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SPECIAL SESSION ON DISASTER MANAGEMENT

23 November 2009

IGU UGI

International Geographical Union (IGU)

Chairs: **Dr. Shigeko Haruyama**
International Geographical Union (IGU)

Dr. Cherdsak Virapat
Executive Director
International Ocean Institute

The East Asian Seas Congress 2009

"Partnerships at Work: Local Implementation and Good Practices"

Manila, Philippines
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INTRODUCTION

The special session on disaster management tackled two main topics, the Science and Technology for Marine Disaster Prevention and Management and Good Governance on Disaster Management.

The special session was chaired by Dr. Shigeko Haruyama from the International Geographical Union (IGU) and Dr. Cherdsak Virapat, Executive Director of the International Ocean Institute (IOI).

An introduction of the session was delivered by the Chair. Dr. Haruyama explained that disaster management is becoming more important in light of the recent natural disasters that resulted in damages in the region. She reiterated that the East Asian Seas region is vulnerable to the impact of climate change, in particular coastal communities and small islands.

Further, she explained that the importance of knowing how to prepare and respond to disasters has also led to the evolution of disaster management from an almost ad-hoc response to nature's disturbances to a holistic system of preventing and mitigating risks and adaptation. New ways of addressing disasters have taken advantage of the advances in information and communication technology. It has also integrated various disciplines and concerns including stakeholder involvement, governance and policy issues at the local and

national level and the threat of climate change, which puts a global perspective on an otherwise local concern.

Dr. Haruyama also provided some information on the IGU Hazard and Risk Commission which has the mandate on improving links with related agencies working on the geographical approach to hazard and risk. The Commission works to promote further collective engagement in research projects with these organizations. The aim is to research and publish studies on the approach for mitigation such as on GIS technology and landscape studies.

The specific objectives of the special session are to:

- Take stock of available resources that can be optimized to create a more effective disaster management framework with due consideration to the unique settings of each locality/country.
- Assess the effectiveness and determine the value of applying science and technology as a tool for disaster management.
- Share information on the new ways of collaborating among various sectors of the society.

PART 1: SCIENCE AND TECHNOLOGY FOR MARINE DISASTER PREVENTION AND MANAGEMENT

Development of a Decision Support System (DSS) for Environment Protection in Cases of Marine Incidents

Dr. Mladineo Nenad, University of Split, Croatia

Dr. Nenad presented on the development of effective DSS for defining the places of refuge (PoRs) for ships in distress at sea, with special concern on environment protection. He showed a program simulating some scenarios wherein a multi-criteria approach was applied as a DSS for defining the PoR. The Croatian coast is very indented with more than 1,000 islands and, at the same time, the Adriatic Sea hosts a lot of tankers. The issue of "places of refuge" is one aspect of contingency planning. It considers the rights and interests of coastal states, such as Croatia, and the need to render assistance to vessels that are damaged or disabled or otherwise in distress at sea. This situation brought out a need for an efficient system for granting access to a place of refuge, which could involve a political decision that can only be taken on a case-to-case basis with due consideration on all possible consequences. In so doing, consideration would need to be given to balancing the interests of the affected ship with those of the environment.

In November 2003, the International Maritime Organization (IMO) Assembly adopted two resolutions (guidelines) addressing the issue of places of refuge for ships in distress — an important step in assisting those involved in incidents to make the right decisions at the right time. The guidelines recognize that, when a ship has suffered an incident, the best way of preventing damage or pollution from its progressive deterioration is to transfer its cargo and bunkers, and to repair the casualty. Such an operation is best carried out in a place of refuge. However, to bring such a ship into a place of refuge near a coast may endanger the

coastal State, both economically and from an environmental point of view, and local authorities and populations may strongly object to the operation. In order to make a decision process that is as efficient as possible, a GIS-based DSS is defined. Such DSS contains all relevant data necessary for an environmentally and socially sound risk assessment. Multi-criteria analysis, with GIS-generated input data, would be used to establish worthiness of a place of refuge for each ship category, taking into account kind of accident. Tables of available intervention resources would be made, as well as analysis of their availability in respect to response time, and quantitative and qualitative sufficiency. Integrated GIS support with data on both coastal and sea characteristics (including a 3D model of the coast with 3D bathymetry) enables pre-identification of places of refuge that greatly enhances the saving of life at sea and pollution prevention. Dr. Nenad informed the participants that Croatia is the first country to have an integrated system and expected to apply the same technology in the East Asian seas region.

Experimental Research on the Development of Inorganic Coagulant for the Removal of Wreck Oil by Oil Spill Accident
Prof. Kenji Hotta, Nihon University, Japan

Prof. Hotta presented his research findings which used the oil spill incident in Guimaras Island in the Philippines as a study site. The purpose of the study was to examine the removal effects of inorganic coagulant on attached oil and to examine the effect of bio-stimulation method in combination with the coagulant. The experiment led to the conclusion that the cleanup effects of bio-stimulation on heavy oil after solidification showed that Total Petroleum Hydrocarbons (TPH) was decomposed by up to 80 percent during the first three weeks, demonstrating that solidified heavy oil decomposes as much as ordinary heavy oil. Solidification reduces the initial TPH level by more than half. Therefore, the TPH level in solidified heavy oil goes below 1,000 mg/kg a week earlier than in unsolidified heavy oil, shortening cleanup periods. Prof. Hotta's presentation showed that the coagulant was effective in removing wreck oil although the coagulant is not yet available commercially.

The Oil Spill Site in Guimaras Island.

Prevention and Management against Marine Disasters in China
Mr. Li Jun, China Institute for Marine Affairs (CIMA)

Mr. Li Jun emphasized that disaster prevention and management is a complicated natural-economical-social system. Mr. Li noted that in 2008, there were about 134 times marine disasters, including storm tide, ocean wave, sea ice disasters, red tide and other types of marine disasters. These marine disasters caused direct economic losses of about 20.6 billion Yuan and led to 152 deaths. The Chinese government attaches great importance to the prevention and management against marine disasters, seeking to establish and improve the marine disaster warning system and emergency management. In order to reduce the losses incurred in marine disasters, a marine environment detection and ocean disasters observing and forecasting system was built, relying on marine observing technological development. With regard to marine disaster observing, forecasting and management system including forecasting, emergency response and management mechanisms, the importance of several activities were pointed out. These include: (1) setting up the strategic concept of natural disaster reduction through science and technology; (2) reinforcing marine disasters monitoring; (3) strengthening marine disaster forecasting and warning; (4) strengthening the studies on science and technology of marine disasters; (5) enhancing investigation, evaluation and analysis of marine disasters; and (6) developing some products related to disasters reduction technology.

PART 2: GOOD GOVERNANCE ON DISASTER MANAGEMENT

Partnership Building for Mitigation of Disaster

Dr. Shigeko Haruyama

Dr. Haruyama reported on the recent floods that occurred in the region, the lessons learned from historical flooding and how to mitigate disasters. She also emphasized the importance of partnerships. Among the recent floodings that occurred are the Mekong floodings and Tokai flood disaster that was caused by a dike break in the Nagoya urban area. In 2004, there was also a huge-scale flood disaster in Japan. The Tokai flooding posted the largest economic loss in the last 40 years. Dr. Haruyama noted that vulnerability is a function of both hazards and risks.

Flood and Sediment Management in the Philippines

Mr. Minoru Kamoto, Japan International Cooperation Agency (JICA)

Mr. Kamoto noted that in the Philippines, serious damages were caused by flood and debris flow which occurs frequently in various places every year. From January 2000 to December 2008, there were over 8,000 casualties and 38 million people affected by storms and floods. To cope with the economic burden of disaster, the Philippine government relies significantly on the assistance provided by foreign countries, particularly, Japan. Efficient and effective implementation of flood and sediment management is extremely important. Mr. Kamoto provided an overall background on the history of flood control in the Philippines noting that the first study was undertaken after the flood in November 1942. Other notable studies include the study for the Paranaque Spillway and Pasig River Cut-off in 1975 (Development of Laguna Lake was done by The World Bank), the 1984 World Bank – Metro Manila Integrated Urban Drainage and Flood Control Master Plan and the 1988-1990 JICA Study on Flood Control and Drainage Project in Metro Manila Priority Areas. Dr. Kamoto emphasized that more can be done if more importance is placed on flood and sediment management with proper assessment and judgment of the current conditions and problems faced.

Development of Participatory Risk Communication Method using Disaster Risk Scenario

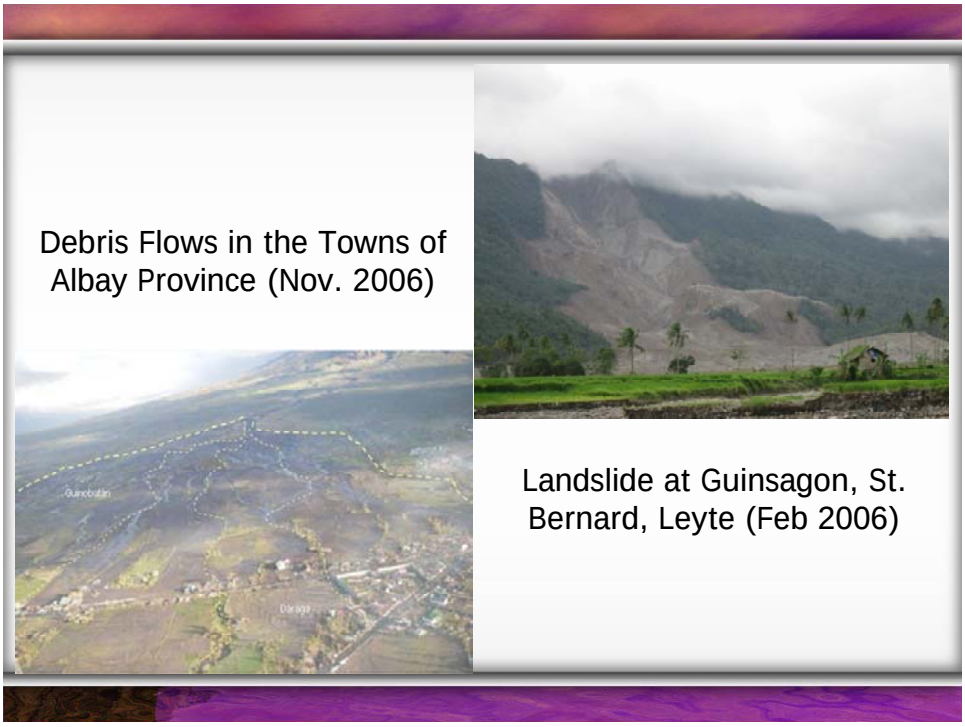
Dr. Hiroki Tsubokawa, National Research Institute for Earth Science and Disaster Prevention (NIED)

Dr. Tsubokawa noted that in 2008, the NIED embarked on a mission to develop methods that will enable residents to improve the disaster prevention capabilities of their regions by means of their own efforts, so that each region can respond autonomously in case of a major disaster. His presentation described a mechanism devised as part of that mission in which disaster risk scenarios are used to cooperatively study a region's disaster risks, understand those risks, and enable local residents to devise effective solutions by means of their own efforts. He emphasized that enhancing public interest on disasters is important; a radio drama was mentioned as an example of the effective tools for public awareness. He also pointed out that it will be an important point to know how the business sector can be part of the scenarios and risk governance.

Good Governance and Effective Collaboration towards Flood Mitigation

Ms. Dolores Hipolito, Philippine Department of Public Works and Highways (DPWH)

Ms. Hipolito talked about the challenges on risk management of sediment-related disasters in the Philippines. She provided general information on the natural conditions in the Philippines, citing that there are on average 20 typhoons visiting the country annually. She noted that the anthropogenic factors of sediment disasters include the degradation of forests and unregulated watershed activities, such as illegal logging, uncontrolled land development and tillage of sloping areas, as well as the human settlements in hazard-prone areas.



Ms. HIpolito gave a piecemeal account of the mechanisms of sediment disasters. This involves insufficient discharge capacity of rivers and weak resistance of slopes against erosion, insufficient mitigation measures against floods and sediment disasters, insufficient guidance to people for early evacuation, insufficient evacuation networks in wider areas, access road problems and insufficient rescue equipment. She provided an overview of disaster management capacity noting that disaster management systems need to be enormously improved. There is also a critical insufficiency in human resources, technology, equipment, and funding. In addition, there is a need to take an integrated approach, including establishment of regulations, improvement of the institutional system, acquisition of budgets, and promotion of training for professional staff and introduction of equipment. Ms. Hipolito summed up the challenges on sediment disaster management that are confronting the Philippines today. These include: strengthening institutional and local capacities; providing structural measures for sediment control, improving watershed/river basin management; establishing a proper management system of data/information; increasing public and private sector awareness and participation; improving enforcement of laws and regulations; and addressing climate change.

Ms. Hipolito further made a presentation on governance and collaboration for sustained flood mitigation and river management. The Japan International Cooperation Agency (JICA) has provided technical assistance to the Philippines in terms of flood mitigation measures. These include: (1) the improvement of Anilao and Malbasag Rivers (channel widening, construction of dikes, revetments, hydraulic drops); (2) the construction of three slit dams to collect floating logs that flow down from mountain areas; and (3) the reconstruction of five bridges to prevent clogging of logs and to fit new river alignment. She noted that in Ormoc, Leyte, in the Philippines, where a flashflood occurred in 1991, a Flood Mitigation Committee (FMC) was formed consisting mainly of the City Government and the DPWH. The FMC has the following river management responsibilities:

1. monitoring of illegal activities which affect river conveyance or damage structures (garbage, hauling of sand/gravel, wastewater disposal, etc);
2. implementation of programs enhancing beauty and use of structures (riverbank beautification, river festivals);
3. watershed protection;
4. awareness campaigns, etc.; and
5. monitoring of water level during extreme events.

Ormoc City Flash Flood of 1991: A Tragic Natural Disaster in the Philippines

- Tropical Storm Thelma (Typhoon Uring, Phil.) caused flash flood
- Inflicted damages on houses, infrastructure, agriculture, private properties, and commercial establishments
- About 8,000 people dead and missing (approximately 20% of urban population), which to date, has been the highest recorded casualty from a water-induced disaster in the country
- Most victims are urban poor who had dwelled in the riverbanks and flood-prone areas

Ms. Dolores concluded her presentation by noting that infrastructures provided residents safety from floods; contributed to improvement of river environment; triggered economic boost in the city; and induced local tourism. Likewise, good governance through issuance of zoning ordinances, provision of funds and support to community-based river programs ensured sustained function of structures for flood mitigation and improved the river environment. Lastly, collaboration between the local government, community, local district offices, nongovernmental organizations (NGOs) and the DPWH Central Office

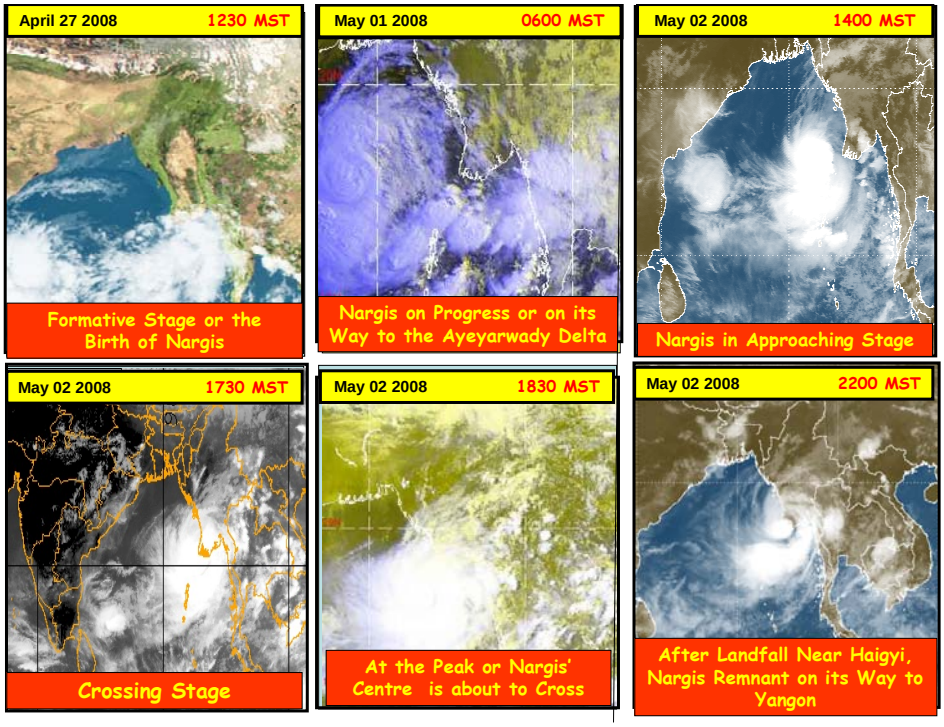
ensured reports and proposals are assessed, acted, and considered in the programs; and community awareness and cooperation are enhanced. Because of these impacts, FMC framework is now being modeled by other local government units.

Numerical Analysis of Flood Control Basin Capability in the Middle Part of the Amur River.
Dr. Mizue Murooka, Researcher, Abashiri Fisheries Experiment station,Japan

The Amur River is an international river between PR China and Russia, and is 4,350 km long and has a catchment area of 2,051,500 km^2. Dr. Murooka noted that there is a very flat plain in the Mid-Amur basin and that crops suffer damage from the inundation by floods in the summer season. The study's key findings pointed out that the distribution of the precipitations fits an exponential model and the probability precipitations were calculated. She added that the Sigmoid model fits the relationship between precipitation and discharge. When precipitation is over 84.0 mm/month (95% of max), theoretically flooding occur. Finally, she concluded that since the relationship between the area of the wetland on floodplain and the precipitation was correlative, wetlands on floodplains played an important role as flood control basin around Khabarovsk.

Tropical Cyclone Nargis: The Worst Natural Disaster to Strike the Southern Ayeyarwady River Delta of Myanmar
Prof. Maung Maung Aye, University of Yangon, Myanmar.

Prof. Aye noted that the most common natural disasters in Myanmar are earthquakes, floods, storms, storm surges, land slides, fires and drought. Prof. Aye presented the meteorological history of cyclone Nargis:

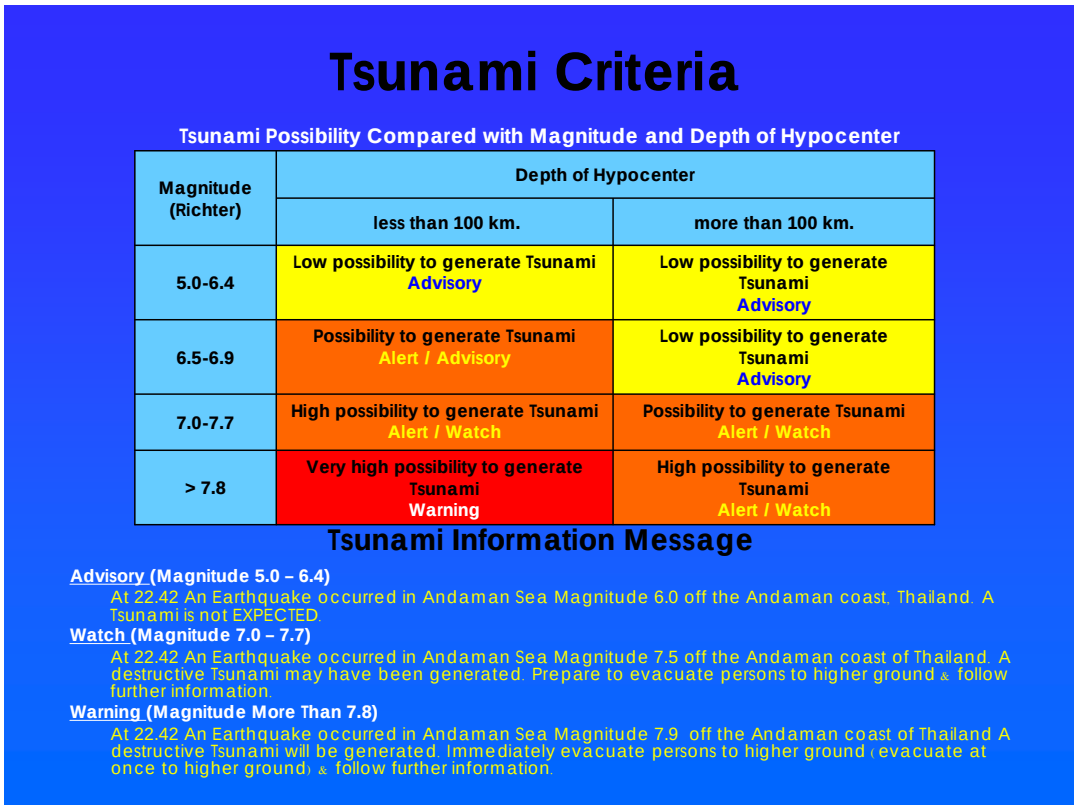


Prof. Aye noted that there is a need to undertake a scientific diagnostic of Cyclone Nargis, which differed from historical cyclone tracks in the Bay of Bengal. He added that further research should be conducted on the impact of climate change on Myanmar. Likewise, dialogue should be made between Myanmar and other countries that are contending with possible impacts of climate change in their delta regions. It is also necessary to exchange methodologies for assessing vulnerabilities and explore adaptation and risk management solutions that may be applicable in the Myanmar context. Prof. Aye stated that an effective radar network should be established to help predict the location and height of surges. It will also be helpful to have a more robust infrastructure for issuing and disseminating warnings of natural hazards. Series of mangrove replanting projects should also be systematically carried out in the coastal areas of the Ayeyarwady Delta. It is necessary to build storm shelters and mounds where people can go to work during both floods and storm surges. Prof. Aye concluded that with adequate planning, education and shelters, it would be possible to reduce the fatality rates from future cyclones by at least one order of magnitude. Unfortunately, the widely deforested, low lying and densely populated Ayeyarwady Delta still remains extremely vulnerable to future storm surge flooding or potential sea level rise.

Case study on International Collaboration and Coordination and the Thai Government's Adaptive Learning in Disaster Management for Community Awareness and Resilience

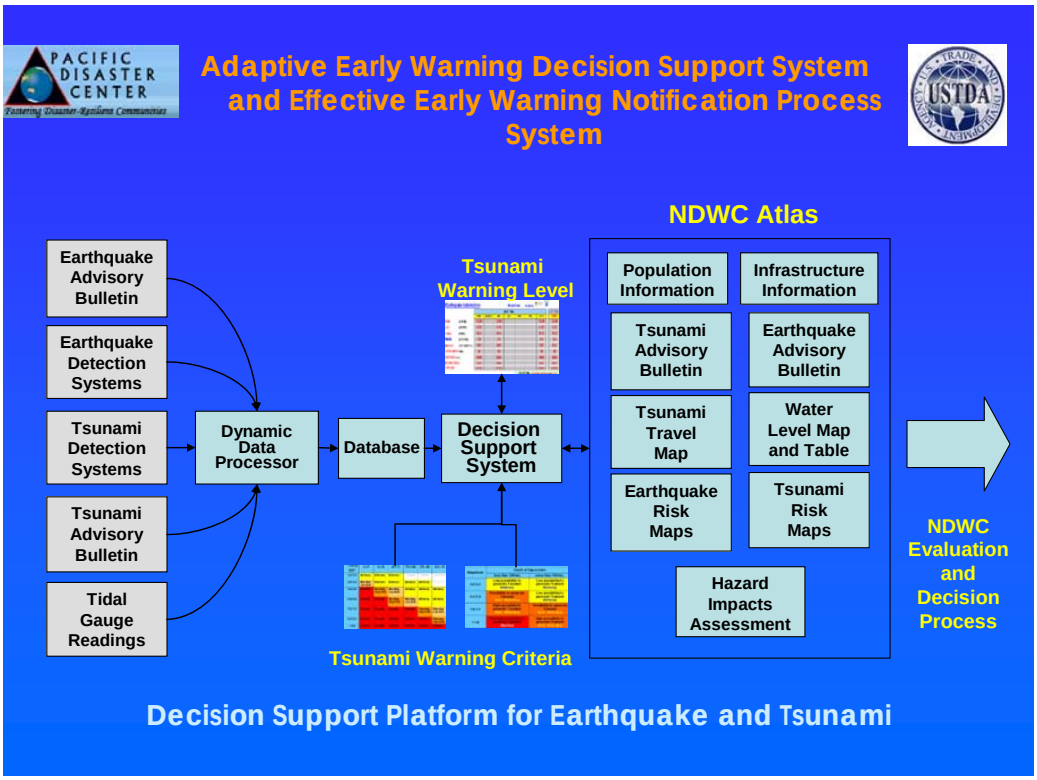
Dr. Cherdsak Virapat, International Ocean Institute

Dr. Virapat noted that the 2004 Indian Tsunami caused more than 8,000 casualties for both Thais and foreign tourists from 38 countries in Thailand. After the disaster, the Thai government committed to put in place an effective tsunami early warning arrangement in Thailand, thus the National Disaster Warning Center (NDWC) was established on 30 May 2005 for end-to-end multi-hazards early warning arrangement. The Center was assessed by UNESCO/IOC in 2005. The assessment recommended that there should be more effective communications from NDWC to coastal communities. Dr. Virapat noted that the Adaptive Learning in Disaster Management for Community Awareness and Resilience (ALDC) was initiated to demonstrate learning mechanisms for schools and involve communities in planning and the decisionmaking process for disaster risk reduction. Twenty-four pilot schools/communities were selected. A warning chart was developed based on the magnitude and depth of the earthquake's hypocenter.



The NDWC has also adopted an early warning notification process involving tsunami warning centers, the NDWC, the Royal Thai Navy and various stakeholders such as the central government, local government, rescue units, affected groups and the general public.

It is suggested that there should be a mechanism in which representatives of governments can act as a coordinating body at the national, provincial and local levels to disseminate and discuss/implement the information, knowledge and understanding on relevant issues at all levels. At the community level, all relevant stakeholders should participate in planning, discussion and decision making processes based on the “learning by doing” approach.



CONCLUSIONS AND RECOMMENDATIONS

The special session on Disaster Management focused on two parts, namely; science and technology for marine disaster prevention and management and good governance on disaster management. It discussed various multi-coastal hazards such as floods, sedimentation, oil spill, marine incidents, Cyclone Nargis and the Indian Ocean tsunami.

The special session also discussed two cases on disaster decision-support system for decisionmaking in protection of marine incidents and how to manage oil spill through oil removal. The session also had an intensive discussion on disaster management strategies such as flood management, participatory risk communication method using disaster risk scenarios, and community-based early warning and mitigation system, adaptive management approach and cooperation, and good governance and effective collaboration.

Several major challenges were identified including communication gaps between governments and communities for effective early warning, mitigation and preparedness. The lack of common understanding of preparedness and prevention arrangement is significant, which are *a priori* of effective disaster management approach at the government function level and the community level.

Good practices have been developed and needs to be scalable and expanded to cover multi-hazard frameworks and communities within the East Asian Sea Region which are highly vulnerable to risks and disasters. In order to strengthen the founding initiatives at the local, national and regional, a regional training course on disaster management shall be designed and developed for interagency government agencies. This can be done through

financial support from regional member countries and international development organizations.

Future implementation, replication and scaling up efforts will be needed as multi-cooperation among countries within the region and among regions. The tasks are too large for any single international agency framework (such as UNISDR, IOC, UNDP and USAID) to solely coordinate on early warning, mitigation and preparedness at the national and local levels, since it will have to deal with large number of populations at risk particularly in the East Asian Sea Region.

Sharing of knowledge and lessons learned, and planning and implementation on the adaptive management approach will be urgently needed. NGOs such as the International Ocean Institute has a significant role to play in coordination, strategic planning and implementation at government function levels and community levels.

An aspect for the immediate attention of countries and governments is the co-management of disaster management with the local community, focusing on the adaptive management approach. Sustainable financial inputs will need to be allocated for local adaptive learning on multi-hazards disaster management. A long-term plan for example, 10-year plans should be developed right after the Special Session.