementation of SOPs
 Lack of regular updating of SOPs;
 More technical nature/language of a particular SOP;
 Absence of SOPs/standing orders between disaster managers and media/broadcaster;
 Lack of coherent and clear SOPs on entire spectrum of disaster management
 SOPs among stakeholders are not available;
 SOPs for cyclone EWS is being developed but not yet tested;
 A formal MOU between NDMA and PMD for satellite TEWS is awaiting;
 Lack of synchronized SOPs;
 Prioritized updating and formulation of new SOPs in line with NDMP;
 Urgent need for formulation of SOPs among various stakeholder (internal as well combined) clearly defining roles and responsibilities;
 Need to formulate SOPs for cyclone in consultation with stakeholders.

Non-SOP Related

Communications and dissemination

- Failure of communication modes in case of emergency;
- Last mile dissemination is limited most of the time (good to district level);
- Fool proof dissemination and communication channels;
- Lapses in reliable communication network to disseminate information to vulnerable communities;
- Data communications from source to station;
- Underutilized existing potential communication network/system (except for military);
- Need for cellular communication for specific disasters (tsunami/cyclone)
- Communication gaps (source to end user);
- Need for multi layered two-way communication system;

Training

- Capacity building, refresher courses, identified curriculum
- Capacity building of staffers/institutions;
- Capacity building of population/communities;
- Need for inserting early warning and hazard information as part of education curriculum at all levels;
- Inadequate related training for public to understand hazards and EWS
- Training of stakeholders including communities in flash flood mitigation;

Equipment

- Inadequate hydro-meteorological and geophysical equipment for monitoring network over land and undersea;
- Inadequate continuous maintenance of equipment and gages before and during event
- Flash flood warning system is not available for coastal areas;
- Satellite TEWS has not been maintained since last year. Satellite link fee not paid
- Need for dense networking (observatories/telemetric systems) in northern Area, FATA, and Baluchistan;
- Radars for Sindh and Baluchistan;
- Inadequate equipment funding;
- Replication of Nala Lai model for establishment of coastal areas flash flood EWS;

Public Awareness

- Promotion of self-help, mutual help, and public help concept
- Inadequate public awareness to understand and respond to EW issued;
- Inadequate tsunami awareness along coastal areas
- Improved realistic simulations/ exercise/ drills;
- Expansion of local volunteers

Coordination

- Inadequate coordination among stakeholders e.g., PMD and Emergency Response Organization;
- Integration between related organizations;
- Centralized information sharing (PMD to media);

- Focal point data not updated;
- Lack of responsibility when information shared for ground action;
- Public and private media representatives.
- Use of media for increasing awareness;

Other

- Requirement of satellite based communication products;
- Required technical and financial assistance;
- Need for legal coverage to discourage encroachments around vulnerable areas;
- Litigation issues/red tape;
- Availability of analytical software;
- Identify the most vulnerable areas where hill torrents generate flash floods;

Recommendations for Manual/Handbook

- Education/public awareness programs including video on disaster preparedness, prevention, mitigation, response in national as well as in local languages (material about DM for school, college curriculum, refresher courses, brief script and color coding);
- Categorization of disasters (meteorological/hydrological/tsunami etc.) in a database;
- Reflection of above through electronic media;
- Meteorological hazard mapping – different levels;
- Introduction of advance communication techniques (net radio, cell phone applications) for first responders
- Designated spokesperson for event
- English and Urdu;
- Clearly defined roles and responsibilities of various concerned organizations for different hazard type;
- Regular updating as and when required and after a disaster;
- Guidance on regulatory framework, byelaws, guidelines, etc.;
- Regular exercise among stakeholders based on the handbook guidelines.
- Different countries have different disasters levels owing to the fault lines and weather patterns;
- Minimum basic requirements to be outlined with illustrations;
- Standard synergized guideline and checklists for various disaster SOPs;
- Sharing of examples from other countries where governments have taken steps to remove obstacles from hazard prone localities;
- List of available websites, case studies, documents, and links to related videos for information acquiring;
- Usage of social media and its mandatory application for information dissemination and 24/7/365 weather, hazard, and early warning updates;
- Initiation of real time and live assistance of virtual social media groups for discussion/ solution suggestions and knowledge sharing;
- Awareness campaigns for politicians, policy makers, communities, and the people at large about the possible threats posed to communities by the natural hazards.

Appendix I

Pilot Workshop on SSOP 10 – 11 October 2013 Pakistan Programme

Synergized Standard Operating Procedures (SSOP) for Coastal Multi-hazards Early Warning System

Pakistan/Typhoon Committee Pilot Workshop

10 - 11 October 2013, Islamabad, Pakistan

PROGRAMME

VENUE: Marriot Hotel, Islamabad-Pakistan

Time	Topic	Speaker
DAY-1: 10 October Thursday)		
Opening remarks and Introduction		
0900-0915	Welcome Remarks	Mr. Arif Mahmood, Director General, PMD and Secretary of WMO/ESCAP Panel on Tropical Cyclones
Session 1: Roles and Responsibilities in Coastal Multi-hazards Early Warning System		
0915-0930	Workshop orientation, objectives, and goals	Mr. Olavo Rasquinho, Secretary, Typhoon Committee
0930-0945	Hydro-meteorological services roles and responsibilities at national, district, and local levels in early warning system for coastal multi-hazards. (12 minute presentation – 3 minutes questions)	Mr. Muhammad Touseef Alam, Chief Meteorologist, PMD
0945-1000	Disaster management roles and responsibilities at national, district, and local levels in early warning system for costal multi-hazards. (12 minute presentation – 3 minutes questions)	Mr. Idress Mahsud, Member DRR, NDMA
1000-1015	Media (TV, radio, and print) roles and responsibilities at national, district, and local levels in early warning system for costal multi-hazards. (12 minute presentation – 3 minutes questions)	Ms. Rashada Shoeeb GEO News

<i>Break</i>		
1030-1045	Elected Officials roles and responsibilities at national, district, and local levels in early warning system for coastal multi-hazards. (12 minute presentation – 3 minutes questions)	Mr. Syed Ali Raza Abidi, MNA
1045-1100	Roles and responsibilities at national, district, and local levels in early warning system for coastal multi-hazards. (12 minute presentation – 3 minutes questions)	Mr. Shabir Ahmad, PDMA, Balochistan

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

1100-1200	Group discussion of issues, gaps, and challenges in early warning system for coastal multi-hazards.	All participants. Moderated by Mr. Olavo Rasquinho
1200-1215	Early Warning Dissemination Gaps / Realities in Coastal Areas of Pakistan (12 minute presentation – 3 minutes questions)	Ms. Ghazala Naeem, DRR Expert

Lunch break

Session 3: Role of Standard Operating Procedures

1315-1330	Role of Standard Operating Procedures – Introduction and review	Mr. Olavo Rasquinho
1330-1345	Hydro-meteorological service internal, external, and integrated SOPs for early warning system, including procedures for development and annual review. (12 minute presentation – 3 minutes questions)	Mr. Muhammad Riaz, Chief Meteorologist, PMD
1345-1400	Disaster Management internal, external, and integrated SOPs for early warning system, including procedures for development and annual review. (12 minute presentation – 3 minutes questions)	Mr. Ahmad Kamal, Chief Engineer, FFC
1400-1415	Media internal, external, and integrated SOPs for early warning system, including procedures for development and annual review. (12 minute presentation – 3 minutes questions)	Mr. Fahad Hussain, Dunya TV, Islamabad

1415-1430	Elected officials internal, external, and integrated SOPs for early warning system, including procedures for development and annual review. (12 minute presentation – 3 minutes questions)	Ms. Samina Baloch Member, Baluchistan Provincial Assembly
1430-1445	Others internal, external, and integrated SOPs for early warning system, including procedures for development and annual review. (12 minute presentation – 3 minutes questions)	Mr. Tufail Baloch
Session 4: Identification of Issues, Gaps, and Challenges for Early Warning System SOPs		
1445-1500	Group discussion of issues, gaps, and challenges in SOPs for early warning system for coastal multi-hazards.	All participants. Moderated by Mr. Olavo Rasquinho
Break		
Session 5: Plans and Thoughts for the Future		
1520-1535	Meteorological Insight into SOPs	Mr Olavo Rasquinho
1535-1550	Disaster Management Insight into SOPs	Mr. Atiq Kainan Ahmed
1550-1605	Media Insight into SOPs	Mr. Ahmed Nadeem
1605-1620	Hydrological Insights into SOPs	Mr. Ahmed Said Al Barwani
1620-1700	International and local SOPs examples and good practices	
Day 1 Ends		

VENUE:

Time	Topic	Speaker
DAY-2: 11 October 2013 (Friday)		
Session 1: Bridging the Gaps in SOPs for Early Warning System - The Road Ahead		
0900-0945	<p>Participants discuss the following topics:</p> <p>What are needed Standard Operational Procedures for the Pakistan: Government officials Hydro-meteorologists Disaster management Broadcasters Others</p> <p>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?</p>	All participants. Moderated by Mr. Olavo Rasquinho
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.
<i>Break</i>		
1045-1200	The groups report on their work and discuss an Action Plan for improvements	All participants. Moderated by Mr. Olavo Rasquinho
<i>Lunch & Prayer Break</i>		
Session 2: Challenge to issue effective, understandable forecasts, advisories, and tropical cyclone bulletins		
1400-1430	<p>Group Discussions:</p> <p>What are the warning/advisory needs of: Elected officials, Disaster Managers, Media, Public, others</p>	
1430-1510	<p>Group Discussion:</p> <p>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</p>	

	<p>What terminologies are best to describe typhoon path, where it will pass and the specific time lines?</p> <p>What type of graphics are needed of forecasts to make them easily understandable and attractive</p> <p>What should be highlighted in bulletins</p> <p>What plots or graphics are needed for extent and height of inundation and for flood forecasts and warnings</p> <p>What frequency should updates be made</p> <p>With language technicality/particularity of the warnings, alerts and messages, people at grass-root village level sometimes do not absorb the gravity of the message and hence do not translate it into actions required. What can be done?</p> <p>Failure of communication modes in emergency, disruption of infrastructure. How does this effect EWS?</p> <p>Warnings and messages sometime being generic and not precisely specific to a particular area (or area at risk)</p> <p>Social and security concerns.</p>	
1510-1525	Action Plan for meeting challenges and gaps	
Session 3: Building Relationships		
1525-1540	Importance of Relationships among members involved in the Early Warning System	
Break		
1600-1615	How to build, foster, and maintain relationships among Early Warning System participates	
1615-1630	Future plans for developing and maintaining relationships	
Session 4: Setting Goals and Completion Dates		
1630-1650	Setting an operational strategy for the future – taking the theory into practice.	
1650-1725	Workshop Summary and documenting goals and completion dates	
1725-1740	Closing Remarks	

Appendix II

Pilot Workshop on SSOP 10 – 11 October 2013 Pakistan Attendees

Synergized Standard Operating Procedures (SSOP) for Coastal Multi-hazards Early Warning System

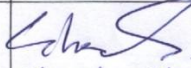
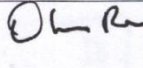

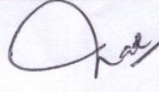



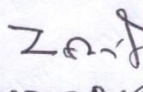
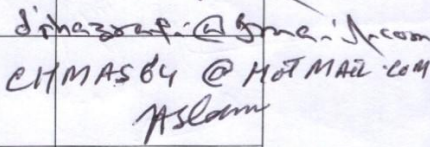
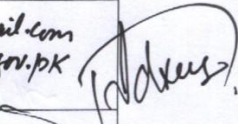
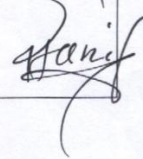
Pakistan Typhoon Committee Pilot Workshop

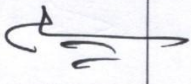

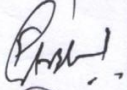
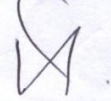
10 – 11 October, 2013 Marriot Hotel, Islamabad Pakistan.

Attendance Sheet

S.No.	Name & Designation	Organization	Signature
1	LT CDR TAUFEEQUE RAUF	taufeeque@yahoo.com HYDROGRAPHIC DEPT. PAKISTAN NAVY	
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6	Shabir Ahmed	AD (Planning) PDMA Quetta atigka@adpc.net	
7	ATIQA K. AHMED	ADPC THAILAND	
8	Syed Ali Raza Abidi	Member National Assembly, MUTTAHIDA QAUMI MOVEMENT, saliraza.abidi@mqmpakistan.org	
9	Dr. Ghulam Rasool	PMD	

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S.No.	Name & Designation	Organization	Signature
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