

Basics on Tsunami

Tsunamis occur relatively rarely, compared to other natural hazards such as tropical storms, floods, and drought, but they are usually very destructive. The Indian Ocean tsunami dramatically showed how a tsunami's highly energetic waves and debris-filled water flows can devastate coastal areas, destroying fishing boats, homes, vehicles, crops and contaminating soils and wells with saline water and mud, in some cases reaching over a kilometer inland, and causing great loss of life.

Tsunamis are generated by undersea earthquakes or other geological events that disturb the sea surface, such as undersea volcanic eruptions, landslides or undersea debris slides. Once initiated, the tsunami waves travel across the ocean, at speeds of up to 800 km/h in the deep ocean, but slowing markedly upon reaching coastal waters. A tsunami may first appear as a rapidly rising or falling tide, or as a series of breaking waves, and an event may last for 30 minutes or more. The first wave may not be the biggest. The height of the water reached on land is called the "run up" and may be as high as several tens of metres in extreme cases.

Tsunami Early Warning Systems

Early warning systems cannot stop the waves and the flooding, but they can significantly cut the loss of life, especially if developed as part of an overall risk reduction strategy. The first warning system is the alertness of coastal inhabitants – sensing a nearby strong earthquake, or observing the strange behavior of the sea falling or rising, or the roar of the waves, and then running for a safe place.

For tsunamis generated at distant locations, a technical warning service is essential, in order to provide rapid analyses and accurate warnings that can be disseminated to perhaps millions of people living along the coasts well before the tsunami arrives. Many years of experience of such systems in the Pacific Ocean are being drawn on by UNESCO's Intergovernmental Oceanographic Commission (IOC) to coordinate and help national efforts to build a Tsunami Warning System in the Indian Ocean, in cooperation with the World Meteorological Organization and with the support of the present project.

Well-organised disaster management institutions and well-informed and well-prepared communities are vital ingredients of any effective early warning system. The project therefore is supporting a range of awareness raising and capacity building activities in the region by experienced regional and UN partners, under the coordination of the ISDR secretariat and its Platform for the Promotion of Early Warning.

Some key conclusions to date

- Excellent progress has been made to establish the core technical elements of a regional tsunami early warning system. This system is on track for completion by July 2006.
- The project has helped coordinate the efforts of many key organizations in the UN and the region, linking the tsunami warning system to other hazard warning systems and to disaster management institutions.
- Significant progress in awareness raising and capacity building has been achieved, but much work remains to build the long term capacities of countries for effective early warning and risk management.
- The project provides an interesting example of an integrating vehicle for supporting the implementation of the Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disaster.

Implementing Partners

UNDP	United Nations Development Programme	ABU	Asia-Pacific Broadcasting Union
UNESCO-IOC	United Nations Educational, Scientific and Cultural Organization - Intergovernmental Oceanographic Commission	ADPC	Asian Disaster Preparedness Center
UNEP	United Nations Environment Programme	ADRC	Asian Disaster Reduction Center
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific	CRED	Center for Research on the Epidemiology of Disasters
UNU-EHS	United Nations University-Institute for Environment and Human Security	DMI	Disaster Mitigation Institute University of Geneva
WMO	World Meteorological Organization		

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For more information on the tsunami project please visit:
www.unisdr-earlywarning.org/tsunami or <http://ioc3.unesco.org/indotsunami/>

Evaluation and Strengthening of Early Warning Systems in Countries Affected by the 26 December 2004 Tsunami

- Interim Progress Report 1.12.2005 -



Towards building resilience of communities to disasters through the development and strengthening of people-centered early warning systems, this multi-partner, multi-donor initiative presents collective efforts targeting an overall integrated framework for strengthening early warning capacities of people and nations of the Indian Ocean region.

The scope of the tsunami 2004 disaster is huge, the losses are traumatizing, the response of the international community is unprecedented, demands for early warning system are raised, and action is underway ...

“To complement broader disaster preparedness and mitigation initiatives, I recommend the establishment of a worldwide early warning system for all natural hazards, building on existing national and regional capacity.”

Kofi Annan, UN Secretary-General report “In larger freedom: towards development, security and human rights for all” (A/59/2005) of 21 March 2005.

The Indian Ocean tsunami was triggered by 9.0-magnitude earthquake near Sumatra in Indonesia. While many people are believed to have died in the earthquake, the main cause of death was trauma and drowning from the flux of seawater and waves pouring into coastal areas without warning. The death toll is believed to be over 200,000 people. The international community has made concerted efforts to address the humanitarian, recovery and development needs of the countries and population affected. Recognizing the urgency to mobilize efforts and resources towards establishing an early warning system for the Indian Ocean region, a multi-partner, multi-donor initiative "Evaluation and Strengthening of Early Warning Systems in countries affected by the 26 December 2004 Tsunami" was launched early 2005. The initiative is coordinated by UN/ISDR Platform for the Promotion of Early Warning (PPEW), with technical leadership of UNESCO Intergovernmental Oceanographic Commission (IOC).

The 11 Million Dollar tsunami project has been set-up under the UN Tsunami Flash Flash Appeal. It provides an overall integrated framework for strengthening early warning systems in the region affected by the 26 December 2004 Tsunami. Activities range from implementation of technical core systems to community-level approaches, public awareness, and integrated risk management. The project contributes to the improvement of public confidence and security, the national capacity-building for response and emergency planning, the production and flow of information products, and the strengthening of regional and national coordination mechanisms.



Tsunami warning sign, Sri Lanka

	Intended Outcomes	Partners	Selected Achievements to Date
Core System Implementation	Obtain regional consensus on the nature of a tsunami early warning system, design its core elements, national tsunami warning centres, and permanent regional coordination mechanisms, and commence initial strengthening and implementation steps.	UNESCO-IOC leads the technical expertise, field missions, and coordination meetings. WMO, UN/ISDR-PPEW, National Meteorological Agencies, ADRC, ADPC, and the Pacific Tsunami Warning Center.	<ul style="list-style-type: none"> Agreement has been reached on the general design and management of a regional early warning system for the Indian Ocean including generation of necessary consensus and regional agreement on building a distributed, interconnected tsunami warning system. Set up of an interim early warning system involving the exchange of data and warning advisory information to national tsunami focal points centers. Sixteen needs-assessment missions to Indian Ocean countries composed of multidisciplinary expert teams from several organizations. The Global Telecommunication System (GTS) is being reviewed and strengthened to support the exchange and distribution of Indian Ocean Tsunami Warning System alerts and related information. Upgrade of ocean observing system.
Integrated Risk Management	Promote the integration of early warning system into national disaster risk management and reduction mechanisms, seek synergies with other hazard early warning systems and strengthen national capacities for tsunami-related disaster risk management and risk reduction.	ADPC, ADRC, OCHA, UNDP, UNESCO-IOC, UNEP, UNESCAP, UN/ISDR, WMO, and national disaster management offices in countries of operation.	<ul style="list-style-type: none"> National experts from 26 Indian Ocean countries participated in high-level meetings in Japan and at two study tours to Japan and Hawaii for national tsunami warning and mitigation systems. National coordination is enhanced through designation of national focal points for tsunami early warning in 22 countries. Assessment of the technical requirements necessary to integrate environmental assessments with multi-hazard risk assessment in coastal zones and at the community levels. Development of a Hyogo Implementation Guide to assist states and practitioners in implementing the five priority action items of the Hyogo Framework for Action.
Public Awareness & Education	Develop and disseminate information products on tsunami early warning and risk reduction, tailored to local languages and cultures, targeting key intermediaries such as public officials, school teachers, and community leaders, and develop and promote mass media materials and campaigns.	ABU, ADPC, ADRC, ASEAN, IFRC, IOC-ITIC, UN/ISDR, UNESCO, UNU-EHS, and national and local institutions.	<ul style="list-style-type: none"> Two media-targeted regional workshops brought broadcasters together with technical experts from the tsunami and weather warning fields to improve dialogue and understanding in respect to warning dissemination and public education. A workshop on public awareness and education was held in Bangkok with participants from UN agencies, IFRC, national institutes, broadcasting agencies, and NGOs. Reports from numerous organizations are reviewed and summarized to disseminate a compilation of lessons-learned. A survey of the level of community awareness on tsunami was conducted on the need to emphasize public awareness to reduce future disaster risks. Public information and educational material on tsunami produced, targeting 8 Asian countries in 9 local languages. A field libraries project is developed to enhance basic knowledge on tsunami, early warning, and disaster risk reduction.
Community-level Approaches	Implement community-level pilot activities to test and demonstrate good practices, including hazard and vulnerability assessment, organisational strengthening, community participation, warning system operation, and capacity building.	ADPC, ADRC, CRED, IFRC, UN/ISDR, UNDP, UNU-EHS, UNV, UNEP, and national, provincial and local institutions.	<ul style="list-style-type: none"> UNDP country offices in India and Sri Lanka started pilot activities targeting the institutionalization of early warning systems and teams and the strengthening of dissemination mechanisms of early warnings to communities. Field studies and research are carried out in Tamil Nadu, India, to assess the epidemiological factors in deaths and casualties resulting from the Tsunami. Field studies of disaster risk management and a vulnerability assessment were accomplished in Galle, Sri Lanka providing advice to government officials based on results of the studies. Four rapid vulnerability assessment techniques are being developed. Support provided to the Sri Lankan Technical Advisory Committee on early warning and disaster preparedness, including technical assistance in policy design, work planning, and mapping and duplicating experiences. Building linkages and coordination mechanisms between members of the environmental and the disaster risk reduction community.
Coordination	Establish the mutual understandings, agreements, information resources, networks, and support capacities needed to ensure the effective implementation of the project and document lessons learned and best practices.	UN/ISDR-PPEW leads the overall coordination in close partnership with all involved partners and donors.	<ul style="list-style-type: none"> Regional consultative meeting on early warning for the east coast of Africa with participants from the region to share best practices and lessons learned on early warning, and to identify early warning gaps. Enhanced linkages between technical aspects of early warning and the broader disaster risk reduction, multi-hazard approach, guided by the Hyogo Framework for Action. A web-based information system that contains information and documents on the activities and initiatives supported by the tsunami early warning project was established and is accessible to the public at: http://www.unisdr-earlywarning.org/tewis



Hawaii Tsunami Warning System Study Tour