Project Title: Strengthening Tsunami Warning and Emergency Responses: Training Workshops on the Development of Standard Operating Procedures for Indian Ocean and Southeast Asian Countries

Project by: UNESCO Intergovernmental Oceanographic Commission

Funded by: Multi-donor Voluntary Trust Fund on Tsunami Early Warning Arrangements in the Indian Ocean and Southeast Asia, administered by UNESCAP

Beneficiary Countries: Indian Ocean and Southeast Asian Countries in UNESCAP region with borders to the Indian Ocean and/or western Pacific marginal seas that can be affected by tsunamis and earthquakes, including Bangladesh, Brunei Cambodia, China, Iran, India, Laos, Maldives, Sri Lanka, Pakistan, Philippines, Myanmar, Thailand, Malaysia, Singapore, Indonesia, Timor Leste, and Vietnam

Target Groups: National Tsunami Warning Centers (TWC) and National Disaster Management Organizations (NDMO)

Time Frame: 1+ year, Nov 1, 2007 to September 2009

Activities: 1 Regional Training (1-week long), May 12-16, 2008, Bangkok
4 Country-dedicated Capacity Building Projects (3 1-week long missions to Myanmar, Pakistan, Philippines, Vietnam)

Executive Summary

This Project seeks to strengthen existing tsunami warning and emergency responses through training workshops and capacity building missions to assist countries in the development of Standard Operating Procedures (SOP) as part of their Tsunami Warning Center and Tsunami Emergency Response Plans.

National Tsunami Warning Centers (NTWC) are currently being developed in the Indian and South China Sea regions. The NTWC, as the Tsunami Warning Focal Point (TWFP) with the responsibility of receiving international tsunami advisories and issuing official tsunami warnings within their own country, must have robust, well-tested tsunami warning standard operating procedures. When warnings are issued, Disaster Management Organizations (DMO) must then have equally well-practiced tsunami emergency response standard operating procedures to ensure an efficient rapid response that will evacuate people out of tsunami inundation zones before the wave's arrival. These are concepts endorsed by Member States of the UNESCO-IOC Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS), whose Member States have long and valuable working experience in tsunami hazard mitigation.

At the time of this proposal (2006), most countries did not have well-tested protocols and procedures; many still do not. The 2006 conclusion was based on polling and discussions of 23 countries participating to the Regional Tsunami Workshop on Mitigation, Preparedness and Development of Tsunami Early Warning Systems in the Indian Ocean Region 14-16 June 2006, 20 countries participating to the Third session of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System 3-5 August 2006, 20 countries attending the UNESCO-IOC XXth Session of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System 1-5 May 2006, 14 countries attending the International Round Table Dialogue on Earthquake & Tsunami Risks in Southeast Asia and the South China Sea Region 27 – 28 April 2006, 11 countries responding to the IOTWS WG 6 Capacity Questionnaire, and the conclusions of the UNESCAP-funded Mapping Study on Tsunami Early Warning Systems in the Indian Ocean and Southeast Asia (Draft, December 2006).

In order to ensure standards of interoperability and consistency in evaluation and warning message content, regionally coordinated approaches are needed to support the development of end-to-end tsunami warning. A Tsunami Warning Center (TWC) must provide threat advice to emergency authorities as early as possible (within minutes). For this, a TWC should have in place Standard Operating Procedures (SOP) in order to efficiently analyze the incoming data, evaluate its threat, and take clear action. Further, there is a need to stimulate technical and institutional capacity building and through this, agreement and implementation of regionally-transferable procedures for the rapid exchange of data and event information related to a potentially damaging events.

For an effective end-to-end tsunami warning system, Disaster Management Organizations (DMO), or their equivalent, from all levels of government should be responsible for public safety, health and welfare of the people and community during natural or man-made disasters. DMOs and other government and non-government organizations must develop Tsunami Emergency Response (TER) Plans and accompanying Standard Operating Procedures and Checklists to properly coordinate and execute rapid and massive public coastal evacuations in response to a Tsunami Warning Center's notification of an approaching tsunami on a 7X24 basis. TER Plans should be developed as part of an organization's broader multi-hazard Emergency Plans.

Both tsunami early warning systems and disaster management must ultimately be integrated into national, provincial, district and village levels to strengthen a community's capacity to respond appropriately to tsunami warnings and cope with disaster.

The Project is designed as a Regional Project in which a standard, generic set of COP, SOP, checklists, and flow charts will be provided as a common starting point from which countries may develop and enhance the procedures according to their own needs and specific situations. The planned materials, derived from best practice experiences of existing systems in the Pacific and especially from Japan and the USA, are intended to constitute a set of globally-consistent procedures and protocols for tsunami warning and emergency response. From this common point, the Project proposes to undertake Country-dedicated missions using practicing and/or well-experienced experts to assist in the development of responses specific to their needs and requirements.

For this, one Regional Training Workshop is planned to provide guidance, templates, and best practices to countries across the IOTWS and Southeast Asia region; the workshop will be conducted at the beginning-to-middle of the Project implementation period to introduce the concepts and provide reference materials. Four Country-dedicated, multi-mission technical assistance sub-projects will be carried out over a 5-6-month period in order to work directly with the country to build understanding and capacity to develop sound tsunami warning and emergency response SOPs; the sub-Projects will consist of technical assessment and recommendations to strengthen each country's protocols and procedures, development of or improvement upon their existing SOPs, and conduct of one type of tsunami drill, such as a tabletop exercise, to evaluate the feasibility of the developed SOPs. It should be emphasized that the Project funds are sufficient only to provide basic SOP understanding and development guidance; countries are expected to continue to improve and enhance their procedures, and especially after each event in order to identify and immediately make corrections to improve existing procedures.

Additionally, under separate funding, this approach will assist Sri Lanka, Maldives, Mauritius, and Mozambique in 2008 / 2009, and will continue to assist Indonesia through 2009.

Strengthening Tsunami Warning and Emergency Responses:
One-week Training Workshop on the development of
End-to-End Tsunami Standard Operating Procedures

Introduction

The UNESCO Intergovernmental Oceanographic Commission (IOC) Strengthening Tsunami Warning and Emergency Responses End-to-End Standard Operating Procedures Training Workshop was developed to support the IOC's effort to assist countries in developing and strengthening their tsunami warning operations. The 2008-2009 capacity building project, funded by Regional Multi-Donor Voluntary Trust Fund for Tsunami Early Warning Arrangements in the Indian Ocean and Southeast Asia administered by UNESCAP, consists of a regional training workshop and multiple-mission technical visits to four countries (Myanmar, Pakistan, Philippines, Vietnam). The Project emphasizes Standard Operating Procedures (SOP) as a key requirement for ensuring efficient, timely, and consistent responses by stakeholder agencies, principally tsunami warning centers and disaster management agencies.

To carry out the Project, guidance on tsunami warning and emergency response operations was developed and training workshops conducted using tsunami operations practitioners who shared their expertise, experience, and advice. The generic set of operational templates, checklists, and timeline-driven actions provides a common starting SOP point for countries to customize to meet their specific needs and tsunami threat. These materials are intended as a set of globally consistent procedures and protocols for tsunami warning and emergency response. Together, they represent part of the IOC's collaborative contribution to national capacity building and training on end-to-end tsunami warning and tsunami standard operating procedures to countries of the Indian and Pacific Oceans and Southeast Asia, and the Caribbean region.

To support the introductory one-week Training Workshop, this Training Manual was compiled and provided in hard copy and electronic formats. The Manual includes reference, best practice, decision support tools, and templates and guidance materials covering key components, requirements, and activities to enable an effective and timely warning and evacuation against tsunamis. The materials were developed under the lead of the International Tsunami Information Center (ITIC) and in close partnership with experienced practitioners in tsunami warning and emergency response, and have been used in numerous training courses since the 2004 Indian Ocean tsunami. The hard copy portion of the Manual includes materials referenced by the lecturers and/or used by participants for small group activities during the Workshop. The accompanying data DVD contains electronic files, including the Support Documents, copies of the lecturer's PowerPoint presentations and other Workshop materials.

The Training Workshop is intended to be a 5-day intensive course for tsunami warning center and emergency response agencies and their staff. An Agenda and Session Plan describe the topics covered, their learning points, teaching methodology, and references Manual and Support Documents for each topic. The Workshop concludes on Day 5 with participants carrying out an exercise simulation using the tsunami standard operating procedures learned about and created during the week. The exercise is intended to evaluate the feasibility of the created SOPs, and to illustrate how operational readiness can be improved through the regular conduct of drills and exercises to identify gaps and correct responses before an actual emergency. Post-exercise or

post-event evaluations emphasize the importance of reviewing an event's response and then immediately taking corrective action so that the same problem does not repeat itself.

The development of Standard Operating Procedures is a dynamic process, and each event is unique in its generation and impact, and so also in its response. In every event, we learn a little more about the science of tsunamis and how to better mitigate against their impact. There are always lessons learned which we must apply (modifying our SOPs accordingly) before the next event occurs. And so with time, this Training Manual will evolve too. We welcome your comment and input on ways to improve its usefulness.

The UNESCO IOC and ITIC would like to express their appreciation to all the countries and agencies which have generously shared their examples and best practices, and to especially thank the following organizations for their input and contribution:

Indonesia
    Meteorological, Climatological, and Geophysical Agency (BMKG)
    Indonesian Institute of Sciences (LIPI)
Japan
    Asian Disaster Reduction Center (ADRC)
    Japan Cabinet Office
    Japan Meteorological Agency (JMA)
    Shizuoka Prefectural Government and Earthquake Preparedness Education Center
    Wakayama Prefecture Government
New Zealand Civil Defense and Emergency Management (CDEM)
Radio-Internet Project (RANET)
UNDP Regional Center, Bangkok
UN International Strategy for Disaster Reduction (ISDR)
USA
    Hawaii State and Local Government, Civil Defense and Emergency Management
    Washington State Government, Emergency Management
    National Oceanic and Atmospheric Administration (NOAA)
        National Geophysical Data Center (NGDC)
        National Weather Service (NWS)
            Pacific Tsunami Warning Center (PTWC)
            West Coast / Alaska Tsunami Warning Center (WC/ATWC)
    Pacific Marine Environmental Center (PMEL)
    US Geological Survey (USGS)

UNESCO-IOC

Strengthening Tsunami Warning and Emergency Responses:
Training Workshop on the Development of
End-to-End Tsunami Standard Operating Procedures (SOPs)

4-8 August 2008
PHIVOLCS Auditorium, UP Campus, Dillman
Quezon City, Philippines

Lecturers and IOC Tsunami Team:

Tony Elliott, Head, ICG/IOTWS Secretariat, IOC
Dr. Gerard Fryer, Senior Geophysicist, US NOAA Pacific Tsunami Warning Center
Sanny Jegillos, Regional Programme Coordinator, UNDP Regional Center in Bangkok
Dr. Laura Kong, Director, International Tsunami Information Centre (ITIC), IOC
Brian Yanagi, Disaster Management Specialist, ITIC, IOC

AGENDA

Session	Start Time	End Time			Topic	Lecturer
1-3					**DAY 1: SESSIONS 1-3**	
1					**MORNING: PLENARY**	
1.1	9:00	9:30			Opening Ceremonies	IOC, PHIVOLCS
1.2	9:30	9:40			Course Overview	Kong
1.3	9:40	9:45			Logistics and other administrative items	Elliott
2					**Tsunami Warning and Emergency Response – Overview**	
					Science, Hazards, and Warning Centres	
2.1	9:45	10:30			End-to-End Tsunami Warning and Emergency Response – Overview	Kong
	10:30	11:00			COFFEE / TEA BREAK	
2.2	11:00	12:00			Earthquake and Tsunami Science for tsunami warning	Fryer
2.3	12:00	12:45			End-to-end Tsunami Warning – Stakeholders, Roles and Responsibilities, Standard Operating Procedures, and their linkage	Yanagi
	12:45	13:45			LUNCH	
					AFTERNOON: PLENARY	
3					**Philippines Tsunami Warning and Mitigation System**	
3.1	13:45	14:15			Tsunami Risk Mitigation Program of the Philippines	Solidum, PHIVOLCS

3.2	14:15	15:00			NDCC's Emergency Operations Center	Lorenzo, Civil Defense Operations
3.3	15:00	15:45			Tide Monitoring Network of the Philippines	Ventires, NAMRIA
	15:45	16:15			COFFEE / TEA BREAK	
3.4	16:15	17:00			Philippine Coast Guard role in tsunami warning	Avila, Coast Guard
	17:30				**Welcome Cocktail Reception**	PHIVOLCS
					DAY 2: SESSION 4	
					MORNING: PLENARY	
4					**Tsunami Warning and Emergency Response – Overview**	
					Tsunami Warning	
4.1	8:30	9:30			Lessons Learned from past tsunami - 1993 Japan, 2006 Indonesia, 1998 Papua Guinea, 2007 Sumatra, 2006 Kurils Use of timelines for assessing information flow effectiveness	Fryer
4.2	9:30	10:00			Pacific Tsunami Advisory Service – Standard Operating Procedures	Fryer
	10:00	10:30			COFFEE / TEA BREAK	
4.3	10:30	11:00			National Tsunami Warning Centres – Overview on Standard Operating Procedures - Daily Operations, Flow Charts, Timelines	Kong
4.4	11:00	11:30			Discussion: TWC SOPs	All
					Emergency Response and Preparedness	
4.5	11:30	12:15			10 Steps to Enable a Successful Tsunami Emergency Response	Yanagi
	12:15	13:15			LUNCH	
					AFTERNOON: PLENARY	
4.6	13:15	14:15			Warning Dissemination and Public Alerting mechanisms and technologies – Message Scheduling and Message Content, Warnings through GTS, RANET, and other existing reliable methods	Kong
4.7	14:15	15:15			Warning Dissemination and Public Alerts – Roles of the Media – Japan and US examples	Kong, Yanagi
	15:15	15:45			COFFEE / TEA BREAK	
4.8	15:45	17:00			Breakout Groups: Information Flow SOPs - Media and Public Information	All (Jegillos, Kong)
					DAY 3: SESSIONS 4-5	
					MORNING: PLENARY	
4.9	8:30	9:30			Use of Exercises in Tsunami Preparedness: Exercise Development / Regional and National Exercises and Post-Exercise Evaluations, Exercise Pacific Wave 06 and Exercise Pacific Wave 08	Yanagi
4.10	9:30	10:30			Tsunami Preparedness - Education and Awareness	Jegillos
	10:30	11:00			COFFEE / TEA BREAK	
4.11	11:00	12:00			Tsunami Warning Decision Support Tools: Earthquake Monitoring, PTWC SMS Alerts, Historical Databases	Kong
	12:00	13:00			LUNCH	
					DAYS 3 - 4: TWC and TER (DMO) MEET SEPARATELY FOR SPECIFIC TOPICAL & TECHNICAL DISCUSSIONS	

5					DAY 3: TSUNAMI WARNING CENTRE SESSION	
					AFTERNOON	
5.1.1	13:00	13:45			Fundamental TWC SOPs for a Timely Tsunami Warning: TWC Operations - Tsunami Event Activity Timelines: Cases 1 and 2 – Centres with real-time seismic processing	Kong
5.1.2	13:45	14:45			TWC Operations – Active seismic monitoring and real-time earthquake source characterization	Fryer
	14:45	15:15			COFFEE / TEA BREAK	
5.1.3	15:15	16:15			TWC Operations - Sea level monitoring, tsunami confirmation and wave forecast	Fryer
5.1.4	16:15	17:00			Tsunami Warning Decision Support Tools: Sea Level Monitoring	Kong
5-6					DAY 4: TSUNAMI WARNING CENTRE SESSION	
5.1.5	8:30	9:15			SOP Guidance - How to Guidance, including Analysis Processes, Flow Charts and Checklists in SOP	Kong
5.1.6	9:15	10:00			Tsunami Event Case Studies – Successes and Continuing Challenges TWC and DMO interactions: Hawaii example between PTWC, Tsunami Advisor Scientists, Emergency Management for distant and local threat cases	Fryer
	10:00	10:30			COFFEE / TEA BREAK	
5.1.7	10:30	12:30			Breakout Groups: Using Templates to Create TWC SOPs (Roles & Responsibilities, Routine Operations, Ensuring Data Quality Control and Telecommunications Reliability, and other requirements)	Small Groups
	12:00	13:00			LUNCH	
5.1.8	13:00	13:30			Creating SOPs: Timeline-driven SOPs	Fryer
5.1.9	13:30	15:00			Break out Groups: Using Templates to Develop Timeline of Processes and Actions as SOPs (Messages, Checklists, Information Dissemination)	Small Groups
	15:00	15:30			COFFEE / TEA BREAK	
5.1.10	15:30	16:00			Break out Groups: Using Templates to Develop Timeline of Processes and Actions as SOPs (Messages, Checklists, Information Dissemination)	Small Groups
5.1.11	16:00	16:30			Presentation of Break out Group SOPs	Breakout Group Chairs
6.1	16:30	17:00			Table Top Exercise – Background and Scenarios for Day 5	Exercise Controller
5					DAY 3: TSUNAMI EMERGENCY RESPONSE SESSION	
					AFTERNOON	
5.2.1	13:00	13:45			Understanding and acting on TWC Messages, DMO Actions and Use of Timelines in Emergency Response	Yanagi
5.2.2	13:45	14:45			Evacuations: Alerting and Moving People, Inundation maps, Evacuation Routes and Signage, Safe return	Yanagi
	14:45	15:15			COFFEE / TEA BREAK	
5.2.3	15:15	16:00			Community-level preparedness and response	Jegillos
5.2.4	16:00	17:00			Case Studies on experiences in developing and using SOPs - Wakayama, Japan; Indonesia	Yanagi, Jegillos

5-6					**DAY 4: TSUNAMI EMERGENCY RESPONSE SESSION**	
					MORNING	
5.2.5	8:30	9:30			Tsunami Emergency Response – Distant and Local Tsunami Threat – Case Studies on present operations - Hawaii, New Zealand, Japan	Yanagi
	9:30	10:00			COFFEE / TEA BREAK	
5.2.6	10:00	10:30			SOP Guidance Manual – Explanation of Templates, Distant and Local Threats	Yanagi
5.2.7	10:30	11:00			Creating SOPs - How to Guidance, including Response Processess, Flow Charts and Checklists in SOPs	Yanagi
5.2.8	11:00	11:30			Breakout Groups: Using Templates to Create General Roles and Responsibilities for SOPs	Small Groups
	11:30	12:30			LUNCH	
5.2.9	12:30	13:00			Breakout Groups: Using Templates to Create General Roles and Responsibilities for SOPs	Small Groups
5.2.10	13:00	14:00			Breakout Groups: Using Templates to Create Evacuation Checklists for SOPs	Small Groups
5.2.11	14:00	14:30			Creating SOPs: Timeline-driven SOPs	Yanagi
	14:30	15:00			COFFEE / TEA BREAK	
5.2.12	15:00	16:00			Break out Groups: Using Templates to Develop Timeline of Processes and Actions as SOPs	Small Groups
5.2.13	16:00	17:00			Presentation of Break out Group SOPs	Breakout Group Chairs
6.1	17:00	17:30			Table Top Exercise – Background and Scenarios for Day 5	Exercise Controller
6-7					**DAY 5: SESSIONS 6 and 7, PLENARY**	
6					**Table Top Exercise and Summary**	
6.2	8:30	9:00			Table Top Exercise Set-up according to Stakeholder Warning and Response Groups	Exercise Controller
6.3	9:00	10:00			Table Top Exercise – EPW06 source, TWC (Local, Regional (South China Sea), Regional (Pacific)) and DMO (Local, 1 or 2 Regional) groups	Small Groups
	10:00	10:30			COFFEE / TEA BREAK	
6.3	10:30	11:00			Table Top Exercise – EPW06 source, TWC (Local, Regional (South China Sea), Regional (Pacific)) and DMO (Local, 1 or 2 Regional) groups	Small Groups
6.4	11:00	12:00			Table Top Exercise – EPW06 source, TWC (Local, Regional (South China Sea), Regional (Pacific)) and DMO (Local, 1 or 2 Regional) groups	Small Groups
	12:00	13:00			LUNCH	
6.4	13:00	14:00			Table Top Exercise – Evaluation	Breakout Group Chair, Exercise Controller
	14:00	14:30			COFFEE / TEA BREAK	
6.5	14:30	15:00			Table Top Exercise – Summary and Next Steps	Exercise Controller and Observers
6.6	15:00	15:30			Workshop Summary Discussion	All
7					**CLOSING CEREMONIES**	
	15:30	15:45			Presentation of Certificates	All
	15:45	16:00			Closing	IOC, PHIVOLCS