

# ASIAN DISASTER MANAGEMENT NEWS

a newsletter of and for the community of disaster risk management practitioners and development workers

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## Multi-hazard Early Warning Systems

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**ADPC Executive Director, Dr. Suvit Yodmani is appointed the Minister of Tourism and Sports, in the Royal Thai Government**

Dr. Suvit Yodmani, the Executive Director of the Asian Disaster Preparedness Center was honored with an invitation by the Royal Thai Government to join the new interim administration's cabinet as the Minister of Tourism and Sports. Dr. Suvit will assume the position of Senior Advisor during his time with the Royal Thai Government. ADPC welcomed Dr. Bhichit Rattakul as Acting Executive Director for the coming year, after which Dr. Suvit will return to ADPC as the Executive Director in 2007.

Dr. Bhichit Rattakul with over 20 years of experience in policy and management directing posts was a former Governor of Bangkok. He has been the Senior Advisor to ADPC for the past year and has been coordinating the UNDP and World Bank supported disaster preparedness programmes in Thailand. Dr. Bhichit completed his undergraduate studies at Chulalongkorn University and his Master's and Doctorate at Brigham Young University, Utah, USA.



**ADPC signs MOU with SAARC**  
19 Dec 2006, Bangkok

H.E. Lyonpo Chenkyab Dorji, Secretary General of SAARC and Dr. Bhichit Rattakul, Executive Director a.i. of ADPC signed a Memorandum of Understanding (MOU) to collaborate on developing and strengthening mechanisms for sharing experiences, information and resources on disaster preparedness, mitigation and management including emergency response. His Excellency was accompanied by Mr. Sonam Tshong, Director, Environment, Science & Technology, SAARC.

## editor's note



Dear Readers,

A community focussed early warning systems is the urgent need of the hour to empower, to mitigate, to be aware and prepared for the onslaught of natural hazards and its impacts. However, we are also exposed to its limitations, scope and reach. Efforts are being mobilized towards enhancing the capacities and capabilities of coordinated early warning systems that combine the technological requirements with community level action. This newsletter focusses on concepts to action approaches in this endeavour.

Acknowledging and thanking all the invited contributors with special mention to the Climate Risk Management unit of ADPC in the production of the publication, I present the quarterly newsletter for your perusal.

## Eleven-country Cooperation in Establishing a Regional Multi-hazard Early Warning System in the Indian Ocean and Southeast Asia

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Nature has proven, time and again, that hazards do not recognize political boundaries. Addressing the impacts of trans-boundary hazards, such as the 26 December 2004 tsunami, requires concerted actions of governments, organizations, and individuals, not only in the more immediate emergency relief, rehabilitation and reconstruction phases, but also, importantly, in long-term disaster prevention and mitigation.

Days after the 2004 tsunami disaster, ASEAN leaders met in Jakarta on 6 January 2005 and agreed to establish a regional tsunami early warning system in the Indian Ocean and Southeast Asian region, and develop national and regional human and institutional capacity and promote transfer of know-how, technology and scientific knowledge in building and managing a regional early warning system and disaster management through international cooperation and partnership. The Ministerial Meeting in Phuket on 29 January 2005 provided guidance that such early warning arrangements should build on existing institutions and mechanisms, strengthen and upgrade national systems, link national mechanisms with sub-regional and regional capabilities, integrate early warning with preparedness, mitigation and response (end-to-end), and must be integrated into existing warning systems to promote a multi-hazard approach to make the system sustainable. The meeting recognized the Asian Disaster Preparedness Center's (ADPC) readiness to serve as a regional center or focal point for a multi-nodal tsunami early warning arrangement in the region, and its goal to strengthen its capacity, including the incorporation of additional technological capabilities. The meeting also welcomed Thailand's proposal to establish a Voluntary Trust Fund for strengthening national and regional capacities in early warning.

### **INTERNATIONAL EFFORTS TO ESTABLISH A TSUNAMI EARLY WARNING SYSTEM IN THE INDIAN OCEAN**

UNESCO's Intergovernmental Oceanographic Commission (UNESCO/IOC) coordinates efforts to establish a tsunami warning and mitigation system in the Indian Ocean. The International Coordination Meetings for the development of the Indian Ocean Tsunami Warning and Mitigation system (IOTWS) held in Paris from 3-8 March 2005 and in Mauritius from 14-16 April 2005 agreed on a framework for the IOTWS as consisting of a coordinated network of national systems and capacities, with Member States having the responsibility

for warning issuance and dissemination within their respective territories, utilizing or building on existing institutions and complementing existing warning frameworks, within a multi-hazard approach. The 23<sup>rd</sup> session of the IOC Assembly from 21-30 June 2005 established the Intergovernmental Coordination Group (ICG) for the IOTWS (ICG/IOTWS), composed of interested IOC Member States from the Indian Ocean Region, to govern the system, with the IOC Secretariat as secretariat.

The first meeting of the ICG/IOTWS in Perth in August 2005 established four working groups to develop technical plans for the IOTWS based on national and international contributions: (i) seismic measurements, data collection, and exchange; (ii) sea level data collection and exchange, including deep-ocean tsunami detection instruments; (iii) tsunami hazard identification and characterization, including modeling, prediction and scenario development; and (iv) the establishment of a system of interoperable operational centers. These working groups were later expanded to six, with a working group separately looking into risk assessment, and with the addition of a working group on mitigation, preparedness and response, noting a similar entity in the Pacific tsunami warning system and the need to integrate the ICG-coordinated warning systems into disaster management and national development processes.

In the second ICG/IOTWS meeting in Hyderabad from 14-16 December 2005, the Working Group on system of interoperable centers recommended the appropriate structure for the Indian Ocean region as consisting of a system of systems, where countries receive advisories through bilateral agreements with IOC-accredited tsunami watch providers in the region. The detailed design and implementation requirements for the IOTWS were drafted in a rolling plan, which was endorsed by the third ICG/IOTWS meeting in Bali from 31 July – 2 August 2006. The fourth ICG/IOTWS meeting is scheduled from 28 February – 2 March 2007 in Mombasa, Kenya.

### **EFFORTS TO ESTABLISH A REGIONAL MULTI-HAZARD EARLY WARNING SYSTEM THAT INCLUDES SOUTHEAST ASIA**

Noting the exclusion of Southeast Asia in the deliberations of the first UNESCO/IOC International Coordination Meeting in Paris, despite the sentiments expressed by ASEAN leaders and officials in the Jakarta and Phuket meetings and the need

for a warning system in Southeast Asia as had been identified by the Tsunami Warning System in the Pacific (ITSU) Master Plan, senior officials of Cambodia, China, Lao PDR, Myanmar, the Philippines, Thailand and Vietnam met in Bangkok from 28-29 March 2005 and agreed to establish an end-to-end multi-hazard early warning arrangement in the Indian Ocean and Southeast Asian region, in partnership with Thailand, and with technical support from China and the Philippines, under the framework of UNESCO/IOC and the World Meteorological Organization (WMO). The countries requested ADPC to coordinate and facilitate this regional arrangement. Bangladesh, the Maldives, Sri Lanka and, recently, Mauritius, subsequently joined through signed agreements. Agreements with Pakistan and Mongolia are being finalized.

#### *Why is regional cooperation needed?*

- *Countries facing similar hazards can share good practices and lessons learnt*
- *Real-time information may be shared for providing early warning, and reduce impacts*
- *Resources and technical knowledge may be shared to reduce costs to individual countries*

The collaborating countries envisioned a system where the countries contribute technical and human resources through secondment of personnel, draw resources through partnerships and participation of international experts to advise, exchange ideas, information and experiences, and undertake research to acquire state-of-the-art internationally-available scientific and technical advances and best practices and make these available for all participating countries. They also envisioned a system with continuous involvement of all stakeholders to constantly up-grade, upkeep and sustain national and local disaster preparedness and response capabilities to meet the challenges posed by low frequency, but high impact hazards like tsunami.

In June 2005, Thailand reported in the 23<sup>rd</sup> IOC Assembly on its cooperation with ADPC, supported by Cambodia, China, Lao PDR, Myanmar, the Philippines and Vietnam, in establishing partnerships with stakeholders in the Indian Ocean and Southeast Asian region for a regional tsunami warning arrangement. From 12-14 July 2006, early warning focal points of Bangladesh, Cambodia, China, Lao PDR, the Maldives, Myanmar, the Philippines, Sri Lanka, Thailand and Vietnam met in Bangkok and agreed that ADPC, as facilitator of the regional early warning system, shall also serve as a regional tsunami watch provider to the participating countries. The countries also agreed to equip the regional facility for tsunami watch with capabilities to assist national hydro-meteorological services, in collaboration with WMO, in building their capacities in providing locally-specific disaster warnings for hydro-meteorological hazards, which are far more frequent than tsunami. The meeting also established institutional arrangements at regional, national,

sub-national and local levels, and adopted a regional program that would address gaps and needs for an end-to-end multi-hazard early warning through five components: 1) *Regional hazard observing and advisory system*; 2) *Strengthening national capacities in early warning, disaster management planning, risk communication, and emergency response*; 3) *Enhancing local capacities to assess disaster risks, respond to warnings, and undertake local risk reduction*; 4) *Regional exchanges of information, best practices and lessons learned*; and 5) *Research to improve system performance and (warning) recipient response*.

#### *Requirements for a sustainable regional cooperation in disaster risk reduction*

*The UN-ISDR global review of disaster reduction initiatives in 2004 revealed that successful and sustainable regional cooperation in disaster risk reduction requires:*

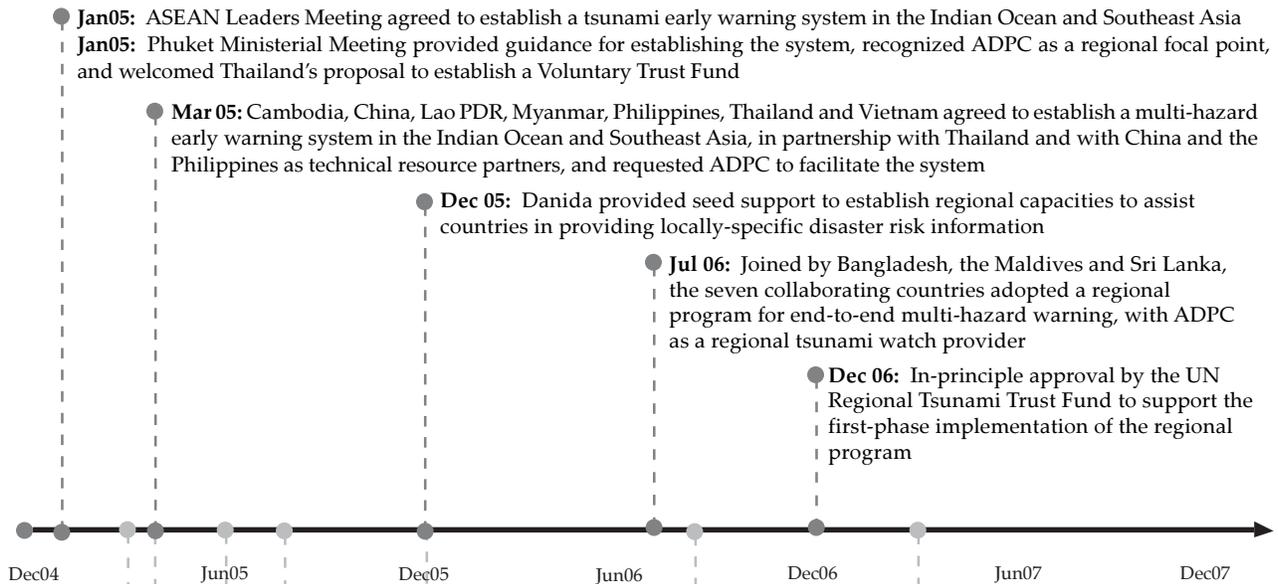
- *An understanding that leads to acceptance of countries in the same region to share information and resources*
- *An established and consistently supported apolitical institutional hub that can promote and respond to multi-state and multi-disciplinary issues. These institutions serve as a dissemination vehicle, acting as clearinghouses for diverse information that merges political, professional and public interests.*

Noting the increase in the incidence of earthquakes in the region, particularly in areas due to the accumulation of stress from the converging movement of the Myanmar and Indian plates, the collaborating countries emphasized the urgency of establishing an operational early warning system in the region, and recommended the phased implementation of the regional program, with highest priority placed on establishing regional capacities to provide tsunami watch to the participating countries, with funding support from the UN Regional Tsunami Trust Fund. The Fund administrator, UNESCAP, conveyed the in-principle approval of about US\$ 2.9 million for establishing the ADPC-facilitated regional multi-hazard early warning system. The Danish International Development Agency (Danida) has provided seed support to establish regional capacities to assist participating countries in providing locally relevant hydro-meteorological disaster risk information. Progress and planned activities towards establishing this regional multi-hazard early warning system will be reported by ADPC in the fourth ICG/IOTWS meeting in Mombasa, Kenya.

**“Do you know 52% of tropical storms formed over the globe is originated in Pacific Ocean?”**

## TIMELINE TOWARDS A REGIONAL END-TO-END MULTI-HAZARD EARLY WARNING SYSTEM IN THE INDIAN OCEAN AND SOUTHEAST ASIA

### Regional efforts



### International efforts

- Mar05:** First International Coordination Meeting to establish a tsunami warning and mitigation system in the Indian Ocean agreed on the IOTWS framework
- Apr 05:** Second International Coordination Meeting
- Jun 05:** 23<sup>rd</sup> session of the IOC Assembly established the Intergovernmental Coordination Group for IOTWS
- Aug05:** First meeting of the ICG/IOTWS established 4 working groups to develop technical plans for establishing the IOTWS
- Dec 05:** Second meeting of the ICG/IOTWS recommended a two-tiered interoperable system of regional tsunami watch providers and national tsunami warning centers
- Aug 06:** Third meeting of the ICG/IOTWS endorsed a rolling design and implementation plan
- Mar 07:** Fourth meeting of the ICG/IOTWS



*Delegates at the Meeting on Regional Cooperation on Early Warning Arrangement, Preparedness and Mitigation of Natural Hazards, 12-14 July 2006, Bangkok*



## The Indian Ocean Tsunami Warning and Mitigation System: Progress and Challenges

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The 26 December 2004 tsunami killed over 230,000 people, displaced more than 1 million people and left a trail of destruction around the coasts of the Indian Ocean. Although the tsunami took over 2 hours to cross the Bay of Bengal, more than 50,000 in India, Sri Lanka, Maldives and East Africa lost their lives. An early warning system would almost certainly have saved many thousands of lives, but none was in place at the time.

Recognising the need for an early warning system, the coastal nations of the Indian Ocean responded quickly. Following two intergovernmental meetings in Paris and Mauritius, the Indian Ocean member states requested the Intergovernmental Oceanographic Commission (IOC) of UNESCO to form an Intergovernmental Coordination Group (ICG) to implement an Indian Ocean Tsunami Early Warning and Mitigation System (IOTWS), and this was formally established at the IOC Assembly in Paris, in June 2005. A Secretariat was also created to provide administrative support and to coordinate the activities of the ICG/IOTWS. Australia offered to fund this and host it at the offices of the Bureau of Meteorology in Perth, Western Australia.

The main objective of the IOTWS is to identify and mitigate the hazards posed by local and distant tsunamis. The goal is to create a fully integrated end-to-end warning system comprising three key components: hazard detection and forecasting; threat evaluation and alert dissemination; and community preparedness and response. The work of the IOTWS is conducted by six working groups specialising in seismology, water level measurement, risk assessment, numerical modelling, warning dissemination and community preparedness. The working groups are task teams who are experts in their fields, responsible for establishing standards and for developing work plans. They report their recommendations to the ICG for endorsement and implementation.

The IOTWS is owned by the member states of the Indian Ocean. It can thus be thought of as a coordinated network of systems, and the challenge is to ensure that operational standards are well defined and uniformly implemented across the broad range of activities of the IOTWS. At the regional level, it is envisaged that a number of Regional Tsunami Watch Providers (RTWP) will provide 24/7 tsunami advisory services. At the national level, each member state is responsible for issuing warnings to its own citizens through their National Tsunami Warning Centre (NTWC), which will be closely linked to one or more RTWP.

A key principle of the IOTWS is that data should be shared and openly available to all member states through international channels of communication such as the Global Telecommunications System (GTS). This is imperative if delays in the reception and analysis of crucial information are to be minimised.

Since December 2004 there has been significant progress in the installation of vital detection equipment. A total of 70 core seismic stations have been identified and by the end of 2006, 38 of these will have been installed, with the remainder to be installed progressively up to 2010. This enhanced network of broadband seismometers will allow earthquake epicentres (location and depth) to be identified more rapidly, within a target of 5 – 10 minutes compared to 15 – 20 minutes today. This improvement will be crucial in providing early warning particularly for local tsunamis, where every minute is important in saving lives.

Progress has also been made in the installation and upgrade of coastal water level measurement gauges. By August 2006, 25 gauges reporting every 15 minutes were in operation, compared to 11 reporting every hour before the 2004 tsunami. Deep-ocean detection equipment has also been installed. Malaysia, Indonesia and India have all installed databuoys

in 2006, and a US-Thai Deep-ocean Assessment and Reporting of Tsunamis (DART) buoy has recently been installed at a key location in the middle of the Bay of Bengal. This latter deployment is an important milestone for the IOTWS because it will be the first to share data over the GTS. There are plans to deploy up to a further 24 buoys across the Indian Ocean by the end of 2008.

An initial IOTWS was declared operational in July 2006, the backbone of which is the tsunami advisory service provided by the Pacific Tsunami Warning Centre (PTWC) in Hawaii and the Japanese Meteorological Agency (JMA) directly to the 24/7 national warning centres in 26 of the IOTWS member states. The time to transmit advisories is reducing as the network of seismic stations increases, and the increasing number of coastal and deep-ocean water level gauges will improve our ability to confirm whether a tsunami has been generated or not.

For all the progress and improvement at the detection end of the system, the harsh reality is that much remains to be done to ensure dissemination of effective warnings and to improve the preparedness of communities to respond to such warnings. The Java tsunami of 17<sup>th</sup> July demonstrated a break in the communication chain between the national and local levels and confirmed concerns that not enough attention was being given to community awareness. In a true end-to-end system, information must flow from one end (detection) to the other (community response) without interruption or ambiguity. Just as equipment must be maintained and warning centre personnel must be trained (and retrained), awareness and preparation to respond must be ingrained in communities for the system to be sustainable. With this in mind, the ICG has established a new working group to concentrate on tsunami mitigation, preparedness and response. Given the diversity of cultures within the ICG, the work of this group is especially challenging but represents an essential component of the complete system.

In summary, much progress has been made in the past two years and the Indian Ocean coastal communities are more aware of the hazards posed by tsunamis. Because of the unpredictable nature of this natural phenomenon, vulnerable communities must always remain vigilant. This does not mean that they must live in constant fear, but they must understand instinctively what to do when the next tsunami comes, which could be next week or 100 years from now. A culture of preparedness must be firmly established and passed down from generation to generation. In this sense the system will always be open-ended and may never be considered truly complete.

IN BRIEF

**British Columbia Tsunami Warning Methods: "A Toolkit for Community Planning"**

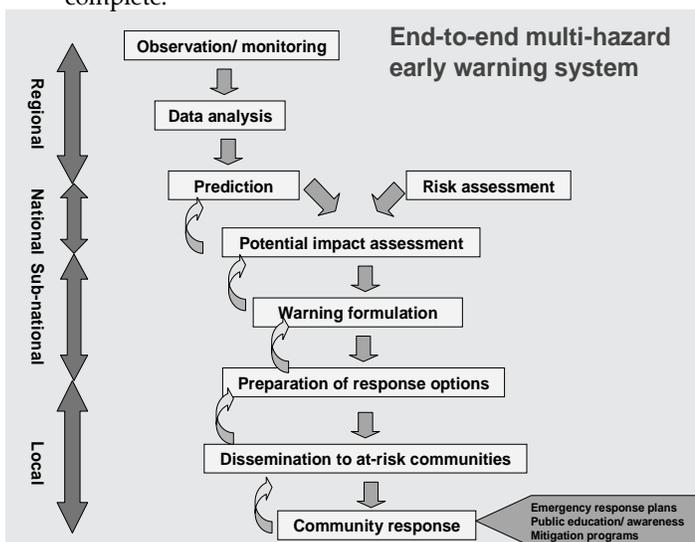
British Columbia has had a Tsunami Warning System in place for a number of years. Tsunami warnings for Coastal British Columbia are initiated by the West Coast Alaska Tsunami Warning Centre (WCATWC). The B.C. Provincial Emergency Program, upon receipt of a Tsunami warning from WCATWC, notifies local authorities, coastal communities, the media and stakeholders by a combination of warning methods, including telephone, fax, and Internet. Local authorities are then required to implement their warning and alerting plans to advise the public at risk. The "Toolkit" provides descriptions of notification methods and options, brief discussions of their advantages and disadvantages relative to other methods, implementation considerations and costs. The purpose of this toolkit is to provide British Columbia local authorities and communities with information that will allow them to evaluate the many options available to provide notification and warning to the public of a potential or impending Tsunami wave. While this toolkit was developed specifically with tsunami hazards in mind, it may also be applicable to many other hazards that could impact communities. *Source: published July 2006 by Peter S. Anderson, Telematics Research Lab, Simon Fraser University, Canada*

**Japan Meteorological Agency (JMA)'s Tsunami Warning System**

Japan is located near an active subduction zone, experiencing many earthquakes and tsunamis. Therefore, Japan has developed one of the most extensive tsunami warning systems in the Pacific, and worldwide. The main observatory of the Japanese Meteorological Agency (JMA) is located in Tokyo, and five regional observatories are responsible for issuing tsunami warnings. Data is continuously collected using satellites and cellular communication. After an earthquake occurs offshore, the observatories close to the epicentre will issue tsunami bulletins and tsunami warnings are broadcast within 3 minutes. The bulletins will go to the prefectures through the Local Automatic Data Editing and Switching Systems (L-ADESS), which will send forecast results like tsunami height to the main observatories. The main observatory will issue bulletins (warning, watch or information bulletin) to other prefectures and alert other government agencies through Central-ADESS. The Central Emergency Management Communication Network (CEMCN) includes ministries and agencies at the national level which contribute to disaster mitigation such as the Ministry of Construction, Tokyo Electric Power or the Nippon Broadcasting Corporation. *For further detail please visit <http://www.jma.go.jp/jma/indexe.html>*

**Implementation of the Global Information and Early Warning System (GIEWS) Workstation**

FAO uses the Meteosat-based estimates of rainfall and the NOAA/AVHRR-based assessments of vegetation cover as one of the key inputs for operational monitoring of crop conditions by the FAO Global Information and Early Warning System (GIEWS). Since early 1992, GIEWS is implementing the project with the objectives to develop a tool to better integrate image and graphic data especially the socio-economic and nutritional indicators with the satellite-based ARTEMIS products and field agro-meteorological data in the analysis and reporting process of the GIEWS analysts. Its applications development at the regional levels is now being undertaken within the framework of the Regional Early Warning System in the SADC region through the FAO/SADC Regional Remote Sensing Project. More details: [www.fao.org/giews/english](http://www.fao.org/giews/english)



## The Role of Geoscience in Hazard Mitigation

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### INTRODUCTION

The 26 December 2005 earthquake west of the Aceh Province of Indonesia generated a large tsunami which devastated large areas along the coastlines of Indonesia, Thailand, Myanmar, Sri Lanka, India and even some parts of the east African coast.

This tragic tsunami event highlighted the critical issues that geoscience can address, relating to tsunami hazards and their economic and social effects. The December 2004 tsunamis caused catastrophic loss of life and damage to coastal infrastructure. Reduction of future risks to high population coastal communities, rehabilitation of affected areas, and future development will all require enhanced geoscience information and analysis that can address such issues as:

- The causes of tsunamis and potential distribution, magnitudes and frequencies.
- Effects of tsunamis on the coastline and factors influencing variability of impact.
- Definition of distributions and magnitudes of risk.
- Development of local warning systems.
- Rehabilitation strategies for areas affected by recent events.
- Input to future sustainable development policy for coastal settlements and infrastructure.
- Input to new building codes to reduce future tsunami impact.

### FAST TRACK GEOSCIENCE STUDY

The Coordinating Committee for Geoscience Programmes in East and Southeast Asia (CCOP)/Norwegian Geotechnical Institute (NGI) has for the Department of Mineral Resources in Thailand completed a detailed study of future tsunami risks along the west coast of Thailand and proposed how the risk should be dealt with in the short, medium and long term. This study was fully financed by the Norwegian Ministry of Foreign Affairs (MFA).

The successful completion of this fast track study on the "tsunami and extreme weather risk reduction measures with focus on land use and rehabilitation" has proven that all parties involved were able to take appropriate and fast action immediately after the Dec 26 2004 tsunami that had caused so many casualties and so much economic destruction. It is appropriate that this project has been expeditiously

completed so that the results can be used by the authorities to better prepare and plan for similar calamity, which is now not a question of if but when it will happen, and to minimize the loss of lives and assets when such an event occurs in the future.

To make the project effective, purposeful and sustainable, it has incorporated the needs and views of the local people through the Local Advisory Panel. The project has also maintained the close cooperation and communication with the local Thai Authorities, carried out some training that contributed to technology transfer, and ensured wide dissemination of the results to the stake holders locally and internationally through holding the dissemination seminar at the end of the project. All these have proven to be vital to contributing to the complete success of the project.

### COMMUNITY BASED IMPLEMENTATION

The results of the study and recommendations given have been very positively received by the intended target groups. The study has already an impact on the Department of Mineral Resources and other Thai authorities on how Thailand has dealt with the consequences of the tsunami so far. The results of this project were used as the key analysis factor for the 2 projects of DMR: the Ban Nam Kem Coastal Protection Project and the Post Tsunami Land use Planning of Andaman Sea Coast, Southern Thailand Project (Figure 1).

Establishment of the Local Advisory Panel is also believed to have contributed to ensuring a local anchoring of the results of the study. Input from the Advisory Panel was also useful and helped focusing on mitigation measures that are considered practical and viable for implementation. The results of the three case study areas will be implied for the revision of mitigation measures as well as the evacuation plans. Involvement of the Local Advisory Panel ensured local ownership of the project and the results.

From feedback received, there is little doubt that Thai authorities have already made use of the results, and that it will also impact on how they will plan implementation of mitigation measures. In the implementation phase, their main challenge will be to maintain focus, ensure local anchoring, financing, and overcome some local obstacles in relation to land ownership and interests of various affected groups.

## CONCLUSION

The geoscience information will help all countries in the region to focus on the main issues at stake when it comes to dealing with future tsunami risks. Dedicated action can be taken on dissemination of the results in the international dissemination seminar to all local and international agencies and bodies involved in similar work, including key international organisations such UNESCO-IOC, ADPC, UN-ISDR. However, following the Java tsunami disaster on 17 July 2006 (Figure 2), the international community has to address the lessons learned and gaps identified of the countries and population affected. Recognizing the urgency to mobilize efforts and resources towards establishing an efficiency tsunami hazard monitoring and mitigation systems within the Indian Ocean region, the international cooperation need to review the interim warning system both intergovernmental and national sharing lesson learnt, and earthquake and tsunami risk reduction effects, by countries in the region and the possibility of the need to strengthen communication. It also needs to identify specific technical activities aimed at ensuring the implementation of risk assessment and disaster management plan in national level and to increase the reliability and availability of appropriate disaster-related information to the public and disaster management agencies in the region.

Figure 1. The future tsunami risk imply for Thailand and neighbouring countries

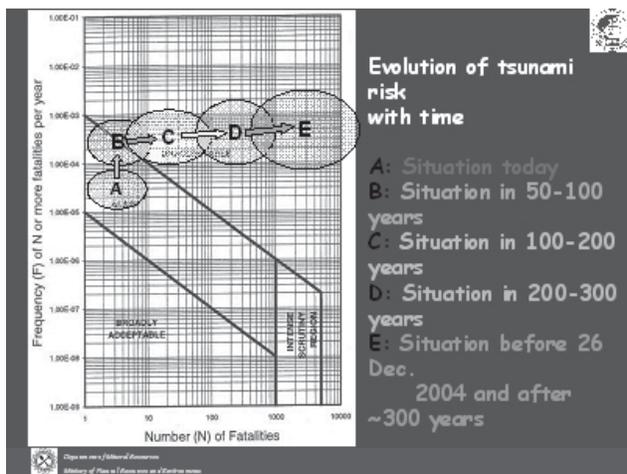
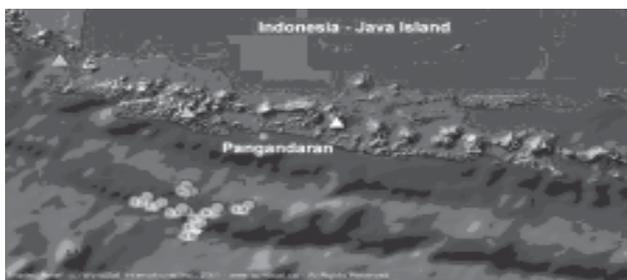


Figure 2. The 16 July 2006 tsunami impact generated by an earthquake located in the sea near the south coast of Java Island, Indonesia



Source: USGS Web Earthquake Report



## Strengthening Multi-Hazard Early Warning Systems – The Last Mile

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Cuddalore, the “Sea Town” in the Tamil Nadu state of southern India, is located south of Pondicherry on the Bay of Bengal. The city lies between 15°11' and 12° 35' along north latitude and 78° 38' and 80° east longitude. It has an area of 3678 km<sup>2</sup> and has 57.5km long coast line. The district has a high degree of exposure to natural hazards such as cyclones, heavy rains, floods, droughts etc, as well as man made hazards such as industrial pollution, fires due to high concentration of industrial units. Cuddalore district was one of the 13 districts in the state which was severely affected during the December 2004 Tsunami.

The district has a well defined institutional mechanism in place for disaster management. The District Collector is the Chairman of the District Disaster Management Committee (DDMC) with head of the line departments as its members. A comprehensive Disaster Management Plan outlines roles and responsibilities of each department at various levels, available skilled human resources, and recovery aspects.

### EXISTING EARLY WARNING SYSTEM

Time tested standard protocol for disseminating the warning information is available in the district. During the monsoon season a 24X7 control room is activated at the district and sub district levels. “Disaster Warning System” is present in three locations of the district to broadcast weather bulletin from the Area Cyclone Warning Center. This is a manual process where the staff has to note the bulletin and disseminate to the concerned authorities.

The district administration also receives timely cyclone warning information from various sources (Indian Meteorological Department, State Relief Commissioner's office, Chief Secretary's office and also from the Public Department at the state level). The information received at the control room is further disseminated immediately to the sub district authorities by phone, fax and VHF sets for alerting and evacuating the people along the low lying areas.

Wireless based two-way radio technology with repeater system is present in Cuddalore district. During the tsunami and the floods thereafter, this wireless system was used extensively in the district. This wireless system is located in the office of the Block Development Officers (BDOs) at the sub district level. In case of issuing a warning, the District Collector can use the wireless system to convey the warnings to the BDOs. Transmission of warning messages further to the communities is done through messengers and other manual modes.

Experience has shown that the communication of warning information to the communities had been a major challenge due to the physical location of communities, their differential access to early warning information and available lead time etc.

The December 2004 Indian Ocean tsunami was a rare, but high-impact phenomenon with a shorter lead time that underscored the need for a timely and effective early warning system. Post tsunami recovery and reconstruction programme in the district has given an opportunity to rebuild at higher standards of safety. With considerable progress already made with the post tsunami recovery and reconstruction mainstreaming disaster risk reduction in all reconstruction and development activity is seen as critical in order to build a secure and lower risk future for the citizens.

### **STRENGTHENING MULTI- HAZARD EARLY WARNING SYSTEM**

As part of medium to long term Disaster Risk Management initiatives, establishment of Early Warning Systems (EWS) is seen as vital to warn the communities along the coastal areas about the imminent threat. Despite efforts being underway at the national and regional levels to establish effective tsunami warning systems there is a clear need for the development of EWS at the local level and capacity to take actions against these warnings at the community level. The efforts to generate technically improved forecasts and warning need to be matched with equal if not greater emphasis on effective communication systems, public awareness and social infrastructure at the community level so that the warnings can be acted on soon enough. In order to meet this demand of an effective EWS mechanism, there is a need for strengthening the capacities of the local level institutions to reduce the impact of future disasters. The Government of Tamil Nadu (GoTN) in association with the United Nations Development Programme is implementing a project that envisages to strengthen and institutionalize the Early Warning System (EWS) in the Tsunami affected coastal districts. This project adopts a strategy of strengthening Early Warning Systems with special emphasis on the delivery of 'understandable' early warnings to the communities at risk.

#### **The objectives of the project are:**

1. Review Early Warning Systems existing for different hazards

2. Strengthening dissemination mechanisms of early warnings to communities, via community participation and training
3. Institutionalization of Early Warning Systems within Disaster Management Committees and Disaster Management Teams at the community level

As part of the ongoing GoTN-UNDP Early Warning System project, an initiative has being taken to increase the reach of the Early Warning message delivery upto the Panchayat's. The pilot project in Cuddalore District has two major components namely Dissemination & Communication and Response Capabilities of the communities. A public address system with four-horn speakers, microphone with a power amplifier has been installed in selected 54 vulnerable panchayats. The public address system is also supported by batteries for power back-up so that the system can work for at least for 48 hours without power, common during natural calamities.

#### **Features of the last mile communication system**

- The radios are programmed with suitable codes by using radio software which has been modified for both emergencies as well as for normal function.
- The system can be used to address either the entire group of villages or also could be used to relay messages selectively to a few villages based on the required target audience.
- In order to initiate an early warning, the District Collector has to dial a specific 4-digit number to initiate the alarm in the radio available in his office and /or his car.
- Upon receipt of the signal code by the site radio decodes and switches on the emergency warning siren in the radio which is in turn fed into the PA system through the auxiliary input.
- Simultaneously, the District Collector's radio at the remote office gets an acknowledgement tone indicating the progress of alarm. The alarm can be programmed from 1sec to-more than 20sec. depending upon the time required to grab the attention of the village public.
- Later the District Collector by using the wireless microphone can address the required message for any length of time from his office or even when he is on the move.
- Similarly, the procedure can be repeated any number of times to announce to the public of any or all important messages.
- If required a combined broadcast for the whole of the district is also possible in one go by a group call so that emergency messages can be passed in few seconds which is vital during emergency.
- The system is also provided with an option of encrypting the messages to prevent the unauthorized warnings.

#### **TRAINING AND CAPACITY BUILDING**

In order to create awareness and build capacities of the communities on Early Warning Systems and Information, around 1500 people have being trained. A training manual on Early Warning has been developed both in English and in Tamil language and has been used for the training programmes at the community level.



## Tsunami Alert Rapid Notification System contribution to the National Disaster Early Warning System for Thailand

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*Chief, International Coordination, Thailand's National Disaster Warning Center (NDWC)*

The Memorandum of Agreement between NDWC and United States Agency for International Development (USAID) Indian Ocean Tsunami Warning System (IOTWS) Program for the Implementation of the Tsunami Alert Rapid Notification System (TARNS) Program was signed on March 24<sup>th</sup>, 2006 at NDWC in Nonthaburi. The program duration was scheduled from March 2006-September 2007.

The TARNS initiative will help NDWC to enhance and implement a robust conceptual plan for adopting the appropriate technologies and procedures to deliver both disaster warnings and "all clear" alerts quickly and efficiently. In addition, nation-wide simulation exercises will be conducted to practice these procedures. Additional technical support will be provided through the USAID-funded U.S. IOTWS Program with experts from the U.S. Department of Agriculture's Forest Service (USDA/FS), the National Oceanic and Atmospheric Administration (NOAA), the Pacific Tsunami Warning Center (PTWC), the International Tsunami Information Center (ITIC), and the United States Geological Survey (USGS). TARNS program will include the following activities:

### **TARNS I (23-27 May 2006) for system design and communication plan;**

- Four Sub-Committees were established under the Committee on National Disaster Warning Management, namely; Sub-Committee on TARNS, Sub-Committee on Telecommunication, Sub-Committee on Organizing Workshop, and Sub-Committee on Exhibitions and Public Relations.
- NDWC also discuss with Asian Disaster Preparedness Center (ADPC) and United Nations Development Programme (UNDP) to integrate risk assessment into TARNS in order to increase knowledge and awareness for government function levels of the six coastal provinces

affected by 2004 tsunami. The project on adaptive learning in disaster management for community awareness and resilience emphasis on community and school level has also been approved by UNESCO/IOC through the Belgian Government and will be conducted from January 2007, onwards.

### **TARNS II (25-28 July 2006) for launching the framework and communication technology and methodology;**

The workshop focused on telecommunication technology to effectively communicate among interagency departments and community. The media training was also conducted to provide adaptive learning ability for NDWC staff and media, way to communicate with media and how to establish relationship with media for enhancing public notification.

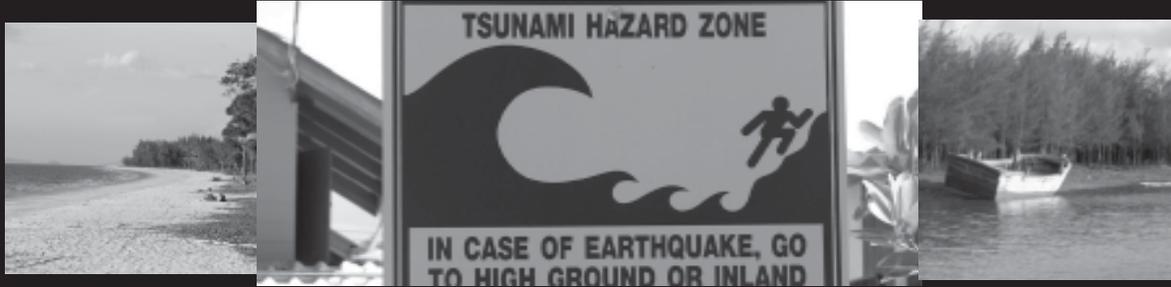
### **Strategic National Action Plan Workshop and pre TARN III (24-26 October 2006); and**

A preliminary simulation exercise was conducted to identify gaps and to demonstrate complexity of communication during the emergency time. A strategic plan on the early warning system for NDWC was also developed during the TARN II.

### **TARNS III (6-8 February 2007) to develop implementation plan for the TARNS;**

- Two simulation exercises (June-July 2007) for full-scale table top exercises of the implementation plan;
- Regional Model showcase of TARNS (August-September 2007)

*(Photo above: TARNS I (23-27 May 2006) for system design and communication plan at the Sai Lom Hotel in Hua Hin, Prajuabkirikhan, Thailand by NDWC)*



## Development of National Early Warning System for Tsunamis and Weather-related Hazards in the Maldives

*Based on the information received from the Department of Meteorology (DoM) and the National Disaster Management Centre (NDMC) - Maldives*

### THE MALDIVES' VULNERABILITY TO NATURAL DISASTERS:

The Maldives' vulnerability to natural disasters has always been considered moderate. This perception, however, was altered by the tsunami of 2004. Though tsunamis are rare, risks at Sumatra keep everyone alert. Other hazards in the country are thunderstorms, storm winds, flash floods and waves, storm surges.

- Thunderstorms (severe local storms) occur usually during the dry northeast monsoon (January to March)
- Storm winds (tropical cyclone winds) occur during the southwest monsoon (May to November) and from low pressure troughs. The northern part of the country is more vulnerable, with frequency and wind speed decreasing from northern to southern regions.

The May 1991 tropical cyclone, though well forecasted, affected thousands of people and caused significant damage (refer to Table 1) due to delay in warning communication. The cyclone, which was observed on the 28th and forecasted on the 29th, passed on the early morning of the 30th. Maximum gust wind was estimated at more than 100 mph. Severe weather condition persisted for 11 days.

About 11 cyclones have passed the country in the last 130 years.

Table 1. Top ten natural disasters in Maldives

| Disaster    | Date             | Killed | Total affected |
|-------------|------------------|--------|----------------|
| Epidemic    | March 1978       | 219    | 11,258         |
| Wave/ surge | 26 December 2004 | 102    | 27,214         |
| Flood       | 11 April 1987    | 0      | 300            |
| Wind storm  | May 1991         | 0      | 23,849         |

Source: EMDAT

- Flash floods result from continuous rains from low pressure trough, cloud burst and cyclone, particularly in islands where drainage facilities are limited. Impacts include water stagnation (ponding). The southern part of the country has the highest recorded rainfall in 24 hours at 220 mm; the central part at 200 mm, and the northern part at 136 mm.
- Tidal waves/ surge were given attention since 1987 when the eastern coast was affected, flooding almost half of Male and neighboring islands. Because of bathymetry, the east coast is more vulnerable than the west coast. Wave/ surge is experienced yearly in different parts of the country. Last month, it was observed in the northern atolls. Waves cause beach erosion. Protective measures include natural coral reefs and artificial sea wall protection (refer to Photo 1).
- Earthquake and tsunami were added to the list of hazards after 2004. The southern atolls are at risk from earthquakes that may be generated from the Carlsberg Ridge towards the west, extending down south of the country. Tsunami threats come from the Makran source, and from the more active Sumatra fault east of Maldives that put the eastern coast at risk. Figure 1 shows the differential risks to these hazards.

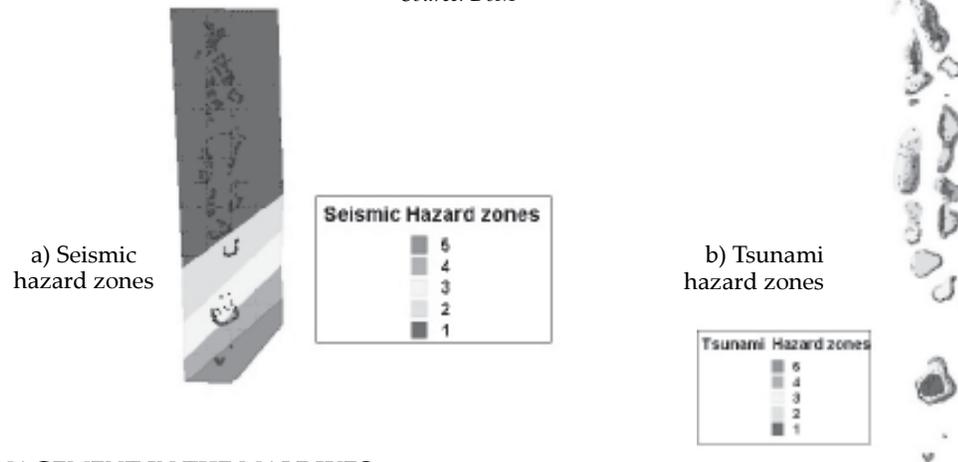
Over 80% of the country's land area has an elevation of less than 1 m above mean sea level, and is at risk from projected sea level rise due to climate change. Growth of coral reefs offer protection for the islands, but projected higher sea surface temperatures would cause coral bleaching and threaten their survival.

Based on the Department of Meteorology (DoM)'s tsunami numerical modeling work the lead times available from information from each potential tsunami source as follows:

- Makran fault – about 2.5 hours lead time
- Near Carlsburg Ridge – 1 hour lead time
- Sumatra – 3-4 hours lead time

Figure 1. a) Seismic hazard zones and b) Tsunami hazard zones, Maldives

Source: DoM



## DISASTER MANAGEMENT IN THE MALDIVES

The National Disaster Management Centre (NDMC) is a newly created government entity, which began as an emergency operations center after the 2004 tsunami, with functions in search and rescue, relief, temporary shelter of internally displaced people, and reconstruction and rehabilitation.

The national disaster management act and plan were recently drafted, with support from the UN Development Programme (UNDP). The proposed disaster management framework consists of the National Council for Disaster Management, to be chaired by the country's President; the NDMC, tasked to develop and implement programs in all aspects of disaster management, develop the national disaster management plan and guidelines, formulate the national emergency operations plan, coordinate implementation of sectoral plans, mobilize resources, and develop partnerships for disaster reduction; and the National Emergency Operations Centre (NEOC), which will be activated when a disaster warning is issued until the state of emergency is over.

NDMC is still on the process of establishing an early warning and emergency communication system. Several capacity building activities have been completed, including two national training workshops on the basic concepts of disaster risk management, community-based disaster preparedness planning exercises in several islands, island-level first aid training programs, and an island-level evacuation exercise (at V. Felidhoo as pilot site).

## NATIONAL TSUNAMI EARLY WARNING FRAMEWORK OF THE MALDIVES

The National Tsunami Early Warning Framework of the Government of Maldives comprises of the following elements:

1. Assessment of Tsunami Hazard and Risks
2. Monitoring and Warning Service
3. Warning Dissemination and Communication
4. Response Capability

### The planned activities under each element are as below:

|  |   |
|--|---|
| <b>Assessment of Tsunami Hazard and Risks</b>  | <ul style="list-style-type: none"> <li>• Undertake vulnerability assessment</li> <li>• Develop capacity for disaster risk assessment</li> <li>• Collect topographic and bathymetric information for inundation mapping and risk evaluation</li> <li>• Develop Geographic Information System as decision support tools display hazards, inundation and evacuation maps</li> </ul>                                    |
| <b>Tsunami Monitoring and Warning Services</b> | <ul style="list-style-type: none"> <li>• Establish and strengthen the Tsunami Warning Services</li> <li>• Continuously monitor for large submarine earthquakes that have the potential to generate tsunamis</li> <li>• Monitor sea levels using coastal sea level gauges to confirm tsunami generation,</li> <li>• Provide tsunami wave forecasts when needed to estimate potential impacts along coasts</li> </ul> |
| <b>Warning Dissemination and Communication</b> | <ul style="list-style-type: none"> <li>• Establish an Emergency Operations Centre</li> <li>• Develop Tsunami Response Plans at all levels (national, regional, atoll &amp; island)</li> <li>• Build a robust nationwide telecommunications infrastructure</li> <li>• Conduct regular drills and exercises</li> <li>• Develop education and public awareness programmes</li> </ul>                                   |
| <b>Response Capability</b>                     | <ul style="list-style-type: none"> <li>• Establish pilot community preparedness programmes</li> <li>• Designate a "Tsunami Awareness Day"</li> <li>• Enhance media through training</li> <li>• Include tsunami early warning and preparedness as part of all-hazards disaster preparedness in required school activities and curriculum</li> </ul>  |

## STRENGTHENING THE TSUNAMI EARLY WARNING SYSTEM:

### Objectives and planned activities

#### *Objective 1: Enhancing the Tsunami Warning Services*

- Project: Enhance the Tsunami Warning Services for the establishment of National Tsunami Warning Centre

#### *Objectives 2: Strengthening of the operation of the national warning service*

- Project: Strengthening of operational 24/7 National Tsunami Warning Services through the National Meteorological Services as part of multi-hazard approach to national Warning systems

#### *Objectives 3: Early warning exercise at island level*

- Project: Implement a table-top simulation exercise to test the tsunami early warning system and response plan at national, regional, atoll, and island level.
- Implement an evacuation drill at a regional level to check the readiness of the community and the disaster response plan.

#### *Objective 4: Awareness-raising and education campaign on tsunami impacts*

- Project: Development of School Safety and Disaster Management Plan and Provide Disaster Education for Students, Teachers and Parents.
- Creating awareness on tsunami early warning and responses to media and to use the mass media for its dissemination.
- Enhance community preparedness for natural hazards through participatory process

#### *Objective 5: Assessment of environmental flashpoints in early warning system*

- Projects: Build the capacity for the development of environmental risk reduction platforms in national multi hazard early warning system
- Assessment of the critical environmental risk and vulnerability for coastal hazards for enhancing the risk knowledge for the tsunami early warning system.

#### *Objective 6: Development of sustainable early warning system*

- Projects: Establishment of a Geographic Information System to integrate Risk Assessment and Monitoring for Enhancing Disaster Preparedness.
- Building technical capacity for disaster assessment and disaster risk reduction.
- Developing a sustainable end-to-end tsunami warning and response system establishing a reliable telecommunication back bone to support an end to end tsunami warning system in the Maldives

## DISASTER RISK COMMUNICATION IN THE MALDIVES

The National Meteorological Center (NMC) of the Department of Meteorology is responsible for the monitoring of meteorological and seismic activity that may affect the country, and accordingly inform concerned authorities. The National Meteorological Centre provides warnings on Undersea/Inland Earthquakes that may create a tsunami, tropical cyclones, heavy rain, gale force wind, tornado, storm surges and flood threats.

The NMC uses three alert levels in providing hazard information:

- Alert Level 1 (color code White): Advisory, issued for information
- Alert Level 2 (color code Yellow): Advisory, issued as an alert
- Alert Level 3 (color code Red): Warning, issued with actions required from recipients

National Disaster Management Centre, Maldives Police Service, Maldives National Defense Force, T.V. Maldives, Voice of Maldives, Ministry of Atolls and Development, Ministry of Tourism and Civil Aviation, Ministry of Health, Ministry of Education and Telecommunication Authority of Maldives are some of its recipients.

Information in these alerts for weather, earthquake and tsunami hazards, their dissemination, and recipients are summarized in Table 2

### Participants at the Risk Communication Workshop held in Maldives on 11 June 2006









U.S. and Thailand. Through the upgrade and integration of detection and communications components into the IOTWS, the U.S. team has helped to ensure compatibility among the region's detection and forecast systems.

**National Dissemination and Communication of Warnings**  
The program has undertaken a range of activities to build national disaster management organizations' capacities to receive and disseminate disaster warnings to communities at risk. With USFS, the program has improved the management of disaster warnings in Sri Lanka through the Incident Command System (ICS) program, a disaster management process that helps the government and civil society to coordinate and prioritize action in emergency situations. The Program introduced standard operating procedures and new policies, held several workshops, and led to the designation of a resource center for ICS training. Similarly, the program has supported Thailand's National Disaster Warning Center (NDWC) to initiate a Tsunami Rapid Alert Notification System (TARNS) program, which is helping to strengthen Thailand's national alert system.

#### LOCAL PREPAREDNESS AND MITIGATION

Besides the regional and national level activities the program has also focused attention on the preparedness and mitigation initiatives at the local level. These local initiatives ensure that communities are prepared for potential coastal hazards and have the ability to adequately respond to them. The Coastal Community Resilience (CCR) initiative in particular helps practitioners adopt common benchmarks and best practices for coastal communities in building resilience to tsunamis and other hazards. The Program developed a guidebook on CCR, along with several capacity building exercises for countries, involving government and non-government practitioners, trainers, managers, and so forth. These measures for building local level community resilience have proven to be effective tools for integrated assessment, planning, and implementation of programs related to community development, coastal management, and disaster management.

#### CROSS-CUTTING INITIATIVES

Various cross-cutting activities support the overall effort of developing end-to-end warning system in the region, including the development and implementation of regional exchanges, small grants, consultation workshops, and training. This is critical to increase the regional impact of the US IOTWS Program by seeking to replicate lessons learned and to share best practices within and among the five focus countries. The US IOTWS Program is also providing support to develop the International Tsunami Training Institute with other regional and international academic institution to create and enable an academic and learning environment on the mitigation of tsunamis and other hazards.

*The US IOTWS Program be completed in September 2007. It will continue working with regional partners such as ADPC and others to build capacity to ensure the sustainability of an end-to-end warning system in the region.*



### Early Warning for Avian and Human Influenza

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The need to prepare for outbreaks of highly pathogenic avian influenza (HPAI) in birds and for a possible human influenza pandemic is evident. HPAI is a disease of birds which has been causing considerable negative impacts on livelihoods in Asian communities where HPAI in birds has been detected and the subsequent destruction of flocks has occurred. There have also been 166 human deaths reported to WHO attributed to the H5N1 subtype of HPAI. Public health officials also fear that HPAI has the potential to be the source of the next human pandemic. Early warning systems for avian influenza are founded on a combination of risk communication, surveillance systems for early detection of the virus in birds, others animals and humans, and actions to reduce and control the spread of disease in these populations.

Seasonal human influenza, commonly known as "flu", kills tens of thousands of people each year around the world. However, HPAI is more aggressive than seasonal influenza, as it causes rapid deterioration of health, leading to multiple organ failure, pneumonia, and death. Most cases have occurred in previously healthy children and young adults.

There are three widely recognized prerequisites for a human pandemic, as follows:

- emergence of a new influenza virus (H5N1), to which the general population has little or no immunity;
- a capacity to jump the species barrier and cause severe disease, with high mortality, in humans; and
- transmission from human to human either through the direct mutation of the H5N1 virus or by exchanging genetic material when a person is simultaneously infected with both H5N1 and the human influenza virus.

The first two of these prerequisites have been met by the avian influenza outbreaks in Asia.

Three phases of the evolution of HPAI have already been identified by the United States Centers for Disease Control and Prevention ([www.cdc.gov](http://www.cdc.gov)): Phase 1 resulted in the death and culling of 90 million chickens and identification of 35 human cases in Korea, Vietnam, Thailand, Japan, Cambodia, China, Laos, and Indonesia; and Phase 2 was supported by the evolution of the virus into a more pathogenic form and spread to other species such as pigeons, domestic cats and tigers. Since December 2004, we have entered Phase 3 with serious repercussions. Across Asia, Phase 3 has resulted in millions of birds being killed due to infection and/or culling, and more than 160 human deaths.

An extensive array of international tools and resources to enable countries and organizations to plan for HPAI is available from the Food and Agriculture Organization ([www.fao.org](http://www.fao.org)), World Organization for Animal Health ([www.oie.int](http://www.oie.int)), World Health Organization ([www.who.int](http://www.who.int)) and UNICEF ([www.unicef.org](http://www.unicef.org)). These international organizations are working with Ministries of Agriculture, Ministries of Health, other national Ministries and organizations to build more effective surveillance and monitoring systems based on established epidemiological concepts and new laboratory tests and diagnostic techniques. They are also building response team capacities and conducting education programs among farmers, health professionals and communities to raise awareness of risks and actions which can reduce risks.

The key messages in the risk awareness programs are as follows:

- **Report** unusual sickness/death among poultry, wild birds and other animals immediately to the authorities
- **Separate** poultry species, and from wild birds, new birds and living areas
- **Wash** hands frequently with soap and water
- Prepare, cook and consume poultry safely

The approach to AI risk communication recognizes the existence of multiple target users, diversity of their information needs, and the need for consistent and reinforcing messages from sources. The approach also emphasizes the need for feedback from target users. International non-government organizations, such as the International Rescue Committee and CARE, as well as the Red Cross movement, are working with communities to reduce their risk to HPAI. CARE's risk communication approach, the STOP AI Model, emphasises the following factors:

- community mobilization focusing on the role of communities as agents of change (use of interpersonal and participatory communication, community empowerment)
- effective risk communication which address underlying social and economic factors that shape behaviour, and
- participatory community events, like village meetings, women talks, spraying demonstrations, hand washing demonstrations, community songs and theatre.

Global and national pandemic influenza plans have identified health care facilities as key institutions in the front-line of containment and response strategies for pandemic influenza. The emergence and re-emergence of life-threatening communicable diseases such as severe acute respiratory syndrome (SARS) have highlighted that hospitals and other health care facilities (HCFs) play critical roles in the local and

national response to communicable disease emergencies. The Asian Disaster Preparedness Center (ADPC) is working with WHO to support national efforts to build the capacity of health care facilities to contribute to national surveillance systems and manage communicable disease emergencies of different orders of magnitude from a small number of patients to a widespread pandemic.

Improved methods of surveillance, diagnosis, and treatment, coupled with better standards of sanitation and personal hygiene can limit the spread of infection minimizing the public health problem. Stronger synergies in the region is required to share existing knowledge and experiences for protecting livelihoods, thus hastening the options for programming, and developing and implementing response plans for the current situation and future pandemic scenarios. There are many uncertainties which challenge planning and preparedness for a human influenza pandemic, such as identifying the viral agent of any future pandemic, the place and timing of first cases, the rate of transmission from human to human, and the scale of the impact on human health, communities, economies and the environment. These unknowns require continuing research to understand the epidemiological nature of the virus (science), and anthropological and sociological information (social science) which shape human vulnerabilities, and provide insights for effective risk management strategies.

#### **ADPC CALENDAR FOR REGIONAL TRAINING COURSES 2007**

**CBDRM-15  
Community Based Disaster Risk  
Management  
22 Jan-2 Feb, Bangkok**

**FDRM 8  
Flood Disaster  
Risk Management  
To be announced  
2 weeks, Bangkok**

**DMC-35  
Disaster Management Course  
14 May -1 Jun, Bangkok**

**CBDRM-16  
Community Based Disaster Risk  
Management  
16-27 Jul, Bangkok**

*For more information, contact Training  
Resource Group, [trg@adpc.net](mailto:trg@adpc.net)*



#### **PROMISE Working Group Meeting, 2-4 Oct, Manila**

ADPC's Program for Hydro-Meteorological Disaster Mitigation in Secondary Cities in Asia (PROMISE) had its annual Working Group Meeting (WGM). The meeting covered the status, implementation, and monitoring of PROMISE, and had planning workshops for the second year of the program. Representatives from five country partners and demonstration cities presented status reports on hazard and (participatory) vulnerability assessments conducted so far. Other invited guests provided technical support to country partners. The US Agency for International Development (USAID) country representatives for the five demonstration sites attended the WGM. The PROMISE program is funded by the Office of Foreign Disaster Assistance (OFDA), USAID.

#### **ADPC conducted assessment of Indonesia's disaster risk management policy and institutional framework, 2-13 Oct, Indonesia**

ADPC together with USAID conducted an assessment of Indonesia's disaster risk management policy and institutional framework. The assessment identified gaps and possible interventions through the US Indian Ocean Tsunami Warning System (IOTWS) program. This activity followed the review of existing resources on policies and institutional arrangements in Indonesia, Sri Lanka, and Thailand and was based on a framework developed by ADPC in collaboration with USAID. The results of the study, encapsulated in a paper entitled, "Review of Policies and Institutional Capacity for Early Warning and Disaster Management in Indonesia" will be shared to relevant national authorities.

#### **CCOP-ADPC-NGI planning meeting for preparation of proposal on tsunami risk assessment and mitigation, 4-5 Oct, Bangkok**

The Coordinating Committee for Geoscience Programs in East and Southeast Asia (CCOP), ADPC and the Norwegian Geotechnical Institute (NGI) detailed the proposal on Tsunami Risk Assessment and Mitigation-Phase 2, for submission to the Royal Norwegian Embassy. The meeting was attended by delegates from Indonesia, Philippines, Sri Lanka, and Viet Nam. The project proposal was a follow-on to the project implemented by CCOP, NGI, and Thailand's Department of Mineral Resources in 2005 on "Tsunami Risk Reduction Measures with Focus on Land Use and Rehabilitation".

#### **MOU on Comprehensive Disaster Management Plan (CDMP), 6 Oct, Bangkok**

ADPC signed a Memorandum of Understanding (MOU) with the Bangladesh delegation including representatives of the Ministry of Food and Disaster Management under the Comprehensive Disaster Management Plan (CDMP) in the presence of H.E Mr. Shahed Akhtar, Ambassador of Bangladesh to Thailand.

#### **The RECLAIM agreement, 6 Oct, Bangkok**

The signing of the agreement for implementation of the Regional Capacity Enhancement for Landslide Impact Mitigation (RECLAIM) phase II took place between the Government of Norway, represented by H.E. Mrs. Merete Fjeld Brattested, Ambassador Extraordinary & Plenipotentiary, The Royal Norwegian Embassy and Asian Disaster Preparedness Center represented by Dr. Suvit Yodmani, Executive Director.

ADPC developed the Asian Program for RECLAIM in collaboration with the Norwegian Geo-technical Institute (NGI) to promote dialogue between decision makers and professionals on the theoretical and practical aspects and practices of landslide hazard mitigation in target countries. It is expected that the "at-risk" communities living in landslide hazard prone areas will certainly benefit from these program activities, which are designed to be implemented over three-years involving national partners from Bhutan, India, Indonesia, Nepal, Philippines, Thailand and Sri Lanka.

#### **Ambassadors meeting on the establishment of the End-to-End Multi-Hazard Early Warning System in the Indian Ocean and Southeast Asia, 9 Oct, Bangkok**

ADPC convened a meeting of Ambassadors of Bangladesh, Cambodia, China, Lao PDR, Maldives, Myanmar, Philippines, Sri Lanka, Thailand, and Viet Nam as follow-on to the meeting of early warning national focal points of these countries on regional cooperation on multi-hazard early warning, held in July 2006 in Bangkok. The meeting sought guidance for the implementation of the regional program approved by national focal points in the July 2006 meeting; sought policy support to the recommendations of the July 2006 meeting, in particular to obtain funding support from the UN Regional Tsunami Trust Fund for phase 1 program implementation; and requested Thailand's Ministry of Foreign Affairs to provide periodic program status reports to UNESCO/Intergovernmental Oceanographic Commission (IOC) and the World Meteorological Organization (WMO). For further details on the outcome of the workshop, please visit <http://www.adpc.net/ews06/moupdatesews.htm>.

#### **ADPC conducted workshop under the Flood Forecast Technology for Disaster Preparedness, 15-25 Oct, Bangladesh**

Under the Flood Forecast Technology for Disaster Preparedness in Bangladesh (also known as Climate Forecast Applications in Bangladesh II), ADPC conducted a mission in Dhaka, Bangladesh to verify the flood forecasts issued through the project. The Department of Agriculture Extension, Bangladesh Water Development Board, Disaster Management Bureau, Institute of Water Modeling, Center for Environmental and Geographic Information Services and CARE Bangladesh are the partners in this project. During the mission, demonstration sites for the joint ADPC-FAO project entitled "Livelihood Adaptation to Climate Change" were also visited to evaluate the impacts of adaptation practices.

#### **US Ambassador to Viet Nam visits PROMISE-Viet Nam, 18 Oct**

US Ambassador to Viet Nam, H.E. Michael Marine visited Da Nang City, the demonstration city of PROMISE in Viet Nam. The meeting was opened by Chairman of People Committee of Cam Le Distring, Danang City, followed by its Vice Chairman and Chief of Economic Department. They briefed Ambassador Marine about the geographic condition of Cam Le District as a flood and typhoon hazard prone area,

common hydro-meteorological disasters. ADPC made presentation on PROMISE. The Ambassador visited the wards under the project that were severely affected by typhoon Xangsane.

**Coastal Community Resilience (CCR) reconnaissance field visit and guidebook field testing, 19-24 Oct, Tamil Nadu**  
ADPC team members conducted field testing of the recently developed CCR Guidebook and a reconnaissance field visit to find out the challenges, gaps and needs of coastal community resilience. The team worked on reviewing institutional arrangements, assessing current status, identifying gaps, and challenges in developing overall resilience for the coastal communities. The team carried out discussions with government and nongovernmental organization representatives at state, district and village levels. Discussions were also held with panchayet leaders, local agency representatives, and coastal communities on relevant issues. The mission identified gaps and initiatives needed for developing a comprehensive program on coastal resilience at community level.

**ADPC facilitated first table top simulation exercise for Tsunami Alert Rapid Notification System (TARNS) workshop, 23-25 Oct, Thailand**

ADPC, in collaboration with the US Forest Service (USFS) and the National Oceanic and Atmospheric Administration (NOAA), facilitated the first table top simulation exercise for the Tsunami Alert Rapid Notification System (TARNS) workshop at the National Disaster Warning Center (NDWC) in Thailand. The objective of the meeting was to prepare simulation scenarios for the TARNS workshop in January 2007. The simulation focused on the process of disseminating tsunami warning from tsunami warning providers to national institutions down to the community level.

**Community Self -Reliance and Flood Risk Reduction, Cambodia (ADB TA)**

The ADB funded Technical Assistance on Community Self Reliance and Flood Risk Reduction, implemented by ADPC along with the Department of Hydrology and River Work, Ministry of Water Resources and Meteorology, Cambodia, is currently in its second phase, where two selected NGOs in Cambodia namely Church World Service (CWS) and Chamroen Chiet Khmer (CCK) are implementing a pilot project of 9 months duration starting from July 2006. CWS is implementing the pilot project in 9 villages in 2 districts of Svay Rieng province and CCK is implementing the project in 7 villages in 2 districts of Takeo Province. The NGOs will be carrying out community-based flood preparedness and mitigation works in selected villages using the Community-Based Disaster Risk Reduction Strategy developed by ADPC in the first phase of the project. Regular field visits would be undertaken by the project team of ADPC to monitor and evaluate the progress of pilot projects.

**6th General Assembly of the Asian Seismological Commission and Symposium, 7-10 Nov, Bangkok**

The sixth General Assembly of the Asian Seismological Commission and Symposium on Earthquake and Tsunami Disaster Preparedness and Mitigation in joint collaboration with Asian Seismological Commission (ASC), Thai Meteorological Department (TMD), National Earthquake Committee of Thailand (NECT), Engineering Institute of Thailand (EIT) and ADPC was held in Bangkok.

**6th Meeting of ADPC Regional Consultative Committee, 9-11 Nov, China**

The Sixth Meeting of the ADPC Regional Consultative Committee on Disaster Management (RCC6) was held in Kunming, China, in collaboration with the Government of the People's Republic of China. The meeting was attended by 28 delegates from 21 RCC Member Countries comprising heads of National Disaster Management Offices from Afghanistan, Bangladesh, Bhutan, Brunei, Cambodia, China, India, Jordan, Korea, Lao PDR, Maldives, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Timor Leste and Viet Nam. The meeting was inaugurated by the congratulatory note sent by H.E. HUI Liang-yu, the Vice Premier of the State Council of P.R. China, Chairman of National Commission for Disaster Reduction. The welcome addresses were delivered by H.E. Mr. Kong Chuizhu, Vice Governor, Yunnan Province, P.R. China, H.E. Prof Dr. Krasae Chanawongse, Chairman, ADPC, Board of Trustees and Dr. Bhichit Rattakul, Executive Director a.i., ADPC. In addition 37 observers from regional organizations, UN Agencies, and bilateral and multilateral funding agencies: ADB, AusAID, FAO, SAARC, UN OCHA, UN ISDR, UNDP, USAID/OFDA and IFRC, senior officials from the Government of the People's Republic of China and ADPC partners from China also attended the meeting.

**Flood Emergency Management Strengthening (FEMS) Project, Oct-Dec**

Under the Flood Emergency Management Strengthening project implemented by ADPC in collaboration with Mekong River Commission and GTZ, the following activities took place during this period:

**National Experience Sharing Workshop was held in Phnom Penh on 19 Oct, and in Ho Chi Minh City on 17 Nov. The objectives of the workshops were:**

- To update the national line agencies and other partners on the overall achievements of implementation, since the start of the project;
- To discuss and share with the national line agencies the experiences gained from the project implementation, particularly in the flood preparedness program development and its ground implementation through priority sub-project during the flood season 2006;
- To seek guidance and suggestions on future activities in the remaining period of FEMS.

The Participants of the workshop included:

- The National Mekong Committees
- Representatives from Flood Management & Mitigation Program (FMMP) of MRCS
- Cambodia and Viet Nam National Disaster Management offices
- Provincial Disaster Management committees of target provinces and districts
- Line agencies who have been involved in the FEMS project implementation (e.g., Education, Health, Water Resources Management, Military Operation)
- National Red Cross Societies in Cambodia and Viet Nam and IFRC
- International organisations and Civil Society Organisations (UNDP, WFP, WHO, UNICEF, Oxfam-GB, Care, Save the Children, and GTZ Country Office)

**Enhancing coastal community resilience to natural disasters, 29 Nov-29 Dec, Viet Nam**

ADPC in a mission to Nam Dinh and other project sites in Viet Nam, under the DANIDA-funded "Enhancing

community resilience to natural disasters in Southeast Asia" project, conducted activities, namely 1) accomplishing the site profiling; 2) constitute local working groups; and 3) to carry out training needs assessment. Viet Nam's National Hydrometeorological Service (NHMS) is the primary partner for this workshop.

**ADPC and US IOTWS team members carried out field practicum assessment of the Coastal Community Resilience (CCR) Guidebook in Ranong, 10-16 Dec, Thailand**

A team comprising of ADPC, University of Rhode Island, and the US Indian Ocean Tsunami Warning Program (IOTWS) carried out a field testing of the Coastal Community Resilience (CCR) Guidebook in Thailand and developed a community level rapid assessment using the CCR framework and benchmarks. This activity was carried out in the tsunami-affected province of Ranong, Thailand, in collaboration with USAID's Post-tsunami Sustainable Livelihoods program. Based on the results, the team will refine the guidebook and assessment methodology, which will be used for country-level training on assessing resilience and developing local action plans. The testing included consultations and interviews with local people, key informants, government agencies, and nongovernmental organizations in the Kamphuan sub-district of Ranong.

**ADPC and the US IOTWS team carried out discussion and meetings on Coastal Community Resilience, 18 Dec Jakarta, Indonesia**

A delegation from the US Indian Ocean Tsunami Warning System (IOTWS) Project and ADPC, along with Indonesian project partners, met with various local partners of Coastal Community Resilience (CCR) initiatives in Jakarta. Major Indonesian agencies such International Federation of Red Cross (PMI Indonesia), Mercy Corporation, Save the Children, Islamic Relief, UNESCO Indonesia, IDEP and others also attended the meeting. The team also met with CARE Indonesia and various USAID-funded programs. ADPC presented the status and progress of CCR, discussed the latest work-plan and discussed future CCR initiative. The agencies discussed scope of incorporating the CCR framework in their future activities. Indonesian agencies are interested in participating in the upcoming CCR training in Indonesia and in the follow up regional workshop in late 2007.

**TRAINING & WORKSHOPS**

**ASEAN Regional Disaster Emergency Response Simulation Exercise (ARDEX), Tak Mau City, Kandal Province, 27-28 Sep, Cambodia**

ADPC participated in the ASEAN ARDEX in Tak Mau City, Kandal Province, Cambodia. The exercise was organized by the ASEAN Disaster Management Committee (ACDM), in collaboration with the National Committee on Disaster Management (NCDM). ADPC sponsored five officials from Viet Nam, one from DDMFSC, Viet Nam and two each from the An Giang and Dong Thap Provinces to participate in this exercise under the Flood Emergency Flood Strengthening (FEMS) project. The exercise provided guidance to the ASEAN and its partners to operationalize policy framework on disaster management and emergency response.

**ADPC facilitated national workshop on Coastal Community Resilience (CCR), 9-10 Oct, Colombo**

ADPC facilitated a Coastal Community Resilience (CCR) workshop to promote awareness of the CCR initiatives under the US Indian Ocean Tsunami Early Warning System (IOTWS) program, establish a network for future CCR outreach

activities, and get feedback on the CCR guidebook which is being developed by USAID, ADPC, and other partners. ADPC, the Program Integrator for the IOTWS program, was involved in the coordination of the event. Over 40 government and non-government agencies working in the field of disaster management and coastal management participated in the workshop, including the Ministry of Disaster Management and Human Rights, Disaster Management Center, Coast Conservation Department, International Conservation Union, International Federation of the Red Cross, United Nations Development Program, and various USAID projects.

**Community Based Emergency Response Course (C-BERC), 13-20 Oct, Phuket**

Two batches of community committee members in Phuket, Phang Nga and Krabi joined the C-BERC. The course in collaboration with Department of Disaster Prevention and Mitigation (DDPM), Bangkok conducted training on search and rescue. As part of disaster risk management, the activity, under the UNDP Early Warning Systems (EWS) project developed and improved basic skills in saving life.

**Asia Pacific Meeting on Health Emergencies and Human Resource Development, 17-20 Oct, Manila**

ADPC participated at the "Asia Pacific Meeting on Health Emergencies and Human Resource Development" organized by the World Health Organization.

**Regional Course on Earthquake & Tsunami Vulnerability Reduction, 23 Oct-6 Nov 2006, Bangkok**

A regional course on Earthquake & Tsunami Vulnerability Reduction focusing on the use of Spatial Geodata (EVRC-6) was held in Bangkok in partnership with International Institute for Geo-Information Science and Earth Observation (ITC), Enschede, The Netherlands, Asian Institute of Technology (AIT), ADPC, UNDP and United Nations University (UNU). The course was funded by The Government of Netherlands and UNDP-SSC unit.

The activity was implemented under the project CASITA Phase 2 with funding support from the European Union (EU) and the Government of The Netherlands.

The course shared the outputs of CASITA 2 project with the wider CASITA network universities and institutions established in the first phase of the project.

**CASITA workshop, 4-5 Nov, Bangkok**

Final workshop of the Capacity Building in Asia using Information Technology Applications in Disaster Management (CASITA) Phase 2 Project was held in Bangkok, Thailand. The workshop was jointly organized by the International Institute for Geo-Information Science and Earth Observation (ITC), Enschede, The Netherlands and the Asian Disaster Preparedness Center, Thailand. The activity was implemented under the project CASITA Phase 2 with funding support from the European Union (EU) and the Government of The Netherlands.

Outputs of CASITA 2 project were shared. Effectiveness of distance education program and strategies for sustainability were discussed with the wider CASITA network universities and institutions, established in the first phase of the project.

**34<sup>th</sup> Regional course on Disaster Management (DMC-34), 6-24 Nov, Bangkok**

ADPC conducted its regional disaster management course (DMC-34) providing comprehensive disaster management

knowledge and skills to enhance the capabilities of executive managers with key disaster management responsibilities. Participants were encouraged to develop skills and to adopt proactive attitudes through participation in interactive lectures and reflection on a range of key issues raised during discussions and practical activities. The next DMC-35 is scheduled in May 2007. For more information, please contact [adpc@adpc.net](mailto:adpc@adpc.net).

**ADPC and US agencies conducted trainings on applying Incident Command System (ICS) in disaster management, 7-18 Nov, Sri Lanka**

ADPC, together with the US Department of Agriculture and US Forest Service, conducted a series of trainings for Sri Lankan officials on applying the Incident Command System (ICS) in disaster response. The training courses were conducted under the auspices of the United States Indian Ocean Tsunami Warning System (IOTWS) program. Around 25 senior government officials from 20 government agencies participated in the training courses, namely ICS Finance/Admin Section Chief Course, ICS Logistic Section Chief Course, ICS Operation Section Chief Course, ICS Incident Commander Course.

**Workshop on "Earthquake vulnerability and Multi-hazard risk assessment", 13-24 Nov, Pakistan**

ADPC participated at the National Center of Excellence in Geology of Pakistan (NCEG-P) in Peshawar, Pakistan. The workshop was organized by NCEG-P, ITC, the Netherlands, ADPC, supported by European Commission Humanitarian, Aid Department.

**First local Climate Forum held in Iloilo, Philippines**

The Climate Forecast Applications (CFA) program initiated the process of holding a regular Climate Forum in Iloilo Province, Philippines in order to institutionalize a dialogue between PAGASA and climate forecast users at the provincial and local level. The first local Climate Forum was convened on 15 Nov 2006 by the Iloilo Provincial Government through the Provincial Agriculture Office (PAO). The forum was attended by 35 participants representing municipal, regional and provincial-level agencies. Representatives from national-level agencies namely PAGASA and the Department of Agriculture's Bureau of Agricultural Statistics (BAS) served as resource persons. The Forum is intended to ensure that the forecast products provided by PAGASA, including their inherent uncertainties are understood and communicated to users in a timely manner. The Forum also provided a venue for forecast users to give feedback on the relevance and applicability of PAGASA's forecast products in managing climate-associated risks in various sectors.

**Disaster preparedness and response training course, 15-27 Nov, Banda Aceh, Indonesia**

ADPC contracted by the German Red Cross conducted a prototype training course on Disaster Preparedness and Response in Public Health Districts in the Aceh Province, Indonesia, with funding from GTZ. The training developed and improved the capacities of public health authorities (provincial and district levels) to prepare for and respond to disasters and emergency situations. ADPC is also developing a standard training module on Disaster Preparedness and Response Planning in Health Emergencies.

**Workshop on Phuket tourism risk management strategy, 21 Nov, Thailand**

A half day workshop on "Phuket Tourism Risk Management Strategy" was held in Phuket, Thailand. The workshop was

jointly organized by APEC International Centre for Sustainable Tourism (AICST), Department of Industry, Tourism and Resources and ADPC with funding support from AusAID. This was the third in a series of workshop organized to develop a Tourism Risk Management Strategy in Phuket.

The workshop participants were Thai Government Officials from the Ministry of Tourism and Sports and representatives from the tourism industry and the private sector. Prior to the workshop, a draft framework of the strategy was prepared and shared with all Tourism Authority of Thailand (ToT) members for discussion at the workshop. Based on the inputs received from the participants, the strategy will be finalized before the fourth workshop, to take place in early 2007.

**Capacity and Institutional Development for Disaster Risk Management in Indonesia (CID), 25 Nov-15 Dec, Indonesia**

ADPC contracted by InWent and AGEG Germany, organized four workshops in Indonesia; commissioned by the German Ministry of Economic Cooperation and Development (BMZ). The workshops, namely "Risk Assessment", "Disaster risk communication & information flow activities", "Developing guidelines for risk assessment", and "Integrating Disaster Risk Management into other planning" strengthened organizational and professional capacities of relevant institutions of disaster risk management in Indonesia; enhance decision makers knowledge about new concepts in disaster risk management and to implement them in planning concepts of their own institutions accordingly.

**ADPC convened workshop on "Enhancing Coastal Community Resilience to Natural Disasters in Viet Nam", 26-28 Nov**

Under the Enhancing Community Resilience to Natural Disasters in Southeast Asia project, ADPC convened a workshop in Nam Dinh Province. The workshop: 1) presented information on proposed demonstration sites and the impacts, lessons learned from the last episode of typhoons & floods; 2) identified key activities for the implementation plan based on the experiences of the last major occurrence of coastal disaster; 3) discussed the different components of the project implementation plan; and 4) elicited strategic project implementation guidance from the key stakeholders. Viet Nam's National Hydrometeorological Service (NHMS) is the primary partner for this workshop. The project is funded by the Danish International Development Agency (DANIDA). A compilation of papers presented at the workshop is available in ADPC library.

**Flood Forecast Technology for Disaster Preparedness Workshop, 3-4 Dec, Dhaka**

In connection with the "Flood Forecast Technology for Disaster Preparedness" project in Bangladesh, a project-wide workshop was conducted to share the results and experiences of the work carried out from June to November 2006 primarily during the monsoon season. About 40 participants from all implementing institutions and stakeholder organizations attended the workshop. Participants reviewed the status of the project and the three-tier forecasts system, including the status of its integration into the flood forecasting and warning system in Bangladesh. At the end of the workshop, participants agreed on the next steps and procedures for transferring the new forecasting technology to Bangladesh as well as future training programs on three-tier flood forecast technology and forecast applications. The project is implemented by ADPC and Climate Forecast Application Network, Georgia Institute of Technology, Atlanta, USA in

partnership with Institute of Water Modelling (IWM) and Centre for Environmental and Geographic Information Services (CEGIS), Dhaka, Bangladesh. It is supported by the United States Agency for International Development (USAID), Dhaka through CARE-Bangladesh.

**Workshop under ProVention-Consortium Applied Research Grant Phase II; 6-8 Dec, Bangkok**

Under the ProVention Consortium Applied Research Grant Phase II, a workshop on ‘Innovative Initiatives in Disaster Reduction Applied Research by young professionals’ in South, South East & East Asia was held on 6-8 December, 2006 in Bangkok.

The event provided the grantees opportunity to meet and share among themselves and interested audiences the experiences in conducting research work in their countries and present the applied research results. The event was also a forum for discussing further work by grantees and possible ways in which ProVention Consortium and ADPC can assist with dissemination of results and follow up actions.

**4th International course on Hospital Emergency Preparedness and Response (HEPR-4), 4-8 Dec, Bangkok**

ADPC organized the HEPR course to assist health personnel, both administrative and medical, to prepare health care facilities and personnel to respond effectively to internal or community emergencies that involve large numbers of casualties. This would enable hospitals and health facilities in general to develop well designed facility-specific plans to increase their ability to respond to emergencies.

The participants from Malaysia, Mongolia, Sri Lanka, Hong Kong and South Africa were hospital staff, health care facility managers and administrators, who are responsible for hospital emergency planning, or and any emergencies involving mass casualties that require the major resources of a hospital.

**ADPC convened a workshop on climate forecast applications for Managing Climate Risks in Agriculture, 11-12 Dec, Philippines**

Under the ‘Climate Forecast Applications (CFA) for Disaster Mitigation’ program, ADPC convened a workshop on ‘Climate Forecast Applications for Managing Climate Risks in Agriculture’. The workshop, hosted by the Municipality of Dumangas, Iloilo Province, Philippines, was convened in order to 1) share experiences between the demonstration sites in Dumangas, Philippines and Indramayu, Indonesia, and allow for cross-fertilization of good practices and lessons on reducing climate risks to small-holder agricultural systems; 2) broaden program implementation by identifying opportunities and developing plans of action to replicate the methodology and tools in other municipalities of Iloilo and Antique provinces and mainstream climate forecast application in development planning at municipal and provincial levels; and 3) advocate for the replication of methodology and tools nationally. The workshop brought together 82 participants from the Philippines and Indonesia. Participants from the Philippines formulated plans detailing how they will go about implementing climate risk management initiatives in their areas using the experiences of CFA demonstration sites. The workshop report will be soon available at the Climate Risk Management website: <http://www.adpc.net/crm06/crm.html>.

**ADPC participated in ITU/ESCAP regional workshop on disaster communications, 12-15 Dec, Bangkok**

ADPC participated in a regional workshop on disaster communications sponsored jointly by the International Telecommunications Union (ITU) and the UN Environmental and Social Commission in the Asia and Pacific (UNESCAP). ADPC shared its regional experience on emergency communication system and in helping institutionalize the Tsunami Alert Rapid Notification System (TARNs) in Thailand through the US Indian Ocean Tsunami Warning System Program (IOTWS). The workshop was attended by 135 participants from government, non-governmental organizations, and private corporations from 32 countries. The meeting adopted seven recommendations for strengthening emergency communication for disaster management.

**Risk Assessment course in Gorno GBAO, 16 - 22 Oct, Tajikistan**

A seven day extensive course on ‘Risk assessment’ was conducted in Gorno, Tajikistan. The course was organized in partnership with Focus Humanitarian Assistance, Tajikistan.

**Workshops on Typhoon and Flood-Resistant Construction, 29 Nov- 1 Dec, Viet Nam**

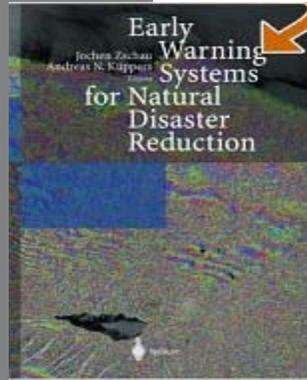
PROMISE-Viet Nam held two workshops on Typhoon and Flood-Resistant Construction Techniques. The first was a workshop on construction techniques resistant to natural disasters for more than 60 participants from city-level government departments and professionals involved mostly in urban planning and building construction. The second was a training class on house reinforcement techniques in Dong No section of the Hoa Xuan wad, one of the most seriously hit area where 63 of 66 houses were damaged by the typhoon. Participants invited were mainly the local masons and community who shared the experiences and lessons learnt from the good building practices. Training methods included presentations of principles, field visits to identify examples of well-built and poorly-built housing, and group exercises to apply the principles. Resource persons gave helpful comments on how to improve the models that the participants developed during group exercises. PROMISE is funded by the Office of US Foreign Disaster Assistance (OFDA) under the US Agency for International Development.

**Damage and loss estimation workshop, 19-21 Dec, Bangladesh**

ADPC organized a workshop on damage and loss estimation in Dhaka, Bangladesh. Participants were from government departments and NGOs that encounter disaster risks of damage and loss-infrastructure, agriculture, industries, fisheries, tourism, health, education, housing, water, telecommunications. The workshop was conducted in collaboration with the Bangladesh University of Engineering and Technology (BUET). The other collaborative partners were Comprehensive Disaster Management Programme-Bangladesh (CDMP), BRAC University, Bangladesh Disaster Preparedness Centre (BDPC), and CARE-Bangladesh. The workshop was organized with the funding support from the Netherlands Development Organization (SNV) ‘Technical Assistance for Tsunami-affected Countries in Asia.’

B

Bookmark



### EARLY WARNING SYSTEMS FOR NATURAL DISASTER REDUCTION

by Jochen Zschau (Editor), Andreas N. Koppers (Editor)

This book offers a comprehensive account of early warning systems developed for hydro-meteorological disasters such as floods, storms, etc. and for geological disasters such as earthquakes, volcanic activity or mountain hazards. One major theme is the increasingly important role in early warning systems played by the rapidly evolving fields of space and information technology. Based on 109 selected contributions by outstanding experts in the relevant scientific and technical fields, presented at the International IDNDR Conference: Early Warning Systems for Natural Disaster Reduction (EWC8) at the GeoForschungsZentrum, Potsdam, Germany, the authors offer a comprehensive overview and in-depth insight into the state of the art and future perspectives for early warning systems. This book is intended for decision-makers in the political arena, scientists, engineers and those responsible for public communication and dissemination of warnings. Offers a comprehensive account of early warning systems developed for hydro-meteorological disasters such as floods, storms, etc. and for geological disasters such as earthquakes, volcanic activity or mountain hazards. <http://www.amazon.com/Warning-Systems-Natural-Disaster-Reduction/dp/3540679626>

#### Final Version of the Global Survey of Early Warning Systems

The publication provides an assessment of capacities, gaps and opportunities toward building a comprehensive global early warning system for all natural hazards.

#### Developing Early Warning Systems: A Checklist

The checklist is an outcome document of the EWC III. It is generated to help governments and communities implement people-centred early warning systems. The checklist is translated into 19 Indian Ocean languages. ([www.ewc3.org](http://www.ewc3.org))

**Early Warning – From concept to action: the Conclusions of the Third International Conference on Early Warning.** ([www.ewc3.org](http://www.ewc3.org))

I

information resources

#### Early warning - Humanitarian and natural disasters

UN Humanitarian Early Warning Service (HEWSweb)  
[http://www.hewsweb.org/home\\_page/default.asp](http://www.hewsweb.org/home_page/default.asp)

Famine Early Warning System (USAID)  
<http://www.fews.net/>

Respond  
<http://respond-int.org/Respond/>

Centre of Excellence in Disaster Management and Humanitarian Affairs (DMHA)  
<http://www.coe-dmha.org/infoman.htm>

AlertNet  
<http://www.alertnet.org/>

GDACS  
<http://www.gdacs.org/>

Free alert system subscription  
<http://www.gdacs.org/subscription.asp>

ProVention Consortium  
<http://www.proventionconsortium.org/>

#### Natural Disaster Early Warning Sites:

Relief Web  
<http://www.reliefweb.int/resources/ewarn.html#natural>

Tropical Storm Watch  
<http://www.reliefweb.int/resources/storm.html>

El Nino Resources  
<http://www.coaps.fsu.edu/lib/elninolinks/themes>

Famine Early Warning System Network (FEWS NET) <http://www.fews.net/>

Global Information and Early Warning System (GIEWS)  
<http://www.fao.org/waicent/faoinfo/economic/giews/english/giewse.htm>

Desert Locust Information Service (DLIS)  
<http://www.fao.org/NEWS/GLOBAL/locusts/locuhome.htm>

HazardNet  
<http://hoshi.cic.sfu.ca/hazard/>

UNEP: <http://www.grid.unep.ch/activities/earlywarning/resource.php>

#### Background Literature on Early Warning

ADPC  
<http://www.adpc.net/ews06/>

UNISDR  
<http://www.unisdr.org/ppew/>

The Possible Contribution of AI to the Avoidance of Crises and Wars: Bibliography

<http://www.ai.univie.ac.at/oeffai/peace/peace-lit.html> (Site link does not work)

The Warning-Response Problem and Missed Opportunities in Preventive Diplomacy References and Notes

<http://www.ccpdc.org/pubs/warning/warningnotes.htm> (Site link does not work)

Workshop on Conflict and Peace Analysis

<http://www.bsos.umd.edu/cidcm/classes/gvpt409a/seminars98.htm> (Site link does not work)

Planning Integrated Responses to Early Warning (August 2000)

[www.reliefweb.int/resources/ewarn.html](http://www.reliefweb.int/resources/ewarn.html)

Conflict and Peace Analysis/Response Manual (Second Edition) July 1999

[www.reliefweb.int/resources/ewarn.html](http://www.reliefweb.int/resources/ewarn.html)

Early Warning Methodology Review (Norman Paterson School of International Affairs) (July 2000)

[www.reliefweb.int/resources/ewarn.html](http://www.reliefweb.int/resources/ewarn.html)

enhancing ownership of CBDRM programs by developing the capacities of local authorities and promoting CBDRM through Disaster Management Practitioners Forum. *For more information on the project, please contact [mahnin@adpc.net](mailto:mahnin@adpc.net)*

**MRC-ADPC project on "Support to Implementation of Flood Preparedness Programs at Provincial, District and Commune Levels in the Lower Mekong Basin (Phase III)"**

This project is the sub component of Flood Emergency Management Strengthening (FEMS), Component 4 of the Mekong River Commission (MRC) Flood Management and Mitigation Program (FMMP). Building on the experiences of the last three phases since 2003 and working with the Mekong River Commission through its National Mekong Committees and the National Disaster Management Offices, the phase III project aims to enhance capacities of province district and commune level Disaster Management (DM) committees in preparation and implementation of Flood Preparedness Programs in the three target countries (Cambodia, Lao PDR and Vietnam) covering three provinces and seven districts. The activities includes supporting the provincial, district and commune authorities to prepare Flood Preparedness Programs and implementation of the priority activities such as the School Flood Safety, Improvement in Safe Area and Improvement in Emergency Kindergarten Management (EKM) etc. *For more information on the project, please contact [aslam@adpc.net](mailto:aslam@adpc.net)*

**UNDP-ADPC project on "Mainstreaming Disaster Risk Reduction into Education sector"**

Under the wider Regional Consultative Committee Program on Mainstreaming Disaster Risk Reduction into Development Policy, Planning and Implementation in Asia (RCC MDRD), this project in partnership with UNDP is to support implementation of Hyogo Framework for Action through Mainstreaming of Disaster Risk Reduction into the Education Sector in the Cambodia, Lao PDR and Philippines. Working with the Ministry of Education and National Disaster Management Offices (NDMOs) of the project countries, the project would undertake the following activities; initiating Mainstreaming of Disaster Risk Reduction into Secondary School Curriculum, Research on impacts of past Disasters on Education Sector, Advocacy Workshop on Mainstreaming Disaster Risk Reduction into Education Sector and Stakeholder consultation as follow up to the Advocacy workshop. *For more information on the project, please contact [arghya@adpc.net](mailto:arghya@adpc.net)*

#### ADPC INVITES DISASTER INFORMATION

ADPC would like to highlight activities, initiatives, projects, studies, good practices and publications on various aspects of disaster management from disaster practitioners & organizations in the Asia and Pacific region. The information received will be highlighted in the ADPC website, thus facilitating effective information sharing at the local, national and regional level. We look forward to receiving your contributions.

*Information & Knowledge Management Unit, ADPC  
email: [roopa@adpc.net](mailto:roopa@adpc.net), [adpc@adpc.net](mailto:adpc@adpc.net)*



Announcements

**Asian Disaster Preparedness Centre (ADPC) partners with UNESCAP, MRC and UNDP to implement three regional projects under the DIPECHO 5<sup>th</sup> Action Plan for South East Asia funded by the European Commission Humanitarian Aid Office (ECHO)**

ADPC will be implementing three separate projects during 2007-2008 in collaboration with UNESCAP, Mekong River Commission (Flood Preparedness Program Phase III) and UNDP (MDRD into Education). The details of the projects are;

**UNESCAP-ADPC project on "Partnerships for Disaster Reduction South East Asia Phase 4 (PDR-SEA 4)"**

PDR-SEA is a multi-phased project being implemented in Southeast Asian countries since 2001. The Phase 4 project, from February 2007 until April 2008, aims to enhance the effectiveness of institutionalization of Community Based Disaster Risk Management (CBDRM) into socio-economic development process through strengthening of national and local capacity for the implementation of Hyogo Framework of Action (HFA) to build up community resilience in the project countries of Cambodia, Indonesia, Philippines, and Viet Nam. The project will be implemented in close cooperation with the National Disaster Management office of these countries. The project activities involve strengthening and institutionalizing CBDRM through pilot local-level activities, facilitating information dissemination through existing regional and national disaster risk management networks,

## End-to-End Early Warning System and Preparedness for Tsunamis and Other Natural Hazards in Southern Thailand



On 29 July 2005, the United Nations Development Programme (UNDP) signed an agreement with the Asian Disaster Preparedness Center (ADPC) for the implementation of the "End-to-End Early Warning System and Preparedness for Tsunamis and Other Natural Hazards in Southern Thailand (EWSP Project)", which it is funding. The objective of the EWSP project is to support the implementation of an end-to-end early warning system for tsunamis and other disasters in Thailand, in response to the Government of Thailand's needs in the execution of its disaster risk reduction responsibilities and initiatives to address tsunami threats in the six tsunami-affected provinces in Southern Thailand. This end-to-end, multi-hazard approach encompasses technical elements, institutional disaster management capacities, community preparedness, and information management integration, a public awareness program, a disaster risk management information system and other related activities that result from lessons learned and needs identified as a result of the initial activities.

This project resulted from a series of meetings held between the Department of Disaster Prevention and Mitigation (DDPM), ADPC and UNDP, when needs identified by DDPM were discussed. On 5 July 2005, ADPC submitted a final technical proposal to UNDP entitled "End-to-End Early Warning System and Preparedness for Tsunamis and Other Natural Hazards in Southern Thailand".

The two key activities to be implemented by the Asian Disaster Preparedness Center (ADPC) of the "End-to-End Early Warning System and Preparedness for Tsunamis and Other Natural Hazards in Southern Thailand (EWSP Project)" have been approved by UNDP as follows:

1. Establishment of Sea Level Gauge Stations for the National Early Warning System; and
2. Enhancement of institutional disaster management capacities and community preparedness.

### Community Based Disaster Risk Management and Preparedness

This component of the EWSP Project is a sub-activity of the second key activity which will prepare the targeted communities for disasters by using a multi-hazard Community Based Disaster Risk Management (CBDRM) approach to involve the participation and cooperation of the people in the communities. The CBDRM approach is a key process for enhancing and building the capacity of community stakeholders through becoming involved and participating in developing safer societies through mitigating disaster reduction measures and better preparedness. Community leaders, community representatives, heads of local working groups, civil defence volunteers, local governmental organizations, local disaster-related NGOs will be identified by DDPM to participate in this CBDRM approach.

At-risk-communities (e.g., neighbourhoods, schools, villages, businesses, industries, etc.) are the principal root-beneficiaries of this programme. National and local government authorities, which are responsible for disaster mitigation, will benefit from both training and participation in these activities. CBDRM will be implemented in the following three provinces in the communities that were affected by the 26 December 2004 tsunami, as identified by DDPM.

- Phuket province: Kamala Beach, Paklok
- Phang-Nga province: Ban Nam Khem, Bang Neang, Koh Yao Yai
- Krabi province: Moo7, 8, Phi Phi Island
- Trang: Baan Leamnakham
- Suratthani: Chaiya, Nambak
- Nakhonsithammarat: Khamklone, Baan Khaophangkai
- Chumporn: Thasae
- Prachuabkirikhan: Bangsaphan, Pranburi
- Petchaburi: Huai Maepreang, Khao Krapuk



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Theme for the next issue of the  
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**Emergency Communication  
for Disaster Management**