March 2006

US IOTWS Program Update

U.S. Indian Ocean Tsunami Warning System (IOTWS) Program

from advanced technologies to resilient communities

UNESCAP Hosts Briefing on the USD$12.5 Million Early Warning System Trust Fund in the Indian Ocean and Southeast Asia. The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) hosted a donors meeting to solicit input on a voluntary trust fund it is managing on behalf of the Governments of Thailand and Sweden, which have contributed $10 million and $2.5 million respectively. The fund will support efforts to develop tsunami early warning capabilities in the Indian Ocean and Southeast Asia. On behalf of the US IOTWS Program, USAID presented priority needs for building national capacity in disaster management and last-mile warning communications and for strengthening community resilience and disaster preparedness. All presenters, including USAID, also emphasized the importance of continuing to support the regional IOTWS process led by UNESCO's Intergovernmental Oceanographic Commission.

USAID Discusses Tsunami Warning System Priorities in Roundtable with UN Special Envoy Bill Clinton. USAID participated in a closed roundtable session with UN Special Envoy for Tsunami Recovery Former President Bill Clinton and other donor countries to discuss priorities for the IOTWS during the Third International Early Warning Conference (EWC-III). USAID and National Oceanic and Atmospheric Administration (NOAA representatives attending the meeting supported Clinton's call for providing greater support to downstream early warning needs, improving coordination between donor efforts, and emphasizing the central role for the UNESCO Intergovernmental Oceanographic Commission, which is responsible for overseeing the international IOTWS process.

US IOTWS Program Promoting Resilient Communities in Sri Lanka and the Maldives
Representatives from USAID, NOAA, the Asian Disaster Preparedness Center (ADPC), and the IOTWS Program Integrator contractor conducted a scoping trip to Colombo, Sri Lanka and Male, Maldives as part of efforts to develop a Coastal Community Resiliency (CCR) Program. The US IOTWS Program team met with national ministries, academia, NGOs and the private sector in each country to build partnerships for establishing the CCR Program and ensure long-term sustainability of the program. Under the program, NOAA and its partners will work with Indian Ocean countries to enhance coastal community initiatives that promote resilience to tsunamis and other disasters, as well as economic and social resilience.

University of Rhode Island (URI) Researcher Compares Tsunami Computer Predictions to Actual Wave Damage in Phuket, Thailand
To help predict the affect of tsunamis in the future, Professor Kate Moran of the URI School of Oceanography, visited the most severe tsunami-affected areas on Phuket Island, Thailand, to compare computer modeling results with actual levels of inundation along the shoreline. Professor Moran had earlier mapped the ocean bottom off of Phuket to collect critical data to determine wave heights and levels of inundation as predicted by a model. To establish the validity of the model, she visited the sites where the largest waves were reported and calibrated the exact heights and distance inland that the waves traveled. She discovered that in several cases, the actual waves were higher and more far-reaching than previously predicted.

USAID and the National Disaster Warning Center (NDWC) to Establish Warning Notification System in Thailand

As part of the US IOTWS Program, USAID's Regional Development Mission for Asia (RDM/A) signed a Memorandum of Agreement with Thailand's NDWC to develop a Tsunami Alert Rapid Notification System (TARNS) for Thailand. The TARNS initiative will help NDWC develop and implement a "master plan" for adopting the right technologies and procedures to deliver both disaster warnings and "all clear" alerts quickly and efficiently, and will involve nation-wide simulation exercises. In addition to USAID, the U.S. technical support team will include experts from the U.S. Department of Agriculture's Forest Service (USDA/FS) and NOAA.

Memorandum of Agreement signing ceremony between Thailand's National Disaster Warning Center and USAID's Regional Development Mission of Asia on March 24, 2006, Nonthaburi, Thailand

NOAA Partners with Australia's Bureau of Meteorology to Enhance Indian Ocean Tsunami Warning System Capabilities

NOAA signed an agreement on March 24, 2006 with Australia's Bureau of Meteorology for improved meteorological and hydrological forecasting in the Indian Ocean and South Pacific regions. The agreement is a mutual exchange of scientific and technical expertise to enhance both countries' capabilities in delivering the most sophisticated forecasting data available. The technology partnership with Australia complements U.S. support for UN-led efforts to develop the IOTWS and other international warning systems, and accelerates Australia's capacity for planning, deploying, and operating tsunami detection systems, such as deep-ocean buoys, in the Indian Ocean.

RECENTLY HELD AND UPCOMING US IOTWS PROGRAM ACTIVITIES

Concept of Operations Workshop. Honolulu, Hawaii — *April 3-6 2006*
Contact: Ed Young, Edward.Young@noaa.gov

Training Program in Seismology and Tsunami Warnings. Colombo, Sri Lanka — *April 3-7, 2006*
Contact: Shane Detweiler, USGS, shane@usgs.gov

Incident Command System Training. Colombo and Kandy, Sri Lanka — *April 22-29, 2006*
Contact: Deanne Shulman, USDA/FS, dshulman@fs.fed.us

Coastal Community Resiliency Workshop. Bangkok, Thailand — *May 23-25, 2006*
Contact: Kitty Courtney, PI, kitty.courtney@ttemi.com

Tsunami Alert Rapid Notification System (TARNS) Workshop. Hua Hin, Thailand — *May 23-27, 2006*
Contact: Deanne Shulman, USDA/FS, dshulman@fs.fed.us

About the US Indian Ocean Tsunami Warning System (IOTWS) Program
The US IOTWS Program is part of the international effort to develop tsunami warning system capabilities in the Indian Ocean following the December 2004 tsunami disaster. The US program adopts an "end-to-end" approach—addressing regional, national, and local aspects of a truly functional warning system—along with multiple other hazards that threaten communities in the region. In partnership with the international community, national governments, and other partners, the US program offers technology transfer, training, and information resources to strengthen the tsunami warning and preparedness capabilities of national and local stakeholders in the region. For more information please visit www.iotws.org.

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USD 750,000 Small Grants Program Launched to Support Local Initiatives for Indian Ocean Tsunami Warning System (IOTWS)

The US IOTWS Program launched its $750,000 Small Grants Program (SGP) by formally releasing a Request for Applications. The SGP will support local initiatives in Indonesia, Sri Lanka, India, Thailand, and the Maldives that contribute meaningfully to developing national disaster warning systems and procedures and strengthening local disaster preparedness. The SGP will accept abstracts in two rounds. The first round closes May 28 and the second round closes June 19. Nongovernmental organizations, universities, and associations are encouraged to apply at any time before these closing dates. For more information on the SGP go to www.us-iotws.gov.

NOAA Sponsors Workshop to Develop Operational Guidelines for Tsunami Warning Centers

April 3-7, 2006. Honolulu, Hawaii

Under the US IOTWS Program, NOAA scientists sponsored a Concept of Operations (CONOPS) workshop on April 3-7 in Honolulu, Hawaii. The purpose of the workshop was to identify the operating principles, concepts, structure, and responsibilities for both a national tsunami warning center and a regional tsunami warning center or watch provider. Participants developed a draft framework for the guidelines including a detailed table of contents. This framework was then distributed in preparation for a World Meteorological Organization (WMO) meeting scheduled for May 23, 2006 in Geneva, Switzerland.

International Experts Train Sri Lankans on Seismology and Tsunami Detection

April 3-7, 2006. Colombo, Sri Lanka

The US IOTWS Program kicked off a series of trainings by international experts in seismology and tsunami detection for countries affected by the December 2004 tsunami. Experts from the Sri Lanka Geological Survey & Mines Bureau, the UNESCO Intergovernmental Oceanographic Commission, and the U.S. Geological Survey jointly held a five-day training workshop for more than 25 Sri Lankan technical specialists. Training topics included the earth's structure, theoretical seismology, interpretation of seismograms, analysis of the Sumatra earthquake that caused the December 2004 tsunami, and other damaging impacts of earthquakes in Asia.

Participants of ICS workshop help drawing a hazard map for their communities

Incident Command System (ICS) Taking Shape for Managing National Disasters in Sri Lanka

April 24-28, 2005. Colombo, Sri Lanka

U.S. Department of Agriculture/Forest Service experts conducted a training to help the Sri Lankan government develop and implement ICS

as part of a comprehensive disaster management system. The ICS effort will be customized to Sri Lanka's needs. Professor Sam Hettiarachchi, member of the national advisory committee for the Sri Lankan Disaster Management Center, thanked the U.S. government for helping Sri Lanka to implement ICS, which he said is very unique and useful for countries like Sri Lanka.

US IOTWS Program Changes Web Site Address
In an effort to more accurately reflect the U.S. government participation in the US IOTWS Program, the program's web site address has changed from www.iotws.org to **www.us-iotws.gov**.

UPCOMING US IOTWS PROGRAM ACTIVITIES

Coastal Community Resilience Workshop, Bangkok, Thailand *May 23-25, 2006*
For more information contact Kitty Courtney, US IOTWS Program Integrator, at kitty.courtney@ttemi.com

First Tsunami Alert Rapid Notification System (TARNS) workshop, Hua Hin, Thailand *May 23-27, 2006*
For more information contact Deanne Shulman, USDA/FS, at dshulman@fs.fed.us

Second Tsunami Alert Rapid Notification System (TARNS) Workshop: Communication, Technology and Media, Location TBD, Thailand *July 23-25, 2006*
For more information contact Deanne Shulman, USDA/FS, at dshulman@fs.fed.us

OTHER UPCOMING ACTIVITIES

Symposium on Multi-Hazard Early Warning Systems for Integrated Disaster Risk Management, Geneva, Switzerland *May 23-24, 2006*
For more information contact Dr. Maryam Golnaraghi, Chief, Natural Disaster Prevention and Mitigation Programme, World Meteorological Organization, at mgolnaraghi@wmo.int

Joint NOAA and South East Asia Center for Ocean Research and Monitoring (SEACORM) Workshop, Bali, Indonesia *June 7-10, 2006*
For more information contact David McKinnie, NOAA, at david.mckinnie@noaa.gov

Third Meeting of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS-III), Bali, Indonesia *July 31-August 2, 2006*
For more information go to http://ioc3.unesco.org/indotsunami/

NEW ON THE US IOTWS PROGRAM WEB SITE

The following documents have been added under the Information and Resources section on www.us-iotws.gov:

- *Activity Brief: Building Capacity for Earthquake and Tsunami Detection for the Indian Ocean*
- *Progress to Date February 2006: Developing a Tsunami Warning System for the Indian Ocean*
- Fact sheet on the Tsunami Alert Ready Notification System Program available in Thai
- Small Grants Program Request for Proposals
- *Proceedings: Second U.S. Indian Ocean Tsunami Warning System Program Coordination Workshop, January 30-31, 2006*

About the US Indian Ocean Tsunami Warning System (IOTWS) Program
The US IOTWS Program is part of the international effort to develop tsunami warning system capabilities in the Indian Ocean following the December 2004 tsunami disaster. In partnership with the international community, national governments, and other partners, the US program offers technology transfer, training, and information resources to strengthen the tsunami warning and preparedness capabilities of national and local stakeholders in the region. For more information please visit **www.us-iotws.gov**.

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United Nation's Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning System (ICG/IOTWS) Endorses DART II Stations for the Indian Ocean

May 1-2, 2006. Melbourne, Australia

At a technical working group meeting of the ICG/IOTWS in Melbourne, Australia, officials from Indian Ocean governments endorsed a U.S. offer for two deep-ocean tsunami detection stations (DART II). NOAA presented the U.S. proposal for contributing two DART II stations that will serve as important models and reference points for additional deployments by Indian Ocean countries and other partners. NOAA will be providing technical training to Indian Ocean countries that will be operating the buoys. The working group endorsement is a major step forward for the USAID-funded US IOTWS program to support tsunami detection and warning system development in the region.

Indonesia and Thailand Receive Seismology and Tsunami Warning Training

May 15-19, Bangkok, Thailand/May 8-19, Jakarta, Indonesia

The U.S. Geological Survey, UNESCO/IOC, and USAID jointly conducted trainings in Bangkok and Jakarta to build capacity of disaster management specialists in seismology and tsunami forecasting, detection, and warning. These trainings are part of a series USAID is supporting in tsunami-affected countries.

Asian Disaster Management Experts Developing Region-wide Preparedness Guidelines for Coastal Communities

May 23-25, 2006, Bangkok, Thailand

Disaster and coastal management experts from Indonesia, Sri Lanka, India, Thailand, and the Maldives worked with specialists from USAID, NOAA, and the University of Rhode Island to begin developing a regional "coastal community resilience" guidebook. A key component of the US IOTWS Program, the guidebook will support ongoing post-tsunami recovery efforts by providing a comprehensive set of tools that disaster management trainers and local authorities can apply simultaneously in communities across the region. In particular, the guidelines will show how coastal communities can conduct self-assessments and strengthen their resilience to tsunamis and other hazards while supporting local livelihoods and natural resource conservation.

Participants identify tools and strategies that can be used by communities to assess and improve their resilience to natural hazards. (photo credit: A. Ahmed, ADPC)

Thailand Works to Enhance Rapid Communications for Early Warning

May 24-26, 2006, Hua Hin, Thailand

The Government of Thailand, in collaboration with U.S. Department of Agriculture/Forest Service (USFS) and the National Oceanic and Atmospheric Administration (NOAA), and USAID conducted a three-day workshop in Hua Hin, Thailand, to coordinate and enhance the early warning communication strategies in Thailand. As a first step, an interim Interagency Workgroup was formed, chaired by Dr. Smith Dharmasaroja, Vice Minister to the Office of the Prime Minister. The Interagency Workgroup will develop a comprehensive integrated plan for effective disaster warning dissemination and strategies for developing the conceptual framework model for the rapid notification system in Thailand.

NEW ON THE US IOTWS PROGRAM WEB SITE

The following documents are included under the Workshops and Training section of the web site at www.us-iotws.gov

- Presentations from May Coastal Community Resilience workshop
- Presentations from May TARNS workshop

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

Joint NOAA and South East Asia Center for Ocean Research and Monitoring (SEACORM) workshop, Bali, Indonesia — *June 7–10, 2006*

For more information contact David McKinnie, NOAA, at *david.mckinnie@noaa.gov*

US IOTWS Program: Paleotsunami Field Work, Phang-Nga, Thailand — *July 1–15, 2006*

For more information contact Brian Atwater, USGS, at *atwater@usgs.gov*

US IOTWS Program: Second Tsunami Alert Rapid Notification System Workshop: Communication, Technology and Media, Hua Hin, Thailand — *July 23–27, 2006*

For more information contact Deanne Shulman, USDA/FS, at *dshulman@fs.fed.us*

Third Meeting of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS-III), Bali, Indonesia — *July 31–August 2, 2006*

For more information go to http://ioc3.unesco.org/indotsunami/

US IOTWS Program: Seismology Training Workshop, Maldives — *August 27–31, 2006*

For more information contact Shane Detweiler, USGS, at *shane@usgs.gov*

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Sri Lanka Meets with UNDP and US Representatives to Coordinate Efforts to Strengthen Sri Lanka's Disaster Management Capabilities

May 26, 2006, Colombo, Sri Lanka

Sri Lankan disaster management experts met with UN and U.S. government officials to help coordinate efforts to strengthen multi-hazard warning and communications capability for the country. Representatives from the National Oceanic and Atmospheric Administration (NOAA), U.S. Trade and Development Agency (USTDA), United Nations Development Program (UNDP), and USAID Mission met with Sri Lankan counterparts to review the status of specific activities being implemented under the US ITOWS Program. These activities include upgrades to Sri Lanka's connection to the Global Telecommunications System for receiving global hazard and weather data, development of procedures outlining how the warning center will operate, upgrades to existing tide gages, development of warning communication protocols and possible collaboration on developing a coastal community resilience program.

NEW ON THE US IOTWS PROGRAM WEB SITE

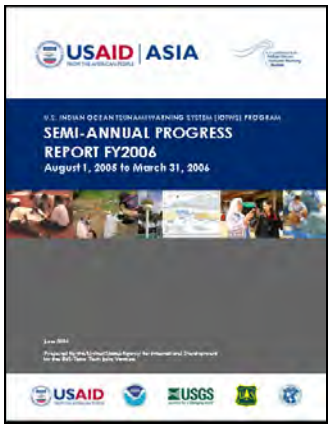
The following documents are included under the Workshops and Training section of the web site at www.us-iotws.gov

- Proceedings from the May 22-23, 2006 Coastal Community Resilience workshop, Bangkok, Thailand
- Proceedings from the May 24-26, 2006 Tsunami Alert Rapid Notification System workshop, Hua Hin, Thailand
- *Concepts and Practice of Resilience*: a compilation from various secondary sources

US IOTWS Program Reports Results for the First Eight Months

June 23, 2006

The US IOTWS Program released its *Semi-Annual Progress Report FY2006* for the period August 31, 2005–March 31, 2006. The document provides an overview of the performance accomplishments of the US IOTWS Program during its first eight months of operation. The report includes a narrative summary of key activities completed as well as quantitative results that address specific performance indicators. To access a copy of the document go to www.us-iotws.gov under What's New.



Joint NOAA and Southeast Asia Center for Ocean Research and Monitoring (SEACORM) Workshop

June 7–10, 2006, Bali, Indonesia

NOAA and SEACORM hosted a workshop in Bali, Indonesia, to identify opportunities for technical cooperation and scientific exchange in ocean observations. NOAA provided information on the use of Deep-ocean Assessment and Reporting of Tsunami (DART) data and the use of ocean observations to promote coastal community resilience. Potential NOAA and Indonesia cooperation for DART station deployment was also discussed and will be explored further at the upcoming Intergovernmental Coordination Group/IOTWS-III meeting scheduled for the end of July in Bali.

Thailand Develops Strategic Action Plan to Enhance Early Warning Capabilities

June 20, 2006, Bangkok, Thailand

The Vice Minister to Thailand's Office of Prime Minister signed an order for the National Disaster Warning Center (NDWC) to establish three sub-committees for enhancing interagency coordination for early warning communication systems. Under the USAID-funded U.S. Indian Ocean Tsunami Warning System (IOTWS) Program, representatives from the U.S. Department of Agriculture/Forest Service (USFS) and the National Oceanic and Atmospheric Administration (NOAA) have been actively working with the NDWC to develop a framework for a rapid alert notification system that integrates warning system components at the national, provincial, district, and community level.

Sri Lankan Official Briefed on Disaster Response Initiative

June 29, 2006, Colombo, Sri Lanka

The U.S. Forest Service (USFS), together with the Sri Lanka Ministry of Disaster Management and Human Rights, briefed all of the district secretaries in the country last week at the Conference of Government Agents/ District Secretaries in Colombo. The US IOTWS Program is working closely with the government of Sri Lanka to develop a comprehensive disaster management plan. USFS representatives described disaster management concepts called the Incident Command System (ICS), and discussed how ICS will be adapted to Sri Lanka.

Seismic Monitoring Stations Upgraded on Sumatra, Indonesia

June 26–July 14, 2006,Sumatra, Indonesia

Researchers from the U.S. Geological Survey (USGS) and the California Institute of Technology, in collaboration with the Indonesian Institute of Sciences (LIPI) and Indonesia's Meteorological and Geophysical Agency (BMG), have begun upgrading an existing network of earthquake monitoring stations on Sumatra and the small islands off its west coast. As part of the US IOTWS Program, Indonesian disaster specialists will also be trained to analyze the data that is received from the networks.

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

US IOTWS Program: Paleotsunami Field Work, Phang-Nga, Thailand — *July 1–15, 2006*

For more information contact Brian Atwater, USGS, at *atwater@usgs.gov*

US IOTWS Program: Second Tsunami Alert Rapid Notification System Workshop: Communication, Technology and Media, Hua Hin, Thailand — *July 26–28, 2006*

For more information contact Deanne Shulman, USFS, at *dshulman@fs.fed.us*

Third Meeting of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS-III), Bali, Indonesia — *July 31–August 2, 2006*

For more information contact David McKinnie, NOAA, at *david.mckinnie@noaa.gov* or go to *http://ioc3.unesco.org/indotsunami/*

US IOTWS Program: Seismology Training Workshop, Maldives — *August 27–31, 2006*

For more information contact Shane Detweiler, USGS, at *shane@usgs.gov*

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For more information please visit **www.us-iotws.gov**.

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USAID-Funded Disaster Response Initiative Reaching District Levels in Sri Lanka

June 29, Colombo, Sri Lanka

As part of the US IOTWS Program, the U.S. Forest Service (USFS), together with the Sri Lanka Ministry of Disaster Management and Human Rights, is broadening its support the country's efforts to develop a comprehensive disaster management plan which includes Incident Command System (ICS). Developed in the U.S., ICS provides a highly efficient management framework that helps government agencies rapidly react to disaster situations. US ICS experts have introduced ICS to all of Sri Lanka's district secretaries and described how ICS can be adapted to Sri Lanka's disaster management system. The 35 Sri Lankan officials attending the Conference of Government Agents/ District Secretaries in Colombo responded that ICS can play a significant role in response to both natural disasters and human-induced disasters in the country.

Scientists Seek Clues from the Past to Help Forecast Future Tsunamis

July 3–15, 2006, Khao Lak, Thailand

Fourteen geologists from four Indian Ocean countries—India, Indonesia, Sri Lanka, and Thailand—met in southern Thailand for field training in estimating the frequency of unusually large tsunamis, like the tsunami of December 2004. This type of information can help to define probabilities of future tsunamis—now a key parameter in planning coastal development around the Indian Ocean. Two scientists from the U.S. Geological Survey (USGS) conducted the training as part of the US IOTWS Program.

Geologists from Thailand and Sri Lanka survey a transect through mangroves toppled by the 2004 Indian Ocean tsunami.

Photo credit: B. Atwater/USGS.

Conference to Support Youth in Building Disaster Resilient Communities

July 3-18, 2006, Bangkok and Phuket, Thailand

The U.S. State Department is supporting a study program was held in Bangkok and Phuket, Thailand entitled Partnership for Youth in Building Disaster Resilient Communities as part of an initiative of the East-West Center in Hawaii called "Linking Individuals, Knowledge, and Culture". The Partnership for Youth Program brings U.S. and Thai high school students together to form a Blue Ribbon Panel that are studying the role of youth in building disaster-resilient communities. The high school students meet with U.S. and Thai experts in disaster preparedness and relief as well as government officials and civic leaders responsible for disaster management to examine "best practices" and to explore comparative governance, civic participation, and accountability in disaster response and management. The US IOTWS Program shared experiences in early warning and disaster management in Thailand during the kick-off event in Bangkok and participated in the final seminar in Phuket with local government officials.

Thailand Adopting US Model for Rapid Warning Communications

July 26-28, 2006, Hua Hin, Thailand

Media representatives discuss procedures Thailand's emergency warning dissemination (left), Deanne Shulman/USFS gives interview to the press during TARNS workshop (right)

Photo credit: R. Supaporn

The Government of Thailand is adopting the U.S. model for Tsunami Alert Rapid Notification System (TARNS) to enhance collaboration between key emergency managers involved in the dissemination of warnings. On July 26-28, 2006, representatives from the USAID funded-US IOTWS Program met with officials from all levels of the Thai Government, private sector, and the media to share experiences and lessons learned on communications technologies for emergency warning dissemination in both Thailand and the U.S. TARNS will initially provide a quick-response system for tsunami alerts but will eventually be expanded to include alerts for other disasters such as flooding. A set of common procedures and protocols will be developed for all relevant entities, with a design tailored to the government structure, culture, infrastructure, and available technologies. The National Disaster Warning Center (NDWC) is working with USAID, USFS, and the National Oceanic and Atmospheric Administration (NOAA) to implement the initiative under the US IOTWS Program.

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

US IOTWS Program: Study Tour on Disaster Management in the United States — *August 19 –September 2, 2006*

For more information contact Trudie Mahoney contact *tmahoney@fsip.net*

US IOTWS Program: Seismology Training Workshop, Malaysia — *August 21-25, 2006*

For more information contact Shane Detweiler, USGS, at *shane@usgs.gov*

Natural Hazard Management Conference 2006, New Zealand — *August 22– 25, 2006*

For more information visit *http://www.us-iotws.gov/ev_en.php?ID=2196_201&ID2=DO_TOPIC*

US IOTWS Program: Seismology Training Workshop, Maldives — *August 27–31, 2006*

For more information contact Shane Detweiler, USGS, at *shane@usgs.gov*

The 3rd Coastal Zone Asia Pacific Conference (CZAP2006) on "Linking People and the Coasts" — *August 29 -September 2, 2006*

For more information contact Dr. Sapta Putra at *saptaputra@cbn.net.id*

About the US Indian Ocean Tsunami Warning System (IOTWS) Program

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Representatives from US IOTWS Program Participate in Third Intergovernmental Oceanographic Commission Intergovernmental Coordination Group (IOC/ICG-III) Meeting

July 31–August 2, 2006, Bali, Indonesia

Several members of the US IOTWS Program recently attended the IOC/ICG-III Meeting in Bali, Indonesia. The US delegation participated in all six working groups at a technical level and actively supported calls for system integration and for long term sustainability. Considerable progress had been made prior to the meeting on the development of national plans for all of the 28 member states that participate in the ICG/IOTWS. In addition, the IOC unveiled an implementation plan that attempted to catalog contributions to the regional system from member state and donors. The next ICG meeting is to be held in Kenya in February 2007.

Disaster Management Experts Assess Early Warning Policies and Institutional Capacity in Four Indian Ocean Countries

August 10–September 8, 2006, Sri Lanka and Thailand

In an effort to improve early warning capability in the region, the US IOTWS Program recently conducted comprehensive assessments of the organizational disaster management capacity in Sri Lanka and Thailand to prepare for, respond to, mitigate, and recover from tsunamis and other natural and man-made disasters. The assessment, which is being implemented in close coordination with UNDP, is based on an all-hazards approach to disaster management. Input was solicited from all levels of governments and of civil society, NGOs, and international organizations. This assessment will provide critical input to country, bilateral, and UN partners to guide practical recommendations to ensure early warning operational capacities are improved.

Officials from Sri Lanka visit United States to Gain Insights into US Disaster Management Practices

August 19–September 2, 2006, USA

The U.S. Forest Service (USFS) hosted a two-week study tour across the U.S. for 12 senior Sri Lankan officials to gain hands-on exposure to how Incident Command System (ICS) is used to respond to disasters in all kinds of contexts and situations. The delegation learned first-hand how the Red Cross, U.S. Coast Guard, and others use ICS. The tour presented a unique and emotional exchange of experiences for disaster managers from two of the world's most devastating catastrophes—the Tsunami of December 2004 and Hurricane Katrina of September 2005—when the delegation visited Katrina's "ground zero" in Bay Saint Louis, Mississippi.

Rich Rusk, the Logistic Chief from the National Interagency Fire Center, gives a briefing about logistic support and activities for the Trailhead Fire Incident.
Photo credit: SHM Fakhruddin/US IOTWS Program.

U.S. Scientists Support Additional Seismic Monitoring Stations in Indonesia

August 2006, Indonesia

Scientists from the California Institute of Technology (CalTech) and the U.S. Geological Survey (USGS) are upgrading and installing new seismic monitoring equipment on the island of Sumatra as part of the international effort to help Indonesia improve its earthquake and tsunami detection capabilities. Twenty-seven monitoring stations were completed as of August 15, 2006, and another three stations are planned over the next six months. This is part of the overall international effort to help significantly improve Indonesia's ability to determine the accurate time and location of earthquakes, including those that can trigger tsunamis.

US IOTWS Program Continues Regional Trainings on Seismic and Tsunami Warning

August 21-25, 2006, Malaysia and August 27–31, 2006, the Maldives

Scientists from the U.S. Geological Survey (USGS) and UNESCO's Intergovernmental Oceanographic Commission (IOC) completed two additional seismology training workshops in Malaysia and the Maldives as part of a series of regional trainings. To date, the US IOTWS Program has trained over 140 seismologists and other experts in five countries to help better identify and react to tsunami-generating earthquakes. Participants also included staff members from warning centers in Indonesia, Thailand, and Sri Lanka.

NEW ON THE US IOTWS PROGRAM WEB SITE

The following documents are included under the Information and Resources section of the web site at www.us-iotws.gov

- Country fact sheets that summarize US IOTWS Program activities for Indonesia, Sri Lanka, Thailand, and the Maldives
- Coastal Community Resilience fact sheet
- Fact sheet on how scientists develop seismic hazard maps to guide safe building practices in earthquake zones

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

US IOTWS Program Event: National Coastal Community Resilience (CCR) Workshop, Jakarta, Indonesia — *September 12–13, 2006*

For more information contact Catherine Courtney at *kitty.courtney@ttemi.com*

US IOTWS Program Event: National Coastal Community Resilience (CCR) Workshop, Colombo, Sri Lanka — *October 9–10, 2006*

For more information contact Catherine Courtney at *kitty.courtney@ttemi.com*

US IOTWS Program Event: Incident Command System Training Course: Planning Section Unit Leader, Colombo, Sri Lanka — *October 16–20, 2006*

For more information contact Trudie Mahoney contact *tmahoney@fsip.net*

US IOTWS Program Event: Incident Command System Training Course: Planning Section Chief — *October 25–27, 2006*

For more information contact Trudie Mahoney contact *tmahoney@fsip.net*

About the US Indian Ocean Tsunami Warning System (IOTWS) Program

The US IOTWS Program is part of the international effort to develop tsunami warning system capabilities in the Indian Ocean following the December 2004 tsunami disaster. The US program adopts an "end-to-end" approach—addressing regional, national, and local aspects of a truly functional warning system—along with multiple other hazards that threaten communities in the region. In partnership with the international community, national governments, and other partners, the US program offers technology transfer, training, and information resources to strengthen the tsunami warning and preparedness capabilities of national and local stakeholders in the region. For more information please visit **www.us-iotws.gov**.

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U.S. Indian Ocean Tsunami Warning System (IOTWS) Program
from advanced technologies to resilient communities

Indian Ocean Scientists Broaden Technical Dialogue on Tsunami Detection Systems during Visit to the United States

August 28-September 1, 2006, USA

In support of a multi-lateral coordination effort for deploying deep-ocean tsunami detection buoys for the IOTWS, a group of 10 Indonesian and Australian marine engineers toured National Oceanic and Atmospheric Administration (NOAA) and private sector "DART" buoy production and operations facilities in the United States. Under the US IOTWS Program, NOAA representatives provided a detailed technical orientation to DART systems to help the delegations explore opportunities to acquire and deploy DART stations as part of each country's national warning system programs. The exchange provided the technical foundation for each country to develop specific plans for DART system deployments and contribute to the regional buoy array for the Indian Ocean.

Indonesian and Australian delegations visit NOAA's DART buoy development facilities at the Pacific Marine Environmental Laboratory (PMEL), Seattle, Washington. Photo Credit: D. McKinnie/NOAA.

Small Grants Program Underway

September 1-30, 2006, Indian Ocean Region

The Small Grants Program established under the US IOTWS Program provides funding for activities in the Indian Ocean region that support, complement, or enhance the development of "downstream" tsunami and multi-hazard warning system components at national and local levels. The US IOTWS Program received more than 30 applications and has made 12 awards of up to $25,000 and 6 awards between $25,000 and $100,000. These grants represent a vital link between national disaster management efforts and on-the-ground implementation of preparedness activities at the community level. For example, with a $25,000 grant from the US IOTWS Program, the Sustainable Environment and Ecological Development Society (SEEDS) will help develop a Community Based Disaster Management Plan and examine all of the hazards related to the coastal communities of India's Andaman and Nicobar Islands.

Indonesian Communities Help Develop Guidelines to Improve Coastal Resilience

September 12-13, 2006, Jakarta, Indonesia

The US IOTWS Program jointly sponsored a two-day workshop with the Indonesian Society for Disaster Management (MPBI) and International Federation of Red Cross/Indonesian Red Cross (IFRC/PMI) to launch the Indonesian component of a regional Coastal Community Resilience (CCR) initiative. Forty-five community representatives and disaster management specialists representing 35 different organizations participated to support Indonesia's post-tsunami recovery aimed at integrating disaster preparedness, livelihoods, and coastal resources management into a single field guide for training across the region. Several of the international and national NGOs, donors, Government of Indonesia, and UNESCO representatives indicated they plan to use the jointly developed guide in their disaster preparedness training efforts in hundreds of coastal communities in Indonesia.

Workshop participant reports on elements of resilience. Photo credit: A. Ahmed/US IOTWS Program.

US IOTWS Program Field Visit to Coastal Municipality to Assess Vulnerability

September 14, 2006, Kelurahan, Indonesia

As a follow up to the CCR workshop held in Jakarta on September 12-14, the US IOTWS Program team conducted a field visit to Kelurahan, an urban coastal municipality in north Jakarta bordering Jakarta Bay. The international organization, Action Contra le Faim (ACF) organized the visit to the local disaster management agency offices and local institutional representatives within the community to assess their vulnerabilities and provide solutions to building resilience at the community level in an area that is under constant threat of flooding from tidal inundation and exposure to chronic domestic pollution.

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

US IOTWS Program Event: National Coastal Community Resilience (CCR) Workshop, Colombo, Sri Lanka — *October 9–10, 2006*
For more information contact Atiq Ahmed at *atiq@iotws.org*

US IOTWS Program Event: ICS Training: Planning Section Unit Leader Course, Hikkaduwa, Sri Lanka — *October 16–20, 2006*

US IOTWS Program Event: ICS Training: Planning Section Chief Course Colombo, Sri Lanka — *October 25–27, 2006*

US IOTWS Program Event: ICS Training: Finance/ Admin Section Chief Course Colombo, Sri Lanka — November 7-8, 2006

US IOTWS Program Event: ICS Training: Operations Section Chief Course Colombo, Sri Lanka — November 14-15, 2006

US IOTWS Program Event: ICS Training: Incident Commander, Colombo, Sri Lanka — November 16-18, 2006
For more information on all ICS trainings, contact Trudie Mahoney at tmahoney@fsip.net

About the US Indian Ocean Tsunami Warning System (IOTWS) Program

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US IOTWS Program Hosts Coastal Community Resilience (CCR) Sri Lanka National Workshop

October 9-10, Sri Lanka

The US IOTWS program conducted a national Coastal Community Resilience Workshop in collaboration with the Sri Lanka Disaster Management Center (DMC) as part of a process to evaluate and test the program's Guidebook and coastal community resilience framework. The Guidebook will be used to help communities assess and improve their resilience to coastal hazards. Major General Gamini Hattiarachchi, Director General of the Sri Lanka Disaster Management Center (DMC), welcomed participants to the workshop, in which more than 48 professionals from the government, national NGOs, international organizations, and academic institutions. Working groups reviewed guidebook sections, tested the resilience benchmarks through site-specific evaluations and discussed strategies for maximizing impact of the guidebook and the CCR framework in strengthening resilience in coastal communities.

NEW ON THE US IOTWS PROGRAM WEB SITE

The following presentations are included under Workshops and Trainings in the Information Resources section of the web site at www.us-iotws.gov

October 9-10, 2006: Coastal Community Resilience (CCR) National Workshop, Colombo, Sri Lanka

October 16-20, 2006 - October 24-26, 2006: Incident Command System (ICS) Workshop, Ahangulla and Colombo, Sri Lanka

US IOTWS Program Team Conducts Policy and Institutional Assessment for Disaster Management in Indonesia

October 9-12, Indonesia

A US IOTWS Program team conducted a comprehensive policy and institutional capacity assessment of disaster management in Indonesia, following similar efforts in Sri Lanka and Thailand. The assessment identified gaps and possible program interventions to support improvement of disaster management. The study is one component within a broader regional assessment that is being conducted by the program. The Indonesia assessment was coordinated with the United Nations Development Program (UNDP), which is also reviewing policy and institutional gaps in the early warning systems in the five US IOTWS Program countries. A total of 26 national and local government agencies and NGOs were interviewed for the study with an expert-level round table focus groups to verify the assessment framework in Indonesia. The results of the study were shared with relevant national authorities.

S.H.M. Fakhruddin/US IOTWS Program

US IOTWS Program team visited the Wlikota, Padang (Mayor Office) for the early warning chain and disaster management activities.

Sri Lankans Strengthen Capacity for Disaster Management at the National and Municipal Level

October 16-20, Ahungalla, Sri Lanka

As part of the US IOTWS Program to help Sri Lanka integrate the Incident Command System (ICS) approach into its national disaster management policy, the U.S. Forest Service (USFS) conducted a rigorous five-day train-the-trainer program for Sri Lankan officials that will increase the country's capacity to effectively prepare for and respond to disasters. Twenty-nine senior government officials from 18 government agencies participated in the course. The Sri Lanka Disaster Management Centre (DMC) under Ministry of Disaster Management and Human Rights adopted ICS for disaster management and these workshop participants will provide further training and form ICS teams at the district level. This course is the second in a series of eight formal classes covering all aspects of ICS.

A. Ahmed/US IOTWS Program

Members from government and non-government agencies participated in the ICS training workshop.

Thailand Develops National Warning System Strategic Plan for 2007-08 and Conducts Tsunami Warning Exercise

October 22-25, 2006

The Thai National Disaster Warning Center (NDWC), developed a two-year national warning system strategic plan and conducted a tsunami warning exercise this week in Nakonnayok Province, Thailand. Under the USAID-funded US IOTWS Program, representatives from the U.S. Forest Service led participants from government and non-government agencies in a simulation exercise designed to highlight and help participants evaluate the efficiencies and gaps in the country's warning dissemination process.

NDWC

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

US IOTWS Program Event: Launch of First DART Buoy in Indian Ocean Region *December 1, 2006*
Phuket, Thailand
For more information on the event please contact Vivian Raksakulthai at Vivian@iotws.org

ITU/ESCAP Regional Workshop on "Disaster Communications" *December 12-15,2006*
Bangkok, Thailand
For more information go to *www.itu.int/ITU-D/asp/Events/ITU-ESCAP-BangkokDec2006*

US IOTWS Program Event: Basic and Intermediate ICS Training *February 20-23, 2007*
Colombo, Sri Lanka
For more information contact Trudie Mahoney, USFS, at tmahoney@fsip.net

US IOTWS Program Event: Basic and Intermediate ICS Training: District Level *March 20-23, 2007*
Kandy, Sri Lanka
For more information contact Trudie Mahoney, USFS, at tmahoney@fsip.net

About the US Indian Ocean Tsunami Warning System (IOTWS) Program

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For more information please visit **www.us-iotws.gov**.

U.S. Contribution to the Indian Ocean Tsunami Warning System

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US IOTWS Program Issues Small Grant to Strengthen Regional Capacity to Assess Risks

November 6-24, 2006, Thailand

The Asian Institute of Technology's Geoinformatics Center received a small grant from the US IOTWS Program for the regional project "Strengthening Capacity on Multi-hazard Risk Assessment in Tsunami-affected Countries (SCRATCH)". The project aims to develop a cadre of professionals in the region able to assess a variety of coastal hazards for early warning and disaster management. AIT, in cooperation with the International Institute for Geo-Information Science and Earth Observation in The Netherlands, held a kick-off workshop on November 6, 2006, with representatives from Indonesia, Sri Lanka, Thailand, and India. Eight participants from the region received intensive training on modeling and risk assessment over three weeks, including the development of in-depth case studies from their respective countries. This small grant project will result in a training manual that may be applied across the region, and the ability of the participants to replicate training in their home institutions.

Vivian Raksakulthai, US IOTWS Program

Speakers and participants at the SCRATCH kick-off workshop

Sri Lanka Receives Advanced Training to Manage Disasters

November 7-18, 2006

The US Forest Service (USFS) concluded a series of advanced emergency response training courses in Sri Lanka for 25 senior government officials as part of the Incident Command System (ICS) program that the US IOTWS Program is supporting under Sri Lanka's national strategic plan for emergency response. ICS is an integrated organizational structure that allows governments to respond more quickly and effectively to disaster incidents and emergencies. The Honorable Mr. Mahina Samarasinghe, Minister for the Ministry of Disaster Management and Human Rights, awarded certificates to the trainers for successful completion of all seven ICS courses.

NEW ON THE US IOTWS PROGRAM WEB SITE

The following document is included under the Workshops and Training section of the web site at www.us-iotws.gov

Presentation: Tsunami Alert Rapid Notification System (Third Workshop Planning Meeting & NDWC Strategic EWS Plan), Thailand, October 24-26, 2006

Developing Standard Operating Procedures (SOPs) to Prepare for and Respond to Tsunamis

November 20-24, 2006, Padang, Indonesia

The US IOTWS Program co-sponsored a three-day workshop with several international organizations and local governments working to develop local Standard Operating Procedures (SOPs) for local community warning systems addressing coastal hazards, particularly tsunamis. More than 50 participants attended the workshop in Padang, representing 30 different organizations. Co-sponsors included the GTZ-TEWS program, Indonesian Red Cross/International Federation of the Red Cross (PMI/IFRC), UNDP, and small learning teams from three pilot cities or districts, Aceh Besar (NAD), Padang (West Sumatra), and Bali. The workshop was the second in a series on *Capacity Building for the Development of Local SOPs for Tsunami Early Warning and Response* organized by the IOC that emphasize shared learning to improve warning dissemination at the local level. The event included one day of roundtable presentations and related case studies describing the progress since the previous workshop (Oct. 2006). The workshop also included site visits to the key offices, operational centers, and evacuation shelters for the host city Padang, as well as a demonstration of a table-top tsunami drill using their draft SOPs. The three districts will conduct various drills and activities in December to commemorate the 2004 Tsunami and will reconvene in January 2007 to share lessons learned.

Henny Vidiarina, GTZ Program

Government officials from the ambulance corps, police, and local radio network manage the local Operational Command Center desk during an Earthquake and Tsunami Table Top simulation to test draft SOPs for tsunami warning for Padang, W. Sumatra

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

US IOTWS Program Event: Coastal Community Resilience (CCR) Guidebook Community Level and National Level Field Testing — *December 6-15, 2006*

Ranong and Bangkok, Thailand

For more information contact: Atiq Ahmed at *atiqka@adpc.net*

ITU/ESCAP Regional Workshop on "Disaster Communications" — *December 12-15, 2006*

Bangkok, Thailand

For more information go to *www.itu.int/ITU-D/asp/Events/ITU-ESCAP-BangkokDec2006*

US IOTWS Program Event: Basic and Intermediate ICS Training — *February 20-23, 2007*

Colombo, Sri Lanka

For more information contact: Trudie Mahoney, USFS, at *tmahoney@fsip.net*

US IOTWS Program Event: Basic and Intermediate ICS Training: District Level — *March 20-23, 2007*

Kandy, Sri Lanka

For more information contact Trudie Mahoney, USFS, at *tmahoney@fsip.net*

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For more information please visit **www.us-iotws.gov**.

U.S. Agency for International Development
www.usaid.gov
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Thailand Launches First "DART" Tsunami Warning Buoy for Indian Ocean Region
December 1-8, 2006, Phuket , Thailand

Thailand's National Disaster Warning Center (NDWC) and USAID, in cooperation with the Thai Meteorological Department, the Thai Ministry of Foreign Affairs, and the U.S. National Oceanic and Atmospheric Administration (NOAA), hosted a launch ceremony on December 1, 2006, in Phuket, Thailand, immediately before the first deployment of a U.S.-built tsunami detection buoy in the Indian Ocean. Under the USAID-funded Indian Ocean Tsunami Warning System (US IOTWS) Program, the U.S. Government donated the Deep-ocean Assessment and Reporting of Tsunamis (DART) II station and provided technical assistance through NOAA during the deployment and initial operation. High-level officials from the U.S. Government and the Royal Thai Government attended, including the U.S. Ambassador Ralph Boyce and the Acting Mission Director of USAID's Regional Development Mission for Asia Richard Whelden. Although there are 20 DART stations deployed across the Pacific and Atlantic Oceans, this is the first operational buoy launched in the Indian Ocean reporting ocean observation data directly to the World Meteorological Organization (WMO) Global Telecommunications System for early warning. Hours after deployment, the buoy began transmitting real-time data that is available for any country to access on global networks. The Pacific Tsunami Warning Center in Hawaii and future warning centers in the region also have access.

USAID/RDMA

US and Thai engineers posed in front of the DART II buoy before its deployment at 9ºN 89ºE, midway between Sri Lanka and Thailand

NEW ON THE US IOTWS PROGRAM WEB SITE

The following document is included on the web site at www.us-iotws.gov

Indonesia's Seismic Monitoring System: Mission #3 Assessment and Recommendations

Coastal Community Resilience Guidebook Field Testing in Ranong, Thailand
December 10-15, 2006

A team comprised of professionals from the Asian Disaster Preparedness Center, the University of Rhode Island, and the Program Integrator for the US IOTWS Program field tested resiliency benchmarks in the *Coastal Community Resilience Guidebook*. 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 from the field, 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 various levels of consultation and interviews with community members, local officials, and other government and non-government agencies professionals in the Kamphuan sub-district of Ranong.

Roundtable Discussions on Coastal Community Resilience in Indonesia

December 18, 2006

The US IOTWS team held a roundtable on the Coastal Community Resilience (CCR) initiative in Jakarta on December 18, 2006, to gain partnership commitments with local organizations such as the Indonesian Red Cross (PMI), Mercy Corps, Save the Children, Islamic Relief, UNESCO Indonesia, Yayasan IDEP Foundation, and others. Roundtable members discussed how CCR can be strengthened through these emerging partnerships. The agency representatives showed a great deal of interest in incorporating the CCR framework into their future activities, as well as participating in the upcoming national CCR training in Indonesia and the regional workshop later this year.

Astri Suryandari

Roundtable members discuss strengthening coastal community resilience in Indonesia

RANET Used to Warn Communities in Bali Tsunami Evacuation Drill

December 26, 2006

Under the US IOTWS Program, NOAA worked with Indonesia's Meteorological and Geophysical Agency (BMG) to provide training through the RAdio and InterNET for the Communication of Hydro-Meteorological and Climate-Related Information program, or RANET. NOAA developed RANET as a community-based emergency communications system to reach the "last mile" in developing countries and remote locations. To move critical information from city centers to rural populations, the program has combined unique satellite broadcast capacities with Internet applications and the use of FM radio, HF radio, and other land-based broadcasting. Throughout the summer of 2006, RANET prepared and retooled its broadcast on the WorldSpace AsiaStar satellite to accommodate warning information. The satellite broadcast capability has been integrated with the BMG 5-to-1 warning system, which is intended to provide five ways to send or receive one warning. Following the integration of the two systems, RANET and BMG conducted several tests in early December, which demonstrated an ability to disseminate a warning from the point of production to the point of reception within 2.5 minutes.

On December 26, 2006, Indonesia's resort island of Bali conducted a tsunami evacuation drill on the two-year anniversary of the tsunami disaster that killed 230,000 people around the Indian Ocean. The drill included real-time warnings sent from Jakarta, the capital, to radios along the beach, and aimed to raise awareness and test new technologies for early warning. RANET contributed to the live drill by sending emergency information through Indonesia's warning system to local operators, who sounded alarms or issued evacuation instructions. Additional receiver sites will be rolled out in Indonesia by early summer 2007.

ABC News Online

Rescue workers simulate an evacuation on Kuta beach, Bali

Seismic Detection Equipment Installed on Sumatra

December 2006

The U.S. Geological Service (USGS) installed two new accelerometers on Sumatra. An accelerometer is an instrument for measuring acceleration or detecting and measuring vibrations. The USGS team also surveyed nearby locations for three sites where broadband seismometers will be installed alongside other instruments. This equipment, which will improve the accuracy of seismic detection, will be shipped to Padang in May-June, 2007, and installed by September 2007.

Tsunami Geology Field Research in India

November 30–December 14, 2006

India's greatest known tsunami before December 26, 2004, came from the Arabian Sea on November 28, 1945. It reached heights up to 10 meters in Gujarat, 15 meters near Karachi, and reportedly swept away 15 people near Bombay. In December 2006, an international team supported by the US IOTWS Program conducted field research in Gujarat's tsunami-prone areas near Kandla, India's fifth-largest port. To promote awareness of northwest India's tsunami hazards, the team will collect and disseminate eyewitness accounts and written records of what one elderly resident called "the sea gone mad."

Brian Atwater

Temple caretakers near India's fifth-largest port tell Gujarati geologist Mahesh Thakkar (right) about storm surges

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

Inundation Modeling Training
Melbourne, Australia — *January 10-19, 2007*
For more information contact: Tony Elliott, Bureau of Meteorology at t.elliott@unesco.org

Seismic Hazards Training
Bangkok, Thailand — *January 16-19, 2007*
For more information contact: Shane Detweiler, USGS, at shane@usgs.gov

Advanced Seismology and Tsunami Studies
Indonesia — *January 30- February 16, 2007*
For more information contact: Shane Detweiler, USGS, at shane@usgs.gov

Basic and Intermediate ICS Training
Colombo, Sri Lanka — *February 20-23, 2007*
For more information contact: Trudie Mahoney, USFS, at tmahoney@fsip.net

National Coastal Community Resilience Training
Sri Lanka — *February 26-30, 2007*
For more information contact Atiq Ahmed, US IOTWS, at atiq@iotws.org

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U.S. Contribution to the Indian Ocean Tsunami Warning System

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U.S. Contribution to the Indian Ocean Tsunami Warning System

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Thai Communities Trained on Coastal Mitigation and Planning

January 16-19, 2007, Pathumthani, Thailand

As part of the US IOTWS Small Grants Program, the Asian Institute of Technology's School of Environment, Resources and Development (SERD) and School of Engineering and Technology (SET) held a training course January 16-19, 2007, for 14 participants from coastal communities in Ranong, Thailand, on coastal mitigation and planning. Participants included local government officials, NGO representatives, and community members from youth and women's groups. The course aimed to integrate social, ecological, environmental, and technical approaches to build capacity at the local level on coastal resource management and disaster preparedness. Activities included visits to AIT's Energy Park, Geotechnical Engineering Laboratory, and Aquaculture Facilities for participants to learn about coastal mitigation measures, such as the use of renewable energy and coastal protection infrastructure. By the end of the week, participants had prepared a coastal mitigation strategy for Muang Kluang Sub-district in Kapoe District, which they will take back to Ranong to share with their communities and develop an action plan over the next two months.

S. Jumnongsong

A coastal village in Muang Kluang in Ranong, Thailand. The mangroves serve as a breeding and nursery ground for aquatic organisms and protect against coastal hazards.

S. Jumnongsong

Training participants visit AIT's Energy Park where alternative energy sources are shown and their uses are demonstrated.

Training on Seismic Hazards for Thai Experts

January 16-19, 2007, Bangkok, Thailand

More than 150 Thailand geologists, geophysicists, engineers, and public policy officials attended a workshop and training by the U.S. Geological Survey (USGS) during January 16-19 at Chulalongkorn University in Bangkok, under the USAID-funded US IOTWS Program. The program aimed to strengthen Thailand's ability to understand earthquake risks using improved data, analysis, and maps. Thai and U.S. scientists conducted the training which addressed geological and seismological principles, seismic hazard concepts, and seismic engineering practices. Instructors presented hazard codes, and distributed computer software to the participants in an interactive hands-on training module. Participants will use the training experience to improve Thailand's disaster planning (as part of its overall early warning capabilities) and construction of earthquake-resistant buildings in regions newly discovered to face elevated seismic risks. Thailand's Dam Safety group has already translated some of the material for future training of its personnel.

Tsunami Warning Dissemination Following Indonesian Earthquake

January 21, 2007, Manado, Indonesia

A powerful earthquake struck Manado, Indonesia, at 7:27 pm (local time) on January 21, 2007, causing alarm and some damage to buildings in the cities of Bitung and Manado. The earthquake was first measured to be 6.5 magnitude (M) on the Richter Scale and was later upgraded by additional sensors and analysts to measure 7.6 M. According to witnesses, there was a small localized tsunami of three wave surges in the narrow Lembeh Strait passage on the southern side of the North Sulawesi Peninsula. Within seven minutes of the earthquake, key agencies and some mobile phone users received a text message that included a local tsunami alert from the Meteorological and Geophysical Agency of Indonesia (BMG). Radio and television stations, telecommunications networks, mosques and churches, and numerous other organizations were included in the early warning chain to ensure that information reached residents. News of the earthquake and tsunami potential was broadcasted on local and international stations approximately 16 minutes after the quake struck. The possibility of a tsunami sent people running inland to seek the safety of higher ground. As aftershocks were felt throughout the night, BMG continued to send messages. A team member of the US IOTWS Program recorded the messages and the time at which they were received, as well as the times that BMG reported the event occurrence. Based on 28 messages received that evening, it took an average of 10.4 minutes for alerts to reach mobile phones linked to the dissemination system. Below is a sampling of the text messages BMG sent on the night of January 21-22 (translated from Indonesian, Manado local times):

19:27 6.5 RS [Richter Scale] EQ [earthquake]. 160 km southeast from Manado, 51 km depth. Potential tsunami.

20:35 In relation to the earthquake at 19:27 in the sea southeast of Manado that had potential for tsunami, there was no tsunami occurring.

03:59 4.9 RS EQ. 155 km west sea of Labuha, North Maluku. 33 km depth.

A total of 27 aftershocks of 4.5 to 5.8 were reported through this dissemination system in the 11 hours after the first major quake. This experience showed that the Indonesian alert system is performing far better than just six months ago in getting alerts to locally affected communities.

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

US IOTWS Program Event: Third Tsunami Alert Rapid Notification System (TARNS) Workshop

Nakorn Nayok, Thailand — *February 6-8, 2007*

For more information contact S.H.M. Fakhruddin, US IOTWS Program, at fakhruddin@adpc.net

US IOTWS Program Event: Basic and Intermediate ICS Training

Colombo, Sri Lanka — *February 20-23, 2007*

For more information contact Trudie Mahoney, USFS, at tmahoney@fsip.net

US IOTWS Program Event: National Coastal Community Resilience Training

Sri Lanka — *February 26–March 2, 2007*

For more information contact Atiq Ahmed, US IOTWS Program, at atiq@iotws.org

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Thailand Conducts Tabletop Tsunami Warning Exercise
February 6-8, 2007, Nakorn Nayok, Thailand

The Government of Thailand through the National Disaster Warning Center (NDWC) conducted a tabletop tsunami warning exercise during the Third Tsunami Alert Rapid Notification System (TARNS) workshop held in Nakorn Nayok from February 6-8, 2007. This workshop was organized under the TARNS program as part of the US government's support to develop the Indian Ocean Tsunami Warning System (IOTWS) in collaboration between NDWC, USAID, the US Department of Agriculture's Forest Service (USDA/FS), and the National Oceanic and Atmospheric Administration (NOAA). Rear Admiral Thaworn Chareondee, Vice Executive Director of NDWC, and Dr. Smith Dharmasaroja, Chairman of the National Disaster Warning Administration, NDWC, opened the workshop. Approximately 80 government officials from all levels, private sector, and local organizations received training and learned about US experiences on warning simulations. Participants then conducted a tsunami warning exercise for Thailand.

First Incident Command System (ICS) Course Taught by Sri Lankan Trainers
February 20-23, 2007, Sri Lanka

More than 40 representatives from Sri Lankan government emergency response agencies and non-governmental organizations came together February 20-23, 2007 to attend the first Incident Command System (ICS) course taught by Sri Lankan master trainers. This significant milestone marks the culmination of a series of eight train-the-trainer Incident Command System courses in Sri Lanka and several study tours hosted by the US Department of Agriculture's Forest Service (USDA/FS) in the United States. The series of trainings comes under the USAID-funded US IOTWS Program. The training process has established linkages with key counterparts in the Sri Lankan government and non-governmental organizations. Several dignitaries, including Mr. P. D. Amarasinghe, Secretary of the Ministry of Disaster

SHM Fakhruddin

Sri Lankan Master Trainers with the chief guest, Mr. P.D. Amarasinghe, Secretary of the Ministry of Disaster Management and Human Rights (middle), and USDA/FS resource advisers Ms. Trudie Mahoney (second from right) and Ms. Janice Gauthier (second from left)

Management and Human Rights, and Major General Gamini Hetttiarachchi, Director General of the Disaster Management Center, were present at the February session. Major General Hettiarachchi stated in his opening remarks, "This is the first training course taught by the locals and it will help us to develop a better emergency management system. The more we are prepared, the quicker we can restore normalcy and infrastructure." With US IOTWS Program support, USDA/FS is providing vital skills development through ICS training to build emergency response capacity throughout Sri Lanka, India, Indonesia, Maldives, and Thailand.

SHM Fakhruddin

Participants from Ampara, Kandy, Galle, and Hambantota districts taking part in an ICS exercise

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

RANET Training Workshops to Support Site Deployment, March 20-22, 2007

Sri Lanka

For more information contact Indira Fernando, US IOTWS Program, at indira@iotws.org

Basic and Intermediate ICS for District Level, March 20-23, 2007

Galle District, Sri Lanka

For more information contact S.H.M. Fakhruddin, US IOTWS Program, at fakhruddin@adpc.net

Indonesia National CCR Training, March 26-30, 2007

Indonesia

For more information contact Atiq Ahmed, US IOTWS Program, at atiqka@adpc.net

Indonesia National Consultation on Assessment of Policy and Institutional Capacity for Disaster Management, April 3, 2007

Indonesia

For more information contact S.H.M. Fakhruddin, US IOTWS Program, at fakhruddin@adpc.net

Advanced ICS Course, April 6-22, 2007

Nevada, USA

For more information contact S.H.M. Fakhruddin, US IOTWS Program, at fakhruddin@adpc.net

Workshop on Local Standard Operating Procedures (SOP), April 10-12, 2007

Indonesia

For more information contact Stacey Tighe, US IOTWS Program, at stighe@cbn.net.id

Thailand National Consultation on Assessment of Policy and Institutional Capacity for Disaster Management, April 27, 2007

Thailand

For more information contact S.H.M. Fakhruddin, US IOTWS Program, at fakhruddin@adpc.net

Thailand National CCR Training, May 14-18, 2007

Thailand

For more information contact Atiq Ahmed, US IOTWS Program, at atiqka@adpc.net

About the US Indian Ocean Tsunami Warning System (IOTWS) Program

The US IOTWS Program is part of the international effort to develop tsunami warning system capabilities in the Indian Ocean following the December 2004 tsunami disaster. The US program adopts an "end-to-end" approach—addressing regional, national, and local aspects of a truly functional warning system—along with multiple other hazards that threaten communities in the region. In partnership with the international community, national governments, and other partners, the US program offers technology transfer, training, and information resources to strengthen the tsunami warning and preparedness capabilities of national and local stakeholders in the region.

For more information please visit **www.us-iotws.gov**.

USAID | ASIA
FROM THE AMERICAN PEOPLE

U.S. Contribution to the Indian Ocean Tsunami Warning System

March 2007
US IOTWS Program Update

US Indian Ocean Tsunami Warning System (IOTWS) Program
from advanced technologies to resilient communities

National Workshops on Coastal Community Resilience (CCR) in Sri Lanka and Indonesia

February 26-March 2, 2007, Ahungalla, Sri Lanka; March 26-30, Jakarta, Indonesia

Over 65 participants from government agencies, NGOs, and universities in Sri Lanka and Indonesia shared their experiences on coastal community resilience (CCR) and learned about new tools that can be used to analyze and prepare for hazards. Initiated through the US IOTWS Program with partners from throughout the region, CCR provides a holistic framework to address the increasing risks from coastal hazards and vulnerable communities living in coastal areas.

Photo: US IOTWS Program

CARE Indonesia facilitating a field mapping exercise during the workshop in Jakarta

During the two workshops, US experts trained participants on methods to assess and strengthen resilience, based on eight elements: governance, socio-economic and livelihood assets, coastal resources management, land use management and structural design, risk knowledge, warning and evacuation, emergency response, and disaster recovery. The presentations and exercises were designed to help participants in understanding the technical and practical issues in building coastal community resilience.

Both events concluded with several national Sri Lankan and Indonesian agencies committing to immediate action plans for using the CCR approach and assessments in selected communities. The participating agencies also shared their plans for incorporating CCR into their ongoing work plans. The next National Workshop on CCR, in Thailand, will be during June 4-8, 2007.

Photo: US IOTWS Program

Participants at the CCR Indonesia workshop

Tsunami Geology Field Training on Phra Thong Island, Thailand

February 28-March 7, 2007, Phra Thong Island, Thailand

Geologic field work supported by the US IOTWS Program has begun to clarify Indian Ocean tsunami history and hazards. From February 28 to March 7, 2007, a team of Thai, Indian, and U.S. scientists uncovered evidence for pre-2004 tsunamis on Phra Thong Island, Thailand. As shown in the photo to the right, four beds of light-colored sand each rest on dark soil. The uppermost sand bed records the tsunami of December 26, 2004, and the underlying sand beds probably represent earlier tsunamis from the past few thousand years. Further study of such evidence is likely to show how often the Indian Ocean is engulfed by tsunamis like the one in 2004. The resulting estimates of tsunami frequency can help provide guidance to Indian Ocean governments and other stakeholders on locations for detection devices and foster more resilient coastal development.

Photo: Brian Atwater

Layer-cake evidence for four Indian Ocean tsunamis surrounds Kruawun Jankaew, a geologist at Chulalongkorn University, Thailand. Dr. Kruawun led the international team that made this discovery in March 2007.

USAID Concludes Study on Sri Lankan Policies and Institutional Capacity for Early Warning and Disaster Management

March 7, 2007, Colombo, Sri Lanka

Under the USAID-funded US IOTWS Program, the Asian Disaster Preparedness Center (ADPC) and several U.S. Government experts recently concluded a study of the policies and institutional capacity for early warning and disaster management in Sri Lanka. At a national consultative meeting, 20 high-ranking Sri Lankan disaster management officials reviewed the findings of the assessment and its recommendations. Based on those findings, the Sri Lankan government has agreed to establish a national committee to develop impact outlooks with warning information; pilot an early warning system and communication plan; and develop local standard operating procedures (SOPs). The US IOTWS Program conducted similar studies in Indonesia and Thailand and will soon hold national consultations with these countries.

Photos: Ramraj Narasimhan

Mr. Benjamin Kauffeld (right), USAID Sri Lanka, and Major General Gamini Hettiarachchi, Director General of the Sri Lankan Disaster Management Center, address the national consultative meeting on Sri Lanka's policies and institutional capacity for disaster management.

Indonesians Receive Radio Phones and Training to Rapidly Communicate Emergency Information

March 20-23, 2007, Jakarta, Indonesia

In March, the US IOTWS Program introduced a critical communications technology to Indonesia's tsunami warning system, and other countries. Leading up to World Meteorological Day on March 23, the U.S. National Oceanic and Atmospheric Administration (NOAA) distributed 150 radio phones and trained 25 disaster management technicians from the region on RANET warning communications. Ten Asian countries participated in the training including the technical field staff from Indonesia's Meteorological and Geophysical Agency (BMG)

stations and communications staff from the Ministry of Marine Affairs and Fisheries. NOAA developed RANET as a community-based emergency communications system to reach the "last mile" in developing countries and remote locations. To date, 150 RANET units are being disseminated to tsunami-affected communities in Indonesia and another 50 units in Sri Lanka. The radios were featured in exhibits for World Meteorological Day. USAID, NOAA, and BMG jointly sponsored trainees from the 10 countries in order to promote greater sharing and cooperation at a regional level.

BMG Celebrates World Meteorological Day

March 23, 2007, Jakarta, Indonesia

The Meteorological and Geophysical Agency (BMG) of Indonesia and the Ministry of Home Affairs hosted a World Meteorological Day workshop on March 23, with the participation of 23 governors and 40 mayors from across the country. The workshop aimed to raise awareness of the importance of effective monitoring and forecasting systems, with a focus on developing local tsunami early warning systems in Indonesia. Representatives from the US IOTWS Program participated, including the U.S. Forest Service, Asian Disaster Preparedness Center, U.S. National Oceanic and Atmospheric Administration (NOAA), and Mayor Harry Kim of Hawaii County. The Minister for Communication Ir. Hatta Rajasa, Minister for Research and Technology Dr. Kusmayanto Kadiman, and Minister for Home Affairs Mohammad Ma'ruf provided key note speeches. President H.E. Susilo Bambang Yudhoyono presented awards to local administrations, the media, and other agencies for their active roles in disseminating early warning information to the public. Participants also identified strategies for further investments in the system and toured an exhibit of forecasting and warning technology, including the RANET system and others. Remarking on BMG's collaboration with NOAA to introduce RANET, BMG Director General Ir. Sri Woro Harijono mentioned the RANET Training Course on Tsunami Warning Dissemination conducted March 20-22 and said, "*This system is making use [of] the satellite communication system AsiaStar which is free of charge and able to broadcast information to all the remote islands in Indonesia.*"

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

Advanced ICS Course, April 6-22, 2007
USA
For more information contact S.H.M. Fakhruddin, US IOTWS Program, at fakhruddin@adpc.net

Workshop on Local Standard Operating Procedures (SOP), April 10-12, 2007
Indonesia
For more information contact Stacey Tighe, US IOTWS Program, at stighe@cbn.net.id

Thailand National Consultation on Assessment of Policy and Institutional Capacity for Disaster Management, April 27, 2007
Thailand
For more information contact S.H.M. Fakhruddin, US IOTWS Program, at fakhruddin@adpc.net

Indonesia Basic/Intermediate ICS Training Course, April 30-May 4, 2007
Jakarta, Indonesia
For more information contact S.H.M. Fakhruddin, US IOTWS Program, at fakhruddin@adpc.net

Regional Sharing of Best Management Practices on Incident Command Systems for Disaster Management, May 8-11, 2007
Jakarta, Indonesia
For more information contact S.H.M. Fakhruddin, US IOTWS Program, at fakhruddin@adpc.net

Thailand National CCR Training, June 4-8, 2007
Thailand
For more information contact Atiq Ahmed, US IOTWS Program, at atiqka@adpc.net

About the US Indian Ocean Tsunami Warning System (IOTWS) Program

The US IOTWS Program is part of the international effort to develop tsunami warning system capabilities in the Indian Ocean following the December 2004 tsunami disaster. The US program adopts an "end-to-end" approach—addressing regional, national, and local aspects of a truly functional warning system—along with multiple other hazards that threaten communities in the region. In partnership with the international community, national governments, and other partners, the US program offers technology transfer, training, and information resources to strengthen the tsunami warning and preparedness capabilities of national and local stakeholders in the region.

For more information please visit **www.us-iotws.gov**.

April 2007
US IOTWS Program Update

US Indian Ocean Tsunami Warning System (IOTWS) Program
from advanced technologies to resilient communities

Warning System Alerts Asia-Pacific Region as Tsunami Strikes Solomon Islands after Earthquake

April 2, 2007, Bangkok, Thailand

On Monday, April 2nd, an 8.0 magnitude undersea earthquake caused a destructive tsunami that struck the Solomon Islands in the South Pacific, killing at least 25 and displacing thousands. Because the islands were so close to the earthquake epicenter, their only advance warning was feeling the strong earthquake itself. Some immediately questioned the value of building and maintaining the sophisticated regional tsunami warning systems (TWSs) in the Pacific, the Indian Ocean, and elsewhere, and called for renewed attention to strengthening local preparedness. While community preparedness remains a critical part of the overall disaster warning and mitigation system, tsunami warning systems are intended to play a vital role in alerting those thousands of communities across an ocean basin which *do* have enough time to evacuate—whether in minutes or hours.

While it was not possible to alert the Solomon Islands through the Pacific warning system, the U.S. Pacific Tsunami Warning Center, Japan, and others did issue warnings on Monday to dozens of countries across the Asia-Pacific region, first to alert them to the possibility of destructive tsunamis in the Pacific region, and later to cancel the warning based on additional data and analysis. Warning systems in two of those countries—Indonesia and Thailand—have benefited from extensive international support since the 2004 tsunami, including from the USAID-funded U.S. Indian Ocean Tsunami Warning System (IOTWS) Program. As a sign of effective system operation, on Monday each country followed its standard tsunami warning procedures and made proper determinations not to issue national warnings—both avoiding panic and demonstrating that the national governments can quickly receive and analyze tsunami data in case of real tsunami risks.

Sri Lankan Government Officials Receive Training in the US on Organizational Management for Disaster Response

April 6-22, 2007, Nevada and California, USA

A group of 15 senior Sri Lankan government officials visited the United States to learn about the organizations and structures required for establishing Incident Command System (ICS) teams for disaster management by participating in the California Interagency Incident Management Teams (CIIMT) Workshop and the Advanced ICS Workshop. Participants attended the CIIMT Workshop from April 10-12, 2007, in Reno, Nevada, which provided the tools necessary for interagency ICS personnel at all levels to perform their jobs in the most efficient and professional manner possible, regarding issues

S.H.M. Fakhruddin

Sri Lankan government officials with Mike Dietrich (third from left) and Ed Hollenshead (fifth from left) of the Southwest Pacific region, Fire and Aviation, USDA/FS, in the 2007 CIIMT Workshop

such as interagency communication, communication with news media, air operations safety, planning, logistics, and finance. The workshop provided a single forum for local and national ICS teams to share the latest information; discuss real-life incident management issues, challenges, and solutions; learn new procedures and policy changes; and network with their interagency counterparts and team members. The Advanced ICS course followed during April 16-20 in California as one of a series of activities through which the Government of Sri Lanka is working together with the US IOTWS Program to institutionalize ICS within its government agencies.

Indonesians Build Capacity to Develop Local Standard Operating Procedures for Tsunami Early Warning and Response

April 10-12, 2007, Jakarta, Indonesia

USAID, together with the United Nations Education, Scientific, and Cultural Organization's Intergovernmental Oceanographic Commission, International Federation of Red Cross and Red Crescent Societies, United Nations Development Programme, and German Technical Cooperation co-sponsored a series of four workshops in Indonesia on building capacity for the development of local standardized operating procedures (SOPs) for tsunami early warning and response. The series provided the opportunity for officials and key stakeholders from local government agencies in Aceh, Padang, and Bali, along with their national counterparts, to begin planning for tsunami early warning and response, initially with how to receive the information from the national warning system at the local level. Indonesian and international experts, including members of the US IOTWS Program team, facilitated discussions and trained participants on issues such as defining the local context, identifying roles and responsibilities, evacuation planning, and best practices. The workshops began in October 2006, and the fourth and final event took place during April 10-12, 2007, in Jakarta.

With Indonesia's decentralized governance, the delivery of final warnings and orders to evacuate are under the mandate of local governments, which have close coordination with the Meteorological and Geophysical Agency, National Disaster Management Coordinating Board, the Indonesian Red Cross Society, and others. Strengthened links between stakeholders at all administrative levels are needed for effective end-to-end responses, and workshop results over the past six months have shown progress in the development of SOPs for Aceh, Padang, and Bali that are compatible with national warnings and response, yet adapted to the needs of local areas. Following the series, the US IOTWS Program, UNDP, and GTZ will continue working with these local governments to finalize their SOPs and strengthen tsunami preparedness. The agencies will then disseminate lessons learned and share these experiences with ministries' disaster risk reduction programs and with Banten Province, which will become the site for the national tsunami evacuation response drill in December 2007.

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

Indonesia Basic/Intermediate ICS Training Course, April 30-May 4, 2007
Jakarta, Indonesia
For more information contact S.H.M. Fakhruddin, US IOTWS Program, at fakhruddin@adpc.net

Regional Sharing of Best Management Practices on Incident Command Systems for Disaster Management, May 8-11, 2007
Jakarta, Indonesia
For more information contact S.H.M. Fakhruddin, US IOTWS Program, at fakhruddin@adpc.net

Thailand National CCR Training, June 4-8, 2007
Thailand
For more information contact Atiq Ahmed, US IOTWS Program, at atiqka@adpc.net

Second Workshop on Inundation Modeling, June 29-July 6, 2007
Bangkok, Thailand
For more information contact Vasily V. Titov, National Oceanic and Atmospheric Administration, at vasily.titov@noaa.gov

About the US Indian Ocean Tsunami Warning System (IOTWS) Program

The US IOTWS Program is part of the international effort to develop tsunami warning system capabilities in the Indian Ocean following the December 2004 tsunami disaster. The US program adopts an "end-to-end" approach—addressing regional, national, and local aspects of a truly functional warning system—along with multiple other hazards that threaten communities in the region. In partnership with the international community, national governments, and other partners, the US program offers technology transfer, training, and information resources to strengthen the tsunami warning and preparedness capabilities of national and local stakeholders in the region.

For more information please visit **www.us-iotws.gov**.

May 2007
US IOTWS Program Update

US Indian Ocean Tsunami Warning System (IOTWS) Program
from advanced technologies to resilient communities

Incident Command System (ICS) Basic/Intermediate Course for Indonesian Disaster Managers

April 30–May 4, 2007, Jakarta, Indonesia

Indonesian disaster managers learned new approaches to operating emergency response organizations during the Incident Command Systems (ICS) for Disaster Management Basic and Intermediate training course, conducted by the US Forest Service (USFS). ICS allows governments to respond more quickly and effectively to incidents, improve coordination, and improve planning, cost-effectiveness, and logistics. Sessions encouraged cross-agency collaboration as the 35 participants identified processes for integrating ICS into existing disaster management practices. The National Coordination Board for Disaster Management (BAKORNAS PB) Director Mr. Sugeng Triutomo said, "ICS will provide us with a great opportunity to enrich the Indonesian disaster management system and organizational structure. The participants here need to facilitate the integration of ICS for emergency management in their own agencies and train other officials on these skills and practices."

Officials from Across Indian Ocean Region Share Best Practices on Incident Command Systems for Disaster Management

May 8-11, 2007, Jakarta, Indonesia

S.H.M. Fakhruddin

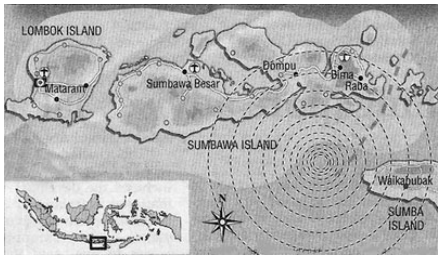
Minister Mahinda Samarasinghe (second from right) providing the keynote speech

Over 70 participants at this regional workshop, sponsored by USAID and co-hosted by BAKORNAS, engaged in lively discussions on how ICS enhances emergency management systems. The Honorable Mr. Mahinda Samarasinghe, Sri Lanka's Minister of Disaster Management and Human Rights, delivered a speech that provided real-world perspective on the Government of Sri Lanka's experience. He discussed how ICS will help Sri Lanka to more effectively manage natural and man-made disasters, as well as the influx of humanitarian aid following complex disasters such as the 2004 tsunami. A three-hour dialogue between Sri Lankan and Indonesian officials resulted in an exchange of innovative strategies for building capacity in disaster management, culminating in a meeting with Indonesian Vice President Jusaf Kalla.

Indian Ocean Disaster Warning Center Detects Earthquake in Central Indonesia

May 24, 2007, Nusa Tenggara, Indonesia

An earthquake in Nusa Tenggara province occurred at 9:06 AM local time on May 24, triggering a tsunami alert from the Indonesian Meteorological and Geophysical Agency (BMG). The earthquake, which BMG measured at 6.5 and the US Geological survey (USGS) at 5.5, resulted in no casualties or major damage. BMG responded rapidly by sending out a message at 9:12 AM warning of a potential tsunami to local communities around Sumba



Jakarta Post

Location of earthquake in Central Indonesia

Island, but the warning was cancelled shortly afterwards upon confirmation that there was little actual risk of a tsunami. The US IOTWS Program has been actively working with Indonesia to strengthen its warning systems, including the installation of two coastal sea level stations, the upgrade of a third, and their integration into the IOC Global Sea Level Observing System (GLOSS) network. In addition, the program has provided technical assistance through various tsunami modeling, seismic hazard, paleoseismology, disaster management, coastal community resilience and other trainings to BMG and other key stakeholders. BMG also uses USGS, US Pacific Tsunami Warning Center, and other sources in the region to calibrate its seismic detection systems.

District-level Officials in Kandy, Sri Lanka Gained Skills on Basic/Intermediate ICS

May 23-25, 2007, Kandy, Sri Lanka

Through training and technical assistance from the US IOTWS Program, the Sri Lankan government has institutionalized ICS within its disaster management system and is now continuing to build the capacity of its personnel at the local levels. Sri Lanka's Disaster Management Centre (DMC) and the American Red Cross jointly conducted the second district-level Basic/Intermediate ICS course in Kandy, building on lessons and training modules from the first course conducted in Galle in March 2007. Resource persons included master trainers from DMC and other government agencies, who have all successfully completed a series of eight ICS courses under the US IOTWS Program.

Sleuthing Tsunami History

April 21-May 9, 2007, Java and Sunda Strait, Indonesia

The Indonesian Institute of Science (LIPI) has unearthed clues for determining the return period for tsunamis in Java, which was struck by a tsunami in July 2006 that took over 600 lives. Understanding how frequently large events occur will help scientists and officials to improve the country's early warning system. This recent fieldwork in Java and Sumatra, co-led by scientists from LIPI and the US Geological Survey and supported in part by US IOTWS, provided training to government researchers, university students, and lecturers. The tsunami geology findings will be used to assess risk and boost awareness under Indonesia's community-preparedness program. While conducting field research, the team also developed criteria for using coral boulders to estimate the strength of the 1883 Krakatau tsunami, which followed one of the most powerful volcanic explosions in recorded history.

Brian Atwater

Eko Yulianto digs out geologic clues to Java's tsunami potential near Pangandaran

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

Second Workshop on Inundation Modeling, June 29-July 6, 2007
Bangkok, Thailand
For more information contact Vasily V. Titov at vasily.titov@noaa.gov

Emergency Response Full-Scale Simulation Exercise, June 27, 2007
Galle, Sri Lanka
For more information contact Indira Fernando at indira@iotws.org, or S.H.M. Fakhruddin at fakhruddin@adpc.net

Study Tour to US on ICS and Disaster Management, July 14-28, 2007
Vallejo, California USA
For more information contact S.H.M. Fakhruddin at fakhruddin@adpc.net

International Tsunami Training Institute, 21 July-2 August, 2007
Seattle, Washington USA
For more information contact Chatchalapa Chongpaibul at chatchalapa@iotws.org

About the US Indian Ocean Tsunami Warning System (IOTWS) Program

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U.S. Contribution to the Indian Ocean Tsunami Warning System

June 2007
US IOTWS Program Update

US Indian Ocean Tsunami Warning System (IOTWS) Program
from advanced technologies to resilient communities

USAID Program Trains Thai Teams on Assessing Coastal Community Resilience
June 4-8, 2007, Phuket, Thailand

Baan Nam Kem, a coastal community in Phang Nga, Thailand, is making strides towards recovery from the 2004 tsunami, particularly regarding livelihoods. Disaster managers and coastal resource managers formed teams to conduct a practice assessment as part of a national Coastal Community Resilience (CCR) training. Since the 2004 tsunami, most fishing households have diversified their income. The community has also established its own banking system so members can access funds at favorable interest rates. Looking ahead, the CCR teams found that while villagers are aware of coastal hazards, improved community resilience still requires a better understanding of risks through scientific knowledge, stronger links with the national warning system, and improved community preparedness.

US IOTWS Program: Chatchie Chongpaibul

Community radio announcer in Baan Nam Kem, Thailand, demonstrates warning process

Indonesian National Consultation to Review DM Policies
June 14, 2007, Jakarta, Indonesia

A recent USAID-supported review of disaster management policies and institutional capacity in Indonesia was presented at a national consultation on June 14, 2007. The report shows that the country has reached several milestones in strengthening its capacity for early warning, preparedness, and response since the 2004 tsunami. Chief among the accomplishments highlighted is the passage of a new disaster management bill in the Parliament. It also outlines seven recommendations for further improvement including enhancing local early warning systems and establishing emergency operations centers. The seven recommendations are in the process of being addressed by the US IOTWS Program, other donors, and national agencies. The consultation provided a forum for disaster management stakeholders to give additional inputs to the report. The report is serving as a living document that is marking progress and priorities for Indonesian disaster management over time.

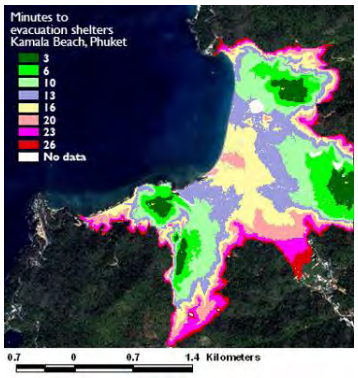
Save Andaman Network and ETSU Present Findings of Natural Tsunami Warning Study
June 18--June 20, 2007, Krabi, Thailand

A study recently completed under a US IOTWS Program grant has identified promising new ways to increase the efficacy of tsunami warning systems. While warning systems often focus on technical components and official notification roles, they often neglect social considerations, informal notification mechanisms, and natural environmental alerts. Case studies have shown that tsunami education programs may not increase the level of community preparedness if they do not also address how communities evaluate risk, the benefits of mitigation efforts, and the need for personal responsibility. Working in Thai communities, a joint research team from Save

Andaman Network and East Tennessee State University (ETSU) identified an effective model for warning systems that integrates social and technical warning system components. The findings for improving tsunami warning systems, such as the greater inclusion of communities in national disaster management and warning efforts, were presented at an international workshop June 18-20, 2007, in Krabi, Thailand.

US IOTWS Grant Recipients Map Potential Evacuation Routes in Phuket

June 25–June 28, 2007, Pathumthani, Thailand



US IOTWS/AIT GIC

The Geoinformatics Center of the Asian Institute of Technology (AIT) and Thailand's Department of Disaster Mitigation and Prevention (DDPM) have prepared a case study on possible tsunami evacuation routes in Kamala Beach, Phuket, Thailand. Results show that people will be able to walk to safe areas within three to twenty-six minutes after a tsunami warning is issued. These findings provide valuable information for planning a safe and effective evacuation in case of a warning in one of Thailand's most popular tourist destinations. The case study, along with training on multi-hazard risk assessment, was conducted as part of the US IOTWS Small Grants Program. The training was held at AIT June 25-28, 2007, with twenty participants from various Thai government agencies. Case studies have also been conducted in India, Indonesia, and Sri Lanka under the grant.

Sri Lanka Conducts Disaster Simulation Exercise in Habaraduwa, Galle

June 27, 2007, Habaraduwa, Sri Lanka

Sri Lankan officials conducted a simulation exercise in Galle's Habaraduwa division, to show how Incident Command Systems (ICS) can be applied within division-level units of disaster management agencies. The exercise simulated a disaster arising from widespread flooding and showcased successful ICS mechanisms that participants from sectors spanning health, emergency services, infrastructure, utilities, hotels, and NGOs will be able to apply in future emergency situations. Following the simulation, organizers from the Sri Lankan government, the US IOTWS Program, and the American Red Cross identified weaknesses and opportunities to improve existing disaster response plans.

S.H.M. Fakhruddin

ICS team conducting an operational briefing before the disaster simulation

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

Study Tour to US on ICS and Disaster Management, July 14-28, 2007

Vallejo, California USA

For more information contact S.H.M. Fakhruddin at fakhruddin@adpc.net

International Tsunami Training Institute Certification Program, July 21-August 2, 2007

Seattle, Washington USA

For more information contact Chatchalapa Chongpaibul at chatchalapa@iotws.org

Tsunami Alert Rapid Notification System Regional Workshop, August 13-14, 2007

Sanur, Indonesia

For more information contact Stacey Tighe at stighe@cbn.net.id, or S.H.M. Fakhruddin at fakhruddin@adpc.net

Coastal Community Resilience Regional Workshop, August 14-16, 2007

Sanur, Indonesia

For more information contact Stacey Tighe at stighe@cbn.net.id, or Atiq Ahmed at atiqka@adpc.net

About the US Indian Ocean Tsunami Warning System (IOTWS) Program

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For more information please visit **www.us-iotws.gov**.

USAID | ASIA
FROM THE AMERICAN PEOPLE

U.S. Contribution to the Indian Ocean Tsunami Warning System

July 2007

US IOTWS Program Update

US Indian Ocean Tsunami Warning System (IOTWS) Program
from advanced technologies to resilient communities

Global Telecommunications System Equipment Upgraded in Sri Lanka and the Maldives

June 2007, Male, Maldives, and Colombo, Sri Lanka

Under the US IOTWS Program, the National Oceanic and Atmospheric Administration (NOAA) provided Sri Lanka and the Maldives with state-of-the-art communication systems. The upgrade of Global Telecommunications System (GTS) equipment supports the fast and reliable data exchange that is essential for responding to multi-hazard events, including tsunamis. The GTS is part of a global network for the transmission of meteorological data from weather stations, satellites, and numerical weather prediction centers. The upgrades include the installation of Message Switching Systems (MSS) and meteorological workstations, which were integrated into the national meteorological centers in Colombo and Male. Technical support from NOAA also includes training for operational staff and a one-year maintenance contract.

Indonesian Officials Strengthen Tsunami Early Warning Communications and Procedures

July 11-13, 2007, Banten, Indonesia

Indonesian disaster management specialists met in Banten Province to review and strengthen their local tsunami early warning systems and standard operating procedures (SOPs). More than 40 disaster managers participated in the workshop, which aimed to strengthen links between provincial and local government officials, as well as relevant stakeholders, to deliver warning messages effectively to the public at risk. During this USAID-supported workshop, officials at the Meteorological and Geophysical Agency (BMG) of Indonesia mapped the pathways in which warning messages are conveyed from the central office to regional BMG offices. Participants discovered an important communications gap during the group exercise which prompted BMG to hold follow-up meetings in Jakarta so that warning messages will be conveyed seamlessly down the command chain from the national to the regional level.

Bryan J. Fisher

Indonesian officials mapping warning communications pathways in group discussions

Sri Lankans Visit U.S. to Reinforce ICS and Disaster Management Skills

July 14-28, 2007, Vallejo, California, USA

The U.S. Forest Service recently conducted a Study Tour under the US IOTWS Program for 10 Sri Lankan disaster managers on Incident Command System as practiced in the U.S. Participants visited the offices of NOAA, Washington State Office of Emergency Management, Oregon State Office of Emergency Management, the Pacific Northwest Interagency Coordination Center and the Northern California Interagency Operations Center. The latter part of the tour was highlighted by a three-day stay on a wildland fire incident being managed by the U.S. Forest Service's Type One Incident Management Team.

Regional Observers Learn Invaluable Lessons from Thailand Tsunami Drill, Largest of its Kind

July 25–July 28, 2007, Thailand

On July 25, The Government of Thailand set a major milestone in development of tsunami warning system capabilities, holding the largest tsunami warning exercise in the region to date. Twenty-four communities in the tsunami-effective areas along the southern coasts participated in the exercise which was heralded as a major success in terms of achieving high levels of participation, raising awareness, showcasing effective warning system operations, and, in particular, identifying areas for improvement. The exercise represented the culmination of a two year effort under the US IOTWS Program to help Thailand develop its capacity for rapidly issuing tsunami alerts, and to promote regional sharing of the experience. Participants from nearby countries saw the simulation as offering immediate concrete lessons to take home, including important steps to improve elements of their own disaster management systems, continued exchange of important scientific and technical information, and the creation of new bilateral working relationships.

Community members in Phuket evacuate as part of the Andaman Wave 2007 tsunami drill.

Courtesy of the Phuket Gazette

Disaster Management Specialists from Indian Ocean Participate in First Offering from the International Tsunami Training Institute (ITTI)

July 21—August 2, 2007, Seattle, Washington

Thirty-one participants from Indonesia, Sri Lanka, Thailand, India, and the Maldives took part in the inaugural two-week training course which marks the initial offering under the ITTI, an accredited training program funded under the US IOTWS Program and offered at the University of Washington and the Asian Institute of Technology. Through a combination of lectures, exercises, simulations, and field visits, participants strengthened their understanding of forecasting and detection, hazard assessment, and community preparedness and response.

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

Multi-hazards workshop on CONOPS and RANET, August 6-10, 2007

Colombo, Sri Lanka

For more information contact Indira Fernando at indira@iotws.org, or Ed Young at edward.young@noaa.gov

Tsunami Early Warning System Regional Workshop, August 13-14, 2007

Sanur, Indonesia

For more information contact Stacey Tighe at stighe@cbn.net.id, or S.H.M. Fakhruddin at fakhruddin@adpc.net

Coastal Community Resilience Regional Workshop, August 14-16, 2007

Sanur, Indonesia

For more information contact Stacey Tighe at stighe@cbn.net.id, or Atiq Ahmed at atiqka@adpc.net

Advanced Seismology for Tsunami Warnings Workshop, August 20-24, 2007

Bangkok, Thailand

For more information contact Walter Mooney at mooney@usgs.gov

Training Workshop on DART Data Analysis, August 27-28, 2007

Bangkok, Thailand

For more information contact S.H.M. Fakhruddin at fakhruddin@adpc.net

CONOPS Seminar for Senior Disaster Management Officials, August 23-24, 2007

Bangkok, Thailand

For more information contact S.H.M. Fakhruddin at fakhruddin@adpc.net, or Ed Young at edward.young@noaa.gov

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Inaugural Course Held under the International Tsunami Training Institute
July 21–August 2, 2007, Seattle, Washington, USA

US IOTWS Program

Brian Atwater, USGS, shows tsunami evidence in Willapa Bay, Washington

Thirty-one disaster managers from the region participated in the inaugural two-week training course in Seattle, Washington, under the International Tsunami Training Institute (ITTI). This accredited training program was offered jointly through the University of Washington and the Asian Institute of Technology (AIT). Through a combination of lectures, group exercises, simulations, and field visits, participants strengthened their understanding of forecasting and detection, hazard assessment, and community preparedness and response. These capacities are all vital for ensuring the operation and maintenance of end-to-end early warning systems. Several members of the US IOTWS Program participated as course instructors. Faculty from AIT observed the course to prepare for a similar offering in Bangkok, Thailand, in 2008.

Warning Communications Capacity Strengthened from National Level to the "Last Kilometer"
August 6-10, 2007, Colombo, Sri Lanka

The Sri Lankan Disaster Management Center (DMC) and the National Oceanic and Atmospheric Administration (NOAA) conducted a hands-on training course on the use of radio satellite technology (RANET) to download and distribute warning messages at the local level. RANET is a low-cost communications technology that creates last-kilometer linkages in the end-to-end warning system. At a follow-on workshop, participants from Sri Lanka and the Maldives received the "Tsunami Warning Resource Guide" which describes the resources required to create a system (equipment, expertise, and partnerships) and provides an overview of an end-to-end Concept of Operations (CONOPS). Participants identified challenges and opportunities for enhancing their tsunami warning systems, as well as strategies to improve these systems and communications between relevant agencies.

US IOTWS Program

Hands-on training to operate RANET satellite radios

Regional Disaster Management Specialists Assess Progress on Early Warning Systems
August 13-14, 2007, Sanur, Indonesia

More than 40 disaster management specialists met in Indonesia to conduct a critical review of the current status of the development of early warning systems in the Indian Ocean region. Organized by the US IOTWS Program, the workshop provided an opportunity for participants to highlight key successes and failures, as well as identify areas needing improvement in the development of the regional system. Participants from Australia, India, Indonesia, Sri Lanka, the Maldives, and Thailand shared information on the current status, progress, and experiences regarding tsunami warning and evacuation simulation exercises. The lessons learned will be incorporated into a document that will be distributed throughout the region.

Partners for Coastal Community Resilience Share Experiences and Finalize CCR Guide

August 14-16, 2007, Sanur, Indonesia

Participants representing 30 organizations in the region Thailand, Indonesia, Sri Lanka, and the Maldives shared results from community assessments and field work conducted in the region, which will provide critical information to support finalization of the Coastal Community Resilience (CCR) elements, resilience benchmarks, and assessment methodologies. The Second Regional Coastal Community Resilience Workshop in Indonesia also provided "Resilience in Action" examples that will enrich the final version of the CCR guide. The guide includes the assessment methodology and supporting resources, and will be distributed in October 2007. A strategic alliance of international organizations focused on institutionalizing CCR in the Indian Ocean region will meet in December 2007 to explore strategies for sustaining the CCR initiative.

Hawaii–Banten Exchange on State- and Local-level Approaches to Tsunami Warning

August 25-31, 2007, Banten, Indonesia, and Hawaii, USA

An exchange between Banten Province and the State of Hawaii on local disaster warning culminated in a concrete plan for a tsunami warning simulation in Banten in December 2007. The trip opened possibilities for collaboration on disaster and response planning, economic partnerships, and sister-state relationships. Banten and Hawaii share many characteristics, including coastal tourism, threats from local tsunamis, and volcanoes. A delegation of 10 Indonesians visited the counties of Oahu and Hawaii islands to learn about state and local level approaches for warnings on tsunamis and other hazards. The governors of Banten and Hawaii, municipal and state representatives, and technical specialists participated.

US IOTWS Program

Officials and technical specialists review a map of Banten

Thai Scientists Trained on Operating and Interpreting Data from the DART Network

August 27-29, 2007, Bangkok, Thailand

A core group of 25 engineers and scientists responsible for Thailand's tsunami warning system have gained new skills and knowledge on the use, operation, and maintenance of the U.S.-designed Deep-ocean Assessment and Reporting of Tsunamis (DART) system. The hands-on training familiarized participants with the instrument, data formats and protocols, and various tools that will be applied in its operational warning center for detecting, analyzing, and forecasting tsunamis using critical sea-level data now available to Thailand's National Disaster Warning Center (NDWC) and the Thai Meteorological Department (TMD). The National Oceanic and Atmospheric Administration (NOAA) conducted the seminar for NDWC, TMD, the Royal Thai Navy, and other agencies to provide a comprehensive overview of NOAA's DART tsunameter technology and its uses.

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

Thailand ICS Basic/Intermediate Training, September 17-21, 2007
Bangkok, Thailand
For more information contact SHM Fakhruddin at fakhruddin@adpc.net

DART Deployment and Launch Ceremony, September 19, 2007
Indonesia
For more information contact Stacey Tighe at stighe@cbn.net.id

US IOTWS Program Transition Workshop, December 6-7, 2007
Bangkok, Thailand
For more information contact Peter Collier at pcollier@iotws.org

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September 2007
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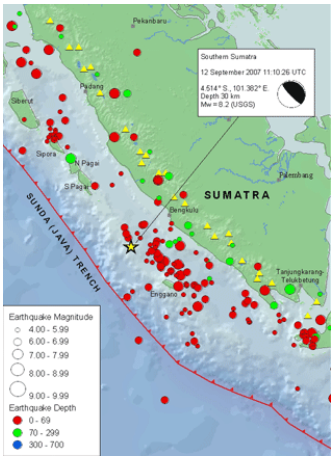


US Geological Survey

Map of earthquake magnitudes and depths off the coast of Sumatra

IOTWS is Put to the Test after 8.2 Earthquake Shakes Sumatra

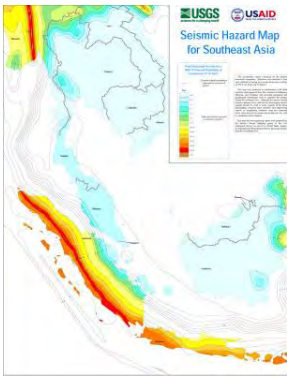
September 12, 2007, Sumatra, Indonesia

The developing Indian Ocean Tsunami Warning System (IOTWS) was put to the test after a magnitude 8.2 earthquake struck Sumatra on September 12, 2007, causing a tsunami of less than one meter in Padang, Indonesia. Warning centers were on high alert after the U.S. Geological Survey (USGS) and national seismic stations across the Asia-Pacific registered the event. NOAA's Pacific Tsunami Warning Center (PTWC) issued its first bulletin 15 minutes after the earthquake, alerting of a potential basin-wide tsunami. This event—the fourth earthquake of magnitude greater than 7.9 over the past decade near the plate boundaries offshore from Sumatra—reinforces the importance of a fully operational IOTWS. In support of efforts to strengthen regional detection and warning capacity, the US IOTWS Program has provided assistance such as PTWC warnings, the installation and integration of seismic stations into international networks, and the launch of a tsunami detection station off the Nicobar/Andaman Islands, which provided critical forecast data soon after the earthquake.

Scientists Gain New Understanding of Seismic Risks and Revise Hazard Maps for Southeast Asia

September 27, 2007, Bangkok, Thailand

USGS has revised seismic hazard maps for Southeast Asia which will promote disaster resilience by assisting engineers in designing buildings and developing building codes that withstand strong ground shaking. Accurate understanding of seismic risk will enable retrofitting and other measures that can reduce structural damage and the related loss of lives and livelihoods from large earthquakes in the future. The maps are the result of collaboration between USGS and local scientists and engineers in the Indian Ocean region to develop and apply new seismic models and ground-motion prediction equations. Building code officials are now updating the codes in Thailand and Indonesia to incorporate this information. USGS implemented the Southeast Asia Seismic Hazard Project under the US IOTWS Program to strengthen technical expertise on assessing seismic risks and developing seismic hazard maps.



US Geological Survey

Seismic hazard map for Southeast Asia

ICS Foundational Course in Thailand

September 17-21, 2007, Pathumthani, Thailand

Disaster managers in Thailand and the Maldives gained much-needed new skills in emergency response and coordination at the Incident Command Systems (ICS) Foundational Training Course, held at the Asian Institute of Technology in Bangkok. The course familiarized participants with organizational resources used in ICS, which

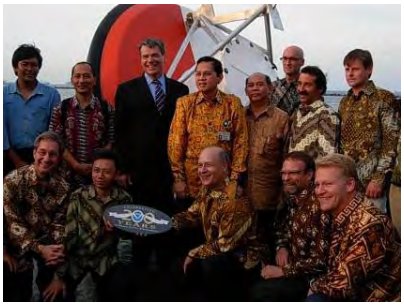
will improve inter-agency coordination, management structures, and communications, thereby increasing disaster response effectiveness. Organizers from the U.S. Forest Service (USFS), Asian Disaster Preparedness Center (ADPC), and other US IOTWS program partners facilitated exercises with scenarios including floods, explosions, storm surges, road accidents, and a ship wreck. Following the course, ADPC will work with Thailand's Department of Disaster Prevention and Mitigation, other relevant agencies in Thailand, and the Maldives' National Disaster Management Center to provide further technical assistance in ICS.

Indonesia Launches Second U.S.-designed Tsunameter in the Indian Ocean

September 19, 2007, Jakarta, Indonesia

The Jakarta Post

A technician checks the DART buoy before its launch into the Indian Ocean



US IOTWS Program

Indonesian and U.S. officials with the DART tsunameter

The second Deep-ocean Assessment and Reporting of Tsunamis (DART) buoy in the Indian Ocean was launched on September 19, 2007, under the USAID-funded US IOTWS. The tsunameter station includes a pressure gauge set on the ocean floor to monitor sea-level changes and communications equipment to send data via satellite to global networks. This is the first DART tsunameter managed by the Indonesian government, through the Agency for Assessment and Application of Technology (BPPT). Following a launching ceremony in Jakarta, which also marked the deployment of four ATLAS buoys to monitor climate change, the DART buoy was placed off the coast of West Sumatra at approximately 0^{0}N and 92^{0}E. The U.S. National Oceanic and Atmospheric Administration, BPPT, and Indonesia's Agency for Marine and Fisheries Research also agreed to future exchanges for capacity building in tsunami detection, climate monitoring, and fisheries management. Several earthquakes in Sumatra over the previous week, including a massive one measuring 8.2 on the Richter scale, underscores the need for a fully operational tsunami warning system and effective communication between warning centers and coastal communities. This tsunameter joins one jointly deployed with Thailand under the US IOTWS Program in December 2006 in a planned array of buoys that will ring the Indian Ocean to provide real-time data on potential tsunamis.

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

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October 2007

US IOTWS Program Update

SPECIAL ISSUE: SMALL GRANTS PROGRAM

US Indian Ocean Tsunami Warning System (IOTWS) Program

from advanced technologies to resilient communities

A Special Focus on the US IOTWS Small Grants Program

This month's Program Update provides a closer look at some of achievements completed through the US Indian Ocean Tsunami Warning System (IOTWS) Small Grants Program. The US IOTWS Program has funded 17 small grants in India, Indonesia, Sri Lanka, and Thailand as part of its $16.6 million two-year effort to support the development of an end-to-end warning system in the region. The grants program promoted pilot activities that contribute to community and bottom-up results in disaster mitigation, preparedness, and response.

Students Get the Word Out on Disaster Preparedness

Komunitas Siaga Tsunami (KOGAMI), Indonesia

Through KOGAMI's School Education Roadshow project, 60 schools in Indonesia collaborated in drafting school evacuation plans and hazard maps, which then served as a basis for full-school evacuation simulations. As a result, 17,700 students and 900 staff throughout Padang are better prepared for disasters and safe evacuation. A post-training assessment indicates that students are actively passing these skills on to their friends and family. KOGAMI and the schools also presented recommendations to local government officials, who have now committed to improving infrastructure and emergency equipment, particularly in "red zones", or the most disaster-prone areas. All 60 schools will include disaster preparedness in the local education curriculum and hold periodic evacuation simulations. In addition, Padang's Strategic Planning for Disaster Preparedness includes provisions to rehabilitate school buildings, and KOGAMI is continuing to develop a "Disaster Prepared School" certification program for 12 pilot schools.

KOGAMI

A student in Padang learning earthquake safety

For more information, contact Patra Rina Dewi at KOGAMI at patra@kogami.or.id.

Communities Chart Their Own Course for Sustainable Livelihoods

WorldFish Center, Indonesia

WorldFish

Community members in Aceh Jaya recording daily fish catch data

The WorldFish Center turned assessment into action, and research into results, while testing management options for the rehabilitation of fisheries and habitats in Indonesia. WorldFish worked with stakeholders in four villages (Pulo Raya, Lhok Kruet, Meunasah Kulam, and Blang Monlung) in Aceh Jaya to develop technically sound, sustainable management structures for natural resources and to support livelihoods. In a region largely untouched by much of the post-tsunami aid, WorldFish was able to make a difference using local knowledge and the support of a primarily Indonesian staff. The activities included testing fish cage cultures for tilapia or grouper; providing technical support to the *Panglima laot*, or tribal leaders in fishing communities; training for the *Panglima laot* to accurately record fish catch data and monitor information; replanting mangroves; and restoring coastal habitats.

Further testing and adoption of these practices will continue with the engagement of community stakeholders from Sampoinet, Aceh Jaya. The lessons learned and knowledge gained will be incorporated into WorldFish's continuing work in Aceh Jaya, Aceh Barat, and other regions.

For more information, contact Len Garces at WorldFish at l.garces@cgiar.org.

Two Communities More Prepared for Next Disaster

Sewalanka Foundation, Sri Lanka

Sewalanka Foundation

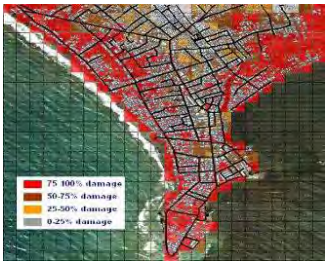
Children enjoying the activities while learning about disaster preparedness at the "Fun Bus"

The Sewalanka Foundation worked with two Sri Lankan communities, Kaluthara and Hambantota, to increase understanding of coastal hazards, including tsunami, so that they will be better prepared for future disasters. The project established an active and well-functioning Village Community Disaster Management Committee (VCDMC) in both of the communities. The VCDMCs took special notice of the most vulnerable members of their community (women, children, and the disabled) to ensure their safety and has developed excellent relations with relevant agencies in the area to guarantee ongoing support. Sewalanka and the VCMDCs implemented a community early warning system, organized mock drills, and conducted trainings regularly to reinforce emergency preparedness plans and answer questions and concerns from the community. With strong linkages to the National Disaster Management Center (DMC), these villages are now connected to the national warning system and lessons learned from this project can be applied to village preparedness initiatives across Sri Lanka.

For more information contact Nayana Maligaspe at Sewalanka-Kalutara at kalutara@sewalanka.org or Bilani Kodikara at Sewalanka-Hambantota at hambantota@sewalanka.org.

Building Multi-hazard Risk Assessment Teams

Asian Institute of Technology, Thailand



AIT Geoinformatics

Building damage assessment in Meulaboh, Indonesia

The Geoinformatics Center at the Asian Institute of Technology (AIT) has strengthened skills within a core group of professionals in India, Indonesia, Sri Lanka, and Thailand to apply tools such as remote sensing and GIS within a multi-hazard risk assessment framework. The project first provided intensive hands-on training sessions, and then participants undertook risk assessments in their home countries, focusing on tsunamis. The case studies included the development of tsunami hazard maps, agricultural and building damage maps, and evacuation plans. Results of these studies have already been used in government initiatives on tsunami preparedness. For example, when the Thai government was planning for the Andaman Wave tsunami evacuation simulation in July 2007, one case study provided valuable information on the times required to reach safe evacuation points in Kamala Beach in Phuket. The eight core participants organized four in-country training events to further expand multi-hazard risk assessment capacity to include 90 additional scientists and professionals in the region.

For more information contact Manzul Hazarika at AIT at manzul@ait.ac.th.

Bright Future for Tay Muang Beach

WWF, Thailand

The coral reefs just offshore Had Tay Muang in Phang Nga province provide an important fishing ground for communities, which are in the immediate proximity of a national marine protected area along this stretch coast in southern Thailand. WWF has assisted the government in developing a participatory coastal resources management model that will be replicated in Thailand's other coastal areas. Sixteen communities—including fishermen, dive operators, government authorities, and approximately 1,000 villagers—have taken part in the

WWF Thailand

WWF Thailand

Villagers installing mooring buoys to reduce anchor damage to coral reefs (top); Mangrove reforestation (bottom)

decision-making process and implementation of activities, together with the national park authority at Had Tay Muang. Measures to restore and protect the coral reef include installing mooring buoys, transplanting coral, cleaning the reef, enriching fisheries, and restoring coastal forests. One of the key achievements is the establishment of public hearings to provide a forum for discussion on important issues within the community. The hearings facilitated agreement on rules for sustainable resource use that balance existing local practices with scientific understanding of ecological capacity. WWF continues to work with communities around Had Tay Muang to develop a sustainability plan, while focusing on community-based tourism to help maintain good environmental quality and diversification of livelihoods within the area. Through the partnership developed between the communities and the national parks authority, the participatory approaches will continue to reduce communities' vulnerability and enhance their resilience.

For more information contact Geraldina Nguyendo at WWF at gnguyendo@mangroveproject.org.

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

US IOTWS Program Transition Workshop

December 6-7, 2007, Bangkok, Thailand

The US Indian Ocean Tsunami Warning System (IOTWS) Program was designed to be catalytic in nature and provide targeted support, while helping to ensure sustainability in the long-term by building capacity within the region and establishing partnerships. Over 100 US-funded experts and scientists have shared their technical expertise, provided guidance, and helped build multi-hazard warning capabilities in the five countries most affected by the December 2004 tsunami. A vast network of government agencies and other organizations have made commendable progress on tsunami warning systems, although much work remains to be done. Over the past several months, the Program team has been working closely with partners to transform tools, technologies, and initiatives into long-term platforms that will continue independently into the future. In support of this, a transition workshop will be held as a critical step in the process. Workshop participants will identify the lessons learned and key accomplishments achieved in the region with US support, and outline the steps required to ensure sustainability. Results of the workshop will also inform the work of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning System (ICG/IOTWS).

For more information contact Peter Collier at pcollier@iotws.org.

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Using the Past to Predict the Future

Chulalongkorn University, Thailand

Teachers viewing images of Pakarang Cape after the 2004 tsunami

To support the tsunami early warning system in Thailand, the Department of Geology at Chulalongkorn University conducted four workshops targeting elementary and high-school teachers from over 70 schools throughout Phang Nga province. The project provided training on earthquakes, tsunamis, and the appropriate actions to take in case of a tsunami warning. As respected members of their communities and playing a significant role in shaping young minds, these 200 teachers now have a wider array of tools and knowledge to help strengthen local capacity and enhance resilience against disasters. The Department of Geology will adapt these materials for use in university lectures and make them publicly available on the Chulalongkorn website. Further development of these tools and the standardization of a national tsunami education curriculum is the clear next step in achieving sustained knowledge of tsunami hazards for the critical "last kilometer". *For more information contact Kruawan Jankaew at kjankaew@yahoo.co.uk.*

Making Safety the Law

Indonesian Society for Disaster Management (MPBI), Indonesia

MPBI used grant funding to critically analyze and document the process of drafting Indonesia's Disaster Management Bill in order to distill the findings into a guidebook for local governments in coastal areas to develop their own disaster management regulations based on the new national policy. With the keen participation and commitment from the government, the project also facilitated the process by which local policymakers can draft their own legal reforms and action plans to suit the needs of their communities. MPBI also prepared a case study, *Knitting the Sense of Togetherness* on the development of the national Disaster Management Bill, as well as a guidebook, *Creating Legal Reform (PERDA) in Disaster Management at the Provincial and District Level*, that can continue to facilitate progress towards greater coastal risk reduction. Building from this small grant, MPBI plans to use its extensive network, in partnership with donors such as GTZ and Oxfam, to support the formation of local disaster management laws starting in the cities of Ende, Alor, Semarang, and Jogjakarta. MPBI is also implementing an advocacy support program, which runs until at least 2010, involving

local governments in Makasar, Lampung, West Java, Jogjakarta, Padang, Surabaya, Bandung, Nusa Tenggara Timor, Aceh, Semarang, and East Kalimantan. *For more information, contact Hening Parlan at info@mpbi.org.*

Natural Barriers Reduce Tsunami Risk

University of Moratuwa, Sri Lanka

Scientists at the University of Moratuwa studied tsunami impacts, response, and recovery along the southern and western coast of Sri Lanka by modeling tsunami wave propagation and investigating countermeasures to minimize wave damage. Physical modeling studies increased understanding of the performance of physical countermeasures during a tsunami, such as coral reefs, coastal vegetation, and coastal structures. The project more accurately identified communities at risk and potential means for saving lives. By taking a multi-disciplinary approach, the local knowledge of risks and vulnerabilities in the community was successfully integrated with scientific input. Collaboration with Geoscience Australia, University of Arizona, Ports and Airport Research Institute, and United Nations University will help to ensure continued capacity building. The establishment of a Centre for Disaster Risk Reduction will provide a platform for collaborative research with stakeholders, including the Disaster Management Centre and Coast Conservation Department. *For more information contact S.S.L. Hettiarachchi at sslh@civil.mrt.ac.lk or S.P. Samarawickrama at samans@civil.mrt.ac.lk.*

National Policies Go Local

Asian Institute of Technology, Thailand

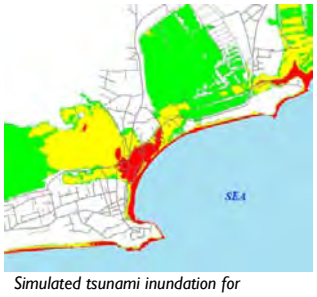
Hand-made drawings for the Local Disaster Preparedness Manual

Researchers from the Asian Institute of Technology (AIT) investigated how national disaster management policies support local institutions in providing preparedness and post-disaster services. Approximately 100 participants, including women, the disabled, and the elderly, contributed to the development of a disaster preparedness manual. The manual incorporates local knowledge on disaster management and outlines how local institutions can increase their effectiveness on community preparedness, relief, and rehabilitation. Grassroots organizations with strong linkages in Nagapattinam, India and Hambantota, Sri Lanka, will carry on efforts launched under the program, and AIT is collaborating with local organizations on applied research for disaster risk reduction. *For more information contact Mokbul Morshed Ahmad at AIT at morshed@ait.ac.th.*

Mapping the Threat

University of Peradeniya, Sri Lanka

The University of Peradeniya, in collaboration with Cornell University College of Engineering, developed tsunami hazard maps for five cities on the coastal belt of Sri Lanka by constructing state-of-the-art computer models of tsunami inundation. These maps were provided to Sri Lanka's Disaster Management Center (DMC) to support evacuation planning and public awareness activities. Project researchers shared experiences on the methodologies of tsunami inundation modeling and hazard mapping with 45 participants of the Master's Degree Program in Disaster Management, as well as with 60 final-year engineering students. The University of Peradeniya will explore the establishment of a center dedicated to coastal hazard modeling and mapping to ensure long-term continuation of tsunami risk assessment for vulnerable areas along Sri Lanka's coastal belt. *For more information contact Janaka Wijetunga at janakaw@pdn.ac.lk.*



Simulated tsunami inundation for Hambantota, Sri Lanka

Natural Tsunami Warnings: Reading the Signs

Save Andaman Network, Thailand, and East Tennessee State University, USA

Save Andaman Network (SAN) and East Tennessee State University (ETSU) jointly analyzed information from interviews on warning and evacuation in Thailand's tsunami-affected provinces. SAN and ETSU then built the capacity of communities to detect, recognize, and effectively respond to disaster warnings. Through the grant, the grant partners trained 380 community residents and local government officials and developed a

comprehensive set of educational materials, including a summary booklet, a DVD, cartoons, and posters. Warning systems often focus on technical components, to the neglect of considering social aspects, informal notification mechanisms, and natural environmental alerts. Studies have shown that tsunami education may not increase preparedness unless it also addresses how communities evaluate risk and the need for personal responsibility. Taking this into account, the research team identified an effective model for warning systems that integrates social as well as technical components. Working with key partners throughout 2008, SAN will pilot a sample curriculum in a local school and continue to provide technical support to government agencies and other organizations. *For more information contact Parkpoom Witantirawat at SAN at saveandaman@yahoo.com and Chris Gregg at ETSU at gregg@mail.etsu.edu.*

Road Map for Preparedness

Asian Institute of Technology, Thailand

The Asian Institute of Technology (AIT) initiated this multi-disciplinary project to build the coastal mitigation capacity of local leaders from Kapoe District in Ranong Province, Thailand. The project drew on sustainable natural resource concepts, such as the importance of mangrove and coral reef ecosystems as a cornerstone of building resilient livelihoods for coastal communities. Training covered the role of communities, local government agencies, and NGOs in coastal mitigation; integrated coastal zone management; and coastal protection infrastructure. Coastal mitigation plans for communities in Muang Kluang Sub-district are being developed through the leadership of the NGO Raks Thai and with input from participants. The multi-disciplinary approach and the training materials developed during the project will be used in training programs through links already established by AIT, short-term programs, and degree courses in the Integrated Coastal Management curriculum. *For more information contact Wenresti Gallardo at AIT at gallardo@ait.ac.th.*

Risk in the Community "Big Picture"

SEEDS, India

Participants in a CBDM workshop, Wandoor, Andaman and Nicobar Islands

SEEDS trained 250 community members on the Andaman and Nicobar Islands on developing maps to identify vulnerable areas, emergency management procedures, and preparing village disaster management plans. Fifteen panchyats (blocks) in one sub-district were mapped, and SEEDS worked with local leaders to form emergency task forces and provide training on early warning, shelter management, search and rescue, and evacuation. The village disaster management plans were distributed throughout the Panchyats, clearly showing the vulnerabilities, resources, and responsibilities of task force members. Villagers now have a clearer understanding of natural hazards, impacts, and the importance of being prepared. Local government authorities will now ensure that the disaster risk reduction process continues. In addition, SEEDS is implementing a strong advocacy program to replicate this model across all panchyats on the Andaman and Nicobar Islands. It is also creating a Citizens' Resource Center, at Port Blair. *For more information, contact SEEDS India at info@seedsindia.org.*

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

Study Tour on Disaster Management, January 12-19, 2008
San Francisco and Sacramento, California, USA. For more information contact S.H.M. Fakhruddin at fakhruddin@adpc.net

Cross-Training Workshop on Media and Disaster Early Warning Systems, January 14, 2008
Jakarta, Indonesia. For more information contact S.H.M. Fakhruddin at fakhruddin@adpc.net

Local Tsunami Early Warning Systems Workshop, January 16-18, 2008
West Timor, Indonesia. For more information contact S.H.M. Fakhruddin at fakhruddin@adpc.net

About the US Indian Ocean Tsunami Warning System (IOTWS) Program

The US IOTWS Program is part of the international effort to develop tsunami warning system capabilities in the Indian Ocean following the December 2004 tsunami disaster. The US program adopts an "end-to-end" approach—addressing regional, national, and local aspects of a truly functional warning system—along with multiple other hazards that threaten communities in the region. In partnership with the international community, national governments, and other partners, the US program offers technology transfer, training, and information resources to strengthen the tsunami warning and preparedness capabilities of national and local stakeholders in the region.
For more information please visit **www.us-iotws.gov**.

December 2007

US IOTWS Program Update

SPECIAL ISSUE: TRANSITION OF PROGRAM ACTIVITIES TO INDIAN OCEAN REGION PARTNERS

US Indian Ocean Tsunami Warning System (IOTWS) Program

from advanced technologies to resilient communities

A SPECIAL FOCUS ON THE US IOTWS TRANSITION WORKSHOP

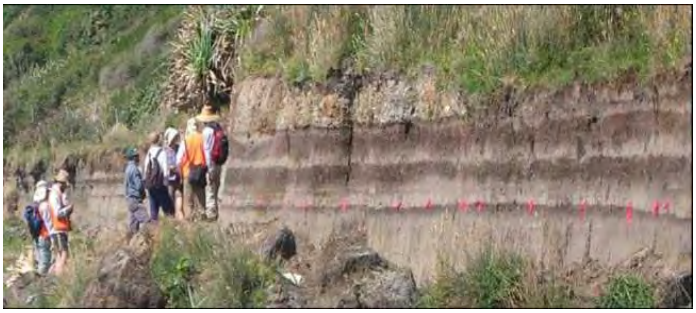
International cooperation to establish the Indian Ocean Tsunami Warning and Mitigation System (IOTWS) has been under way since shortly after the December 26, 2004 tsunami disaster, including the two-year, $16.6 million US IOTWS Program funded by the U.S. Agency for International Development (USAID). Over the past three years, the Indian Ocean region has made impressive progress on regional and national tsunami warning systems, as reported through a UN-led assessment of the response to the 8.4-magnitude earthquake and tsunami that occurred on September 12, 2007. Following the US IOTWS Program's close-out in March 2008, the USG plans targeted support in key areas as international and national partners continue work on a range of ongoing and long-term IOTWS requirements. To help sustain the momentum of U.S. and international efforts, USAID and its partner US Government (USG) agencies conducted a Transition Workshop in collaboration with the Intergovernmental Oceanographic Commission (IOC) at the United Nations Conference Center in Bangkok on December 6-7, 2007.

The Governments of Indonesia, Sri Lanka, Thailand, Maldives, and India together with United Nations and U.S. Government officials joined international, regional, and local partners in the regional forum to define priorities for the continuing development and sustainability of the IOTWS. The workshop had three main objectives: (1) to discuss key U.S. program accomplishments and overall progress of the international IOTWS effort; (2) to ensure continued support for U.S. program contributions; and (3) to identify future priorities and resource needs for the international effort supporting the IOTWS.

Below are highlights from the discussions on topics that included key achievements in the main components of an end-to-end tsunami warning system, experiences from the September 12, 2007 tsunami event, and priorities for sustainability.

Detection and Forecasting

The National Oceanic and Atmospheric Administration (NOAA) has successfully deployed deep-ocean tsunami detection tsunameters ("DART buoys") in partnership with Thailand and Indonesia, and upgraded coastal sea-level gauges in Sri Lanka, Indonesia, and the Maldives. NOAA also upgraded Global Telecommunications System (GTS) connections in the Maldives and Sri Lanka, which improved the ability to share and receive critical data. The U.S. Geological Survey (USGS) has supported countries in the region to enhance seismic detection and hazard assessment capability.



USGS

Indonesian researchers and USGS staff during a field trip to examine evidence of recurrent tsunamis and mudslides

Support for maintaining the seismic networks installed in Indonesia under the Program will continue through the Sumatran GPS Array (SuGAr) network. Technical agencies such as NOAA and USGS plan to remain engaged with a number of partners in the region through new and ongoing agreements focused on technology transfer, research and development, and capacity building. NOAA's Pacific Tsunami Warning Center (PTWC) will continue to provide interim tsunami notification services to the Indian Ocean until a Regional Tsunami Watch Provider is established. To sustain capacity building efforts, technical trainings in seismicity and seismic hazard mapping will be offered both through the Asian Disaster Preparedness Center (ADPC) and the recently established International Tsunami Training Institute (ITTI, described below).

Warning and Dissemination

Courtesy of *Phuket Gazette*

Community members in Phuket evacuate as part of the Andaman Wave 2007 drill

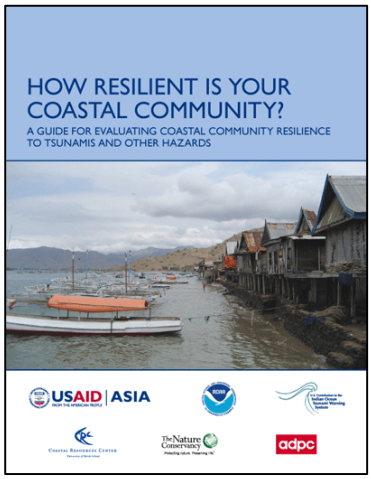
The US Forest Service (USFS) and other partners have conducted intensive training for approximately 600 disaster managers on efficient procedures and dissemination of warning messages. Sri Lanka, Indonesia, and Thailand have incorporated these disaster management systems and practices into their national frameworks and will continue to institutionalize them through training programs at the sub-national levels using materials developed under the US IOTWS Program.

USTDA has supported the Thai National Disaster Warning Center (NDWC) to alleviate communications bottlenecks and improve response time for public notifications. Similarly, USFS and NOAA worked with NDWC and other disaster management agencies to establish a Tsunami Alert Rapid Notification System (TARNS), and Thailand is now seeking funding to continue TARNS implementation.

To reach the "last kilometer", NOAA introduced a low-cost radio technology called "RANET" that enables disaster communications in vulnerable, remote locations, and provided training on its use. Indonesia has installed 106 RANET emergency radio units, while Sri Lanka has also received RANET units and training. NOAA will continue to maintain broadcast operations until 2015 and provide trainings on this communications technology.

Mitigation, Response, and Resilience

The Program has provided extensive support for building capacity in communities and linking them to national warning systems. The US IOTWS launched the Coastal Community Resilience (CCR) initiative in partnership with disaster management organizations working in the region to help them adopt common benchmarks and best practices in community resilience. These best practices and other tools have been published in a guidebook titled *How Resilient is Your Community?*, which has been distributed to partners. Numerous international organizations and national non-governmental organizations, including CARE and the International Federation of

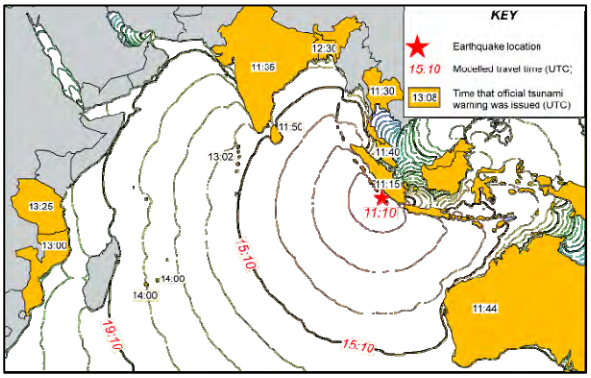


the Red Cross and Red Crescent Societies (IFRC) have adopted CCR for use in their ongoing activities. In addition, ADPC has translated the guide into Vietnamese and incorporated CCR into its training activities.

Having the "upstream" warning components in place is helping local authorities and disaster managers better focus "downstream" efforts by adopting more appropriate standard operating procedures, local response systems, and awareness-building programs. However, just as disaster risk management and preparedness remain significant challenges in general, the "downstream" aspects of the IOTWS will require continued international and host country support over the near and long term. Working Group 6 of the ICG/IOTWS was recently established to help facilitate support to all 28 countries for these downstream issues, including coastal preparedness, education, and resilience. Ideally, efforts to address downstream IOTWS needs should be integrated with broader disaster risk management initiatives.

Experiences from the September 12, 2007 Earthquake

To best understand overall progress for the region, ICG/IOTWS and national government representatives presented country experiences in reacting to the tsunami event of September 12, 2007 following an 8.4 magnitude earthquake near Sumatra, Indonesia. The responses to this event showed the significant advances made by the five partner countries and across the region in tsunami warning capacity since the tsunami disaster of 2004. According to a recent assessment by the ICG/IOTWS, installation of or upgrades to seismic and sea-level monitoring stations have greatly enhanced hazard detection, disaster management institutions and coordination systems are stronger, warnings are more effectively disseminated, and communities are better prepared. In addition to receiving information from PTWC, in many cases the countries formulated their own warnings based on receipt of available seismic and oceanographic data. Indonesia, for example, was able to issue a national warning to local authorities within 10 minutes of the earthquake, comparable to the speed of issuing tsunami warnings in the U.S. or Japan.



ICG/IOTWS

The times at which tsunami warnings were issued on September 12th

Priorities for Sustainability

In spite of the encouraging progress among national governments and the international community, including USG contributions, important gaps remain. Long-term domestic programs, as well as other donor efforts, such as Germany's €45 million five-year program with Indonesia, will continue to address ongoing needs in the region. However, additional technology transfer and capacity building are required to ensure the IOTWS becomes and remains fully operational. Tsunamis are the most difficult of all the natural hazards to prepare for, detect, analyze, and warn against. The challenge of building a robust, reliable tsunami warning and mitigation system in a region where no country had the ability to issue a national warning before December 26, 2004 is an undertaking of many years. Countries other than those most affected by the 2004 tsunami have received little or no tsunami reconstruction funding, and continue to require assistance in developing tsunami/multi-hazard warning capabilities.

The ICG/IOTWS and other workshop participants identified several critical needs for additional donor investment in the IOTWS, including:

- access to observational data, analyses, and other information products for tsunami warning purposes;

US IOTWS

Top: Walter Mooney, Curt Barrett, Smith Dharmasaroja, and Ridwan Djamaluddin
Bottom: Lalani Imbulana, Indira Fernando, Fathmath Fairooza, Patra Dewi, and Jane Cunneen

- region-wide standard operating procedures for warning formulation and dissemination and additional assistance with developing functional and appropriate national standard operating procedures;
- continued support for coastal community resilience (with a multihazards focus) as well as disaster risk management and preparedness; and
- capacity and institution building at all levels to institutionalize the end-to-end tsunami warning and mitigation system nationally and across the region.

To ensure the sustainability of warning systems and the preparedness of coastal communities, government partners committed to maintaining equipment and continuing to build regional, national, and local capacities. Many of the tools and methods introduced through the US IOTWS Program are being incorporated into ongoing capacity building activities of national and regional organizations such as ADPC and the Asian Institute of Technology (AIT). In addition, key publications such as the CCR guide and *Tsunami Warning Center Reference Guide* are available on the US IOTWS Program website (http://www.us-iotws.gov).

Through the ITTI framework, the First Certificate Program in Asia on Tsunami Science and Preparedness will be held March 10-26, 2008, at AIT in Thailand. The course will draw on experiences from the first ITTI course held in July 2007 at the University of Washington. It will be an intensive program organized for practitioners actively engaged in end-to-end tsunami warning, mitigation, and preparedness activities. The program offers participants with a wide range of backgrounds the opportunity to work with colleagues and experts from both the U.S. and the Indian Ocean region.

In their closing remarks, ICG/IOTWS representatives underscored their commitment to establishing regional tsunami watch providers by 2008-2009. Ongoing funding, technical, and coordination needs identified at this transition workshop will be addressed at the Fifth ICG/IOTWS meeting in April 2008 in Kuala Lumpur, Malaysia. After close-out of the US IOTWS Program, USG agencies will continue to provide technical support to partners on selected activities in developing and maintaining the end-to-end system. The agencies will continue to participate in ICG working groups on various issues, including the siting of tsunami detection systems, forecasts for national warning centers, and development of tools to better predict geographic areas most at risk. Over the next two months, USG agency partners will outline options for future engagement with the IOC to support long-term needs in the Indian Ocean region.

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

Training Seminar on the Deep-ocean Assessment and Reporting of Tsunamis (DART) Tsunameter, January 28-30, 2008
Jakarta, Indonesia. For more information contact David McKinnie at david.mckinnie@noaa.gov

Training Seminar on Concepts of Operations (CONOPS), January 31-February 1, 2008
Jakarta, Indonesia. For more information contact David McKinnie at david.mckinnie@noaa.gov

Regional Workshop on Critical Coastal Issues in Post-Tsunami Asia, February 19-21, 2008
Pathumthani, Thailand. For more information contact Saengroaj Srisawaskraisorn at ssrisawas@usaid.gov

ITTI Course: First Certificate Program in Asia on Tsunami Science and Preparedness, March 10-26, 2008
Pathumthani, Thailand. For more information contact Theerachai Haitook at theerachai@ait.ac.th
Application deadline January 31, 2008

About the US Indian Ocean Tsunami Warning System (IOTWS) Program
The US IOTWS Program is part of the international effort to develop tsunami warning system capabilities in the Indian Ocean following the December 2004 tsunami disaster. The US program adopts an "end-to-end" approach—addressing regional, national, and local aspects of a truly functional warning system—along with multiple other hazards that threaten communities in the region. In partnership with the international community, national governments, and other partners, the US program offers technology transfer, training, and information resources to strengthen the tsunami warning and preparedness capabilities of national and local stakeholders in the region.
For more information please visit **www.us-iotws.gov**.

January-March 2008

US IOTWS Program - Final Update

US Indian Ocean Tsunami Warning System (IOTWS) Program

from advanced technologies to resilient communities

Final Update for the US IOTWS Program

After two-and-a-half years of program implementation, this is the final Monthly Update for the US Indian Ocean Tsunami Warning System (IOTWS) Program.

During that time, the US Agency for International Development (USAID) and its US Government partners have worked with the international community, governments, communities, and other partner organizations to strengthen the region's capacity to detect and respond to tsunamis and other natural hazards under the leadership of the UNESCO Intergovernmental Oceanographic Commission (IOC) and the Intergovernmental Coordination Group for the IOTWS (ICG/ITOWS).

The US program team extends its thanks and appreciation to the many individual and partners participating in the US contribution to the IOTWS to date, and looks forward to ongoing collaboration as ongoing and new partnerships continue into the future. As a follow-on to this initial US contribution to the IOTWS, US Government agencies and partners will continue working in each of the key technical areas being addressed through the ICG/IOTWS and national government efforts.

Countries across the region have made significant advances to national warning system networks, communications, and government operations and procedures and are now able to disseminate appropriate warnings rapidly to local populations. The following reflect some of the major highlights from the Program.

- The installation of detection systems including seismic stations, Deep-ocean Assessment and Reporting of Tsunamis (DART) systems, and tide gauges in Indonesia, Thailand, and Sri Lanka have increased capacity to detect changes and forecast potential threats of a tsunami.
- As a result of upgraded communication networks using GTS, Sri Lanka and the Maldives can now receive data from detection systems in a timelier manner so that forecasts can be generated more quickly.
- Sri Lanka and Thailand have adopted policies and procedures to ensure that tsunami advisories are disseminated rapidly and accurately.
- Indonesia and Sri Lanka have created multiple communication channels through the use of RANET satellite phones to disseminate information widely and quickly.
- Thousands of people in Indonesia, Sri Lanka, Thailand, India, and the Maldives have been trained in community preparedness and resilience to minimize the risk to communities in future disasters.
- Hundreds of technical specialists have received training on the end-to-end component of tsunami warning systems, and the new International Tsunami Training Institute (ITTI) will offer training for years to come (see story below).

While this will be the last US IOTWS Program Update, you can continue to access numerous technical resources on the Program web site at www.us-iotws.gov, which will be maintained by the Asian Disaster Preparedness Center (ADPC).

The following stories reflect activities that occurred during the final quarter of the Program.

Indonesian Scientists Trained on Operating and Interpreting Data from the DART Tsunameter Network

January 28-30, 2008, Jakarta, Indonesia

US IOTWS Program

Participants at the DART training workshop

A core group of 31 engineers and scientists responsible for Indonesia's tsunami warning system have gained new skills and knowledge on the use, operation, and maintenance of the US-designed DART system. The US National Oceanic and Atmospheric Administration (NOAA) conducted the seminar for Indonesia's Agency for the Assessment and Application of Technology (BPPT), the Meteorological and Geophysical Agency (BMG), Marine Affairs and Fisheries (DKP), and the National Coordinating Agency for Surveys and Mapping (BAKOSURTANAL). The hands-on training familiarized participants with the instrument, data protocols, and tools that will be applied in Indonesia's operational warning center for detecting, analyzing, and forecasting tsunamis using critical sea-level data. BPPT and BMG are responsible for operating and maintaining the DART provided to Indonesia and the region in September 2007.

Warning Communications Capacity Strengthened from National Level to the "Last Kilometer"

January 31-February 1, 2008, Jakarta, Indonesia

NOAA delivered Concept of Operations (CONOPS) training to representatives of government agencies and related disaster management organizations on building and managing tsunami early warning systems. Training sessions included an overview on the costs to operate a national tsunami early warning system; optimizing tsunami early warning equipment networks, data communications linkages; strengthening institutions; and establishing capacity building programs. Participants also received the *Tsunami Warning Center Reference Guide,* which describes and end-to-end CONOPS and the resources required to create a national and regional warning system (equipment, expertise, and partnerships). Participants identified challenges and opportunities for enhancing their tsunami warning systems, as well as strategies to improve these systems and communications between relevant agencies.

ITTI Course: First Certificate Program in Asia on Tsunami Science and Preparedness

March 10-26, 2008, Pathumthani, Thailand

The first offering of the International Tsunami Training Institute in Asia transitions the program from the University of Washington (UW), where it was offered last summer, to the Asian Institute of Technology (AIT). More than 240 candidates from the five target countries applied for 30 USAID-funded positions, demonstrating the value of this professional certificate program to the region. The AIT offering is a result of a formal partnership with UW and NOAA. In fact, participants will receive certificates from both AIT and UW as formal ITTI partners. AIT and UW are expected to include ITTI in their respective course catalogs and offer the certificate program regularly. Based on the strength of the applicant class for the March program and clear demand, AIT has submitted a grant application to UNESCAP to support three ITTI offerings in 2009 and 2010.

US IOTWS Program

Participants from Thailand, Indonesia, the Maldives, and the Philipines interview village women in Ranong Province about coastal community resilience as part of a field exercise.

Study Tour to US on Incident Command System for Disaster Management

March 15-23, 2008, California, USA

A diverse group of participants from Indonesia will visit California to learn more about disaster response and management from US counterparts. The group of six participants is made up of representatives from the Indonesia National Police, Indonesia Red Cross, BAKORNAS (the lead disaster management agency in Indonesia) and the Indonesia Department of Forestry. The group will meet with representatives from several disaster management organizations such as the US Forest Service Law Enforcement Officials in Vallejo, California, Wildland Fire Training Center in Sacramento, City of Vallejo Citizens ALERT Program representatives, and the Bay Area Chapter of the American Red Cross.

UPCOMING US IOTWS PROGRAM AND RELATED ACTIVITIES

Fifth Session of the Intergovernmental Coordination Group for the ICG/ IOTWS-V, April 8-10, 2008

Putrajaya, Malaysia

For more information see http://ioc.unesco.org/tsunami/icgiotws5.

ComMIT Training for Thai Meteorological Department Staff, June 29-July 6, 2008

Chulalongkorn University, Bangkok, Thailand

For more information contact Absornsuda Siripong, at sabsorns@chula.ac.th.

About the US Indian Ocean Tsunami Warning System (IOTWS) Program

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