



# PROJECT BRIEF

## Enhancing Coastal Hazard Early Warning and Response: Tools and Institutional Strengthening

For countries with inadequate resources for disaster preparedness, as is the case for most countries in the Indian Ocean and Southeast Asian region, identification of areas at high risk to tsunamis is crucial for prioritizing resource allocation. Tsunami hazard and risk assessment, which provides an estimate of potential losses in lives and cost of building damage, would reveal communities that would be highly vulnerable to the hazard and, hence, need to be prioritized for enhancing local tsunami readiness. This, however, entails detailed inundation modeling for a range of scenarios from most important source zones, and requires computational capability and good-quality near-shore bathymetric, topographic, and exposure datasets, which most countries in the region lack.

Investment of scarce resources also favors ventures that are effective, efficient, and have longer-lasting impact. In this regard, development of tsunami early warning systems has taken a multi-hazard approach, and early warning integration into broader disaster risk reduction and development and regional resource sharing are among the sustainability strategies.

### Objectives

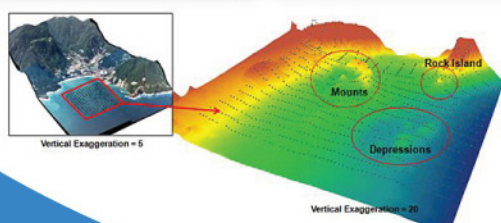
The project on *Enhancing Coastal Hazard Early Warning and Response: Tools and Institutional Strengthening*, supported by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) through the Trust Fund for Tsunami, Disaster and Climate Preparedness, shall:

- Build tsunami hazard and risk assessment capacities in Myanmar, Philippines, Sri Lanka, and Thailand, building on UNESCO/IOC efforts in the Indian Ocean region and taking advantage of low-cost methodologies developed at RIMES; and
- Develop a regional data sharing policy for RIMES Member States and collaborating countries, for improving data availability for warning purposes.

### Approach

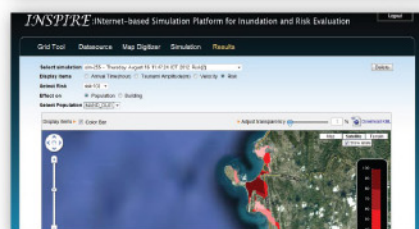
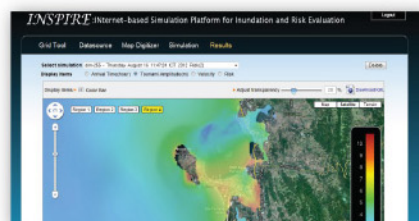
RIMES shall build tsunami risk assessment capacity through training, demonstration of tool application, and transfer of equipment, software, systems, and training manuals to the countries to facilitate replication/upscaling. These tools are:

- ♦ **Low-cost methodology for near-shore bathymetric, topographic, and exposure surveys.** Collection of near-shore sea-floor depth data shall employ an ordinary single-beam fishing sonar and optimized survey route interval. Generation of near-shore topographic data shall use a combination of remote sensing and ground survey data. Building survey and analysis methodology shall demonstrate the determination of building properties and population distribution, for vulnerability assessment.



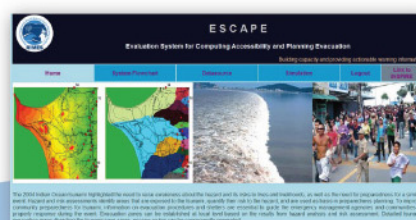
- ♦ **INSPIRE, a computer-based tsunami propagation and inundation risk assessment tool** (<http://inspire.rimes.int>).

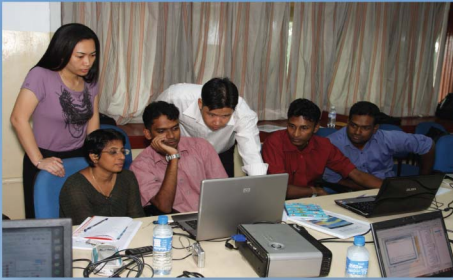
The Internet-based Simulation Platform for Tsunami Inundation and Risk Evaluation (INSPIRE) is a web portal that provides modules for identifying tsunami sources, simulating tsunami propagation and inundation, integrating exposure data, and performing tsunami loss estimation. The analysis modules are designed to handle multi-dimensional vulnerability data and different levels of data accuracy, reflecting the fact that data available from countries may range from low to high levels of accuracy. This allows users to undertake preliminary tsunami risk assessment using existing data, with progressive improvement in assessment results, with the use of more detailed and accurate datasets.



- ♦ **ESCAPE, a computer-based tool for computing shelter accessibility and planning evacuation** (<http://escape.rimes.int>).

Evaluation System for Computing Accessibility and Planning Evacuation (ESCAPE) is a tool to support evacuation planning, using INSPIRE outputs. The system provides information on the fastest evacuation path and direction toward the shelters, with due consideration of topographic condition, land use, location of critical facilities, and population density, age and gender.





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RIMES shall strengthen multi-hazard early warning systems and regional resource sharing mechanisms by: a) tabling, for adoption by the RIMES Council, a policy document on regional data sharing, including a mechanism for forecaster interaction during tropical cyclone event in the region for improving warning coordination on trans-boundary hazards; and b) sharing of experiences, lessons, and successes, and updates on scientific advances and new/emerging technologies and tools through the regular meetings of the RIMES Council.

### Stakeholders

- ♦ **Myanmar:** Department of Meteorology and Hydrology, National Hydrographic Center, Department of Land Survey, Relief and Resettlement Department, General Administration Department
- ♦ **Philippines:** Philippine Institute for Volcanology and Seismology, National Mapping and Resource Information Authority, National Disaster Risk Reduction and Management Council
- ♦ **Sri Lanka:** Department of Meteorology, National Aquatic Resources Research and Development Agency, Survey Department, Coast Conservation Department, Disaster Management Center
- ♦ **Thailand:** Department of Disaster Prevention and Mitigation
- ♦ Relevant research institutions/universities involved in tsunami risk assessment in the countries
- ♦ Local authorities and other disaster management organizations at the pilot sites
- ♦ Members of the RIMES Council, consisting of National Meteorological and Hydrological Services (NMHSs) and/or technical agencies mandated to generate and provide early warning

### Expected Outcomes and Outputs

- ♦ Tsunami risk assessment capacities built within relevant technical agencies and research institutions, in particular:
  - Training on planning for and undertaking near-shore bathymetric, topographic, and exposure surveys, data quality control, DEM generation and mosaicking, building footprint interpretation, building properties estimation, and DEM and building data combination
  - Training on data preparation and management, tsunami simulation and risk assessment, and tsunami hazard and risk mapping using INSPIRE
  - Transfer of survey methodology, equipment, materials, and software
  - Transfer of INSPIRE system
- ♦ Improved tsunami warning capabilities within national tsunami warning centers and response capabilities within disaster management organizations and communities
  - Training on tsunami risk assessment output interpretation and application
  - Training on data preparation and management and evacuation mapping using ESCAPE
  - Tsunami evacuation practice using ESCAPE outputs and UNESCO/IOC guidelines
  - Transfer of ESCAPE system and multi-hazard exercise planning, implementation, and evaluation manual
- ♦ Regional resource-sharing for improved warning information generation and dissemination
  - RIMES regional data sharing policy and mechanism
  - RIMES regional online interaction of forecasters during tropical cyclone occurrence
  - Sharing of project experiences, successes, and lessons, for replication of initiatives

The **Regional Integrated Multi-Hazard Early Warning System** (RIMES) is an international and intergovernmental institution, owned and managed by its Member States for the generation and application of early warning information. RIMES interfaces with global centers of excellence to bring the best of science to the doorsteps of at-risk communities in 31 Member States and collaborating countries in Africa and Asia. RIMES assists Member States in building their capacities in the observation and monitoring of seismic, tsunami, oceanic, meteorological, hydrological, and climate phenomena, communication of associated risks, and appropriate and timely responses to warnings.