Annex I
Terms of Reference / Work Plan and Budget

ESCAP Trust Fund for Tsunami, Disaster and Climate Preparedness in Indian Ocean and Southeast Asian Countries

A. Overview

<table>
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<tr>
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<th>ORGANIZATION SUBMITTING PROPOSAL</th>
<th>Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES)</th>
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</table>
| 2 | FOCAL POINT AT ORGANIZATION AND RELEVANT CONTACT INFORMATION | A.R. Subbiah  
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| 3 | PROJECT TITLE | Enhancing coastal hazard early warning and response: tools and institutional strengthening |
| 4 | BENEFICIARY COUNTRIES | Myanmar, Philippines, Sri Lanka, and Thailand |
| 5 | TARGET GROUPS | Hydrographic Departments  
Land Survey Departments  
Risk assessment institutions  
National Tsunami Warning Centers/  
National Meteorological and Hydrological Services  
Disaster Management Organizations at national and local levels |
| 6 | TIME FRAME | July 2012 – June 2014 |
| 7 | TOTAL BUDGET (US$) AND BREAKDOWN OF FUNDING SOURCES | Total Budget: US$ 684,356  
**Total Cost for ESCAP:** US$ 484,990  
Partner Contribution: US$ 199,366 |

Executive Summary

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 high-risk areas is crucial for prioritizing resource allocation. A tsunami risk assessment would reveal communities that would be highly vulnerable to the hazard. This, however, entails detailed inundation modelling 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 favours 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.

This project is proposed to build tsunami 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.

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: a) low-cost near-shore bathymetric, topographic, and exposure survey methodologies, and data processing tool to generate high-resolution data required for tsunami risk assessment; and b) computer-based tsunami risk assessment and evacuation mapping.

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.

This project shall contribute to:

a) Availability of tools and data for tsunami risk assessment
b) Building of tsunami risk assessment capacities within relevant/mandated technical agencies;
c) Improved warning information generation and dissemination; and
d) Improved tsunami warning response capabilities within disaster management organizations and communities, to reduce disaster risks and enhance resource management.

B. Needs Assessment

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 high-risk areas is crucial for prioritizing resource allocation. Tsunami preparedness, being a rare hazard in the Indian Ocean and South China Sea region, has not been prioritized until after the 2004 Indian Ocean tsunami. Tsunami awareness, and the need for preparedness, was heightened during the East Japan tsunami in March 2011 and the many strong aftershocks from the earthquake that caused it.

A tsunami risk assessment would reveal communities that would be highly vulnerable to the hazard. 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. RIMES assessment, through the ESCAP-supported TTF-07 project, revealed that tsunami risk assessment capability in the region is very low to non-existent, except for countries like Australia, India, and Indonesia, where there is strong computational capability. The focus of capacity building efforts that followed the 2004 Indian Ocean tsunami has been on establishing a regional early warning system, strengthening of warning dissemination systems, enhancing emergency preparedness and response in the affected areas, and building tsunami risk awareness.
UNESCO/IOC implemented from 2007-2010 a project on Improving Emergency Response to Ocean-Based Extreme events through Coastal Mapping Capacity Building in the Indian Ocean (COAST MAP-IO), targeting national hydrographic offices and disaster management agencies of Bangladesh, Comoros, Kenya, Madagascar, Maldives, Mauritius, Mozambique, Myanmar, Seychelles, Sri Lanka, Tanzania, and Thailand. The project organized 15 regional training courses and workshops on advanced bathymetric data acquisition, processing and management; bathymetric and topographic data management and map construction; development of digital elevation models and hydrodynamic models for tsunami inundation simulation; and hazard and risk map applications. The proposed project shall build on these efforts by: a) providing a complementary survey methodology that is low-cost, yet generates high-accuracy data, and includes exposure survey (this methodology will be useful in areas that are considered high-risk, yet are currently lacking in near-shore bathymetric and topographic data); b) offering national level training to include agencies, other than the hydrographic office, concerned with near-shore bathymetric and topographic mapping and application, including research institutes and universities; c) demonstration of techniques in a pilot site to generate and showcase usefulness of products in disaster preparedness.

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 have taken a multi-hazard approach, with multi-stakeholder involvement for providing inputs and feedback, and early warning integration into broader disaster risk reduction and development, and regional resource sharing among the sustainability strategies.

Currently, meteorological and environmental observations are shared globally through WMO’s Global Telecommunication System, as well as through its Global Observing Systems Information Center one-stop web-based portal. Other global data centers, such as the Global Precipitation Climatology Center and Global Runoff Data Center in Germany, share station and gridded datasets under cooperative agreements with WMO or with NMHSs. Data shared through these channels, however, are only from select stations in the countries. Data assimilation for improving forecasts and, consequently, warnings, require local data at the area of interest. Recognizing this, RIMES Member States (Annex 2, page 5) agreed to establish a data sharing mechanism, and included this as a priority area in its Master Plan 2010-2014 (Annex 3, page 6).

In a recent visit to RIMES Program Unit by WMO’s Director of Weather and Disaster Risk Reduction Services, it was agreed that WMO shall assist RIMES in this endeavor by providing guidelines and data format standards, and that RIMES shall link its efforts with WMO’s Regional Climate Centres, which are currently being developed for maintaining regional climate data banks.

This project is proposed to build tsunami risk assessment capacities in Myanmar, Philippines, Sri Lanka, and Thailand; and develop a regional data sharing policy for RIMES Member States and collaborating countries (Annex 1).

C. Problem Analysis

During the development of RIMES Master Plan 2010-2014, RIMES Member States and collaborating countries agreed to address gaps in tsunami risk assessment capacity (Annex 2, page 6). Specifically, Bangladesh, Maldives, Myanmar, Philippines, Vietnam, Kenya, Mozambique, Seychelles, and Tanzania requested for capacity building in tsunami inundation modeling and risk evaluation, including the generation of the required high-resolution dataset (Annex 3, page 6). The countries noted the tsunami risk assessment capacity developed within RIMES Program Unit and the tools that it developed and tested. These include a low-cost methodology for near-shore bathymetric, topographic, and exposure surveys (Annex 4), and a computer-based tsunami propagation and inundation risk assessment tool, named INSPIRE,
which calculates and maps tsunami travel time, amplitude, and current velocity, and probabilities of human death and building damage (Annex 5). The countries further noted the utility of INSPIRE in areas having lower resolution dataset, as it allows four levels of analysis according to the accuracy of input data. This would enable preliminary risk assessments utilizing available data, while resources to generate high-resolution data in other high-risk areas are not yet available. The countries also noted, during the fourth RIMES Council meeting in February 2011, RIMES efforts in developing a computer-based tool that integrates INSPIRE outputs into evacuation planning. This tool, named ESCAPE, calculates and maps the fastest evacuation route, taking into consideration decelerating factors, such as land use, water dynamics, etc. (Annex 6).

RIMES shall demonstrate the functions and use of these tools in aiding tsunami warning and improving preparedness and response in Myanmar, Philippines, Sri Lanka, and Thailand. Myanmar, Sri Lanka, and Thailand were selected from the Indian Ocean countries, while Philippines from the South China Sea countries. Philippines, Sri Lanka, and Thailand were the project countries for TTF-07; hence, partnerships necessary for the proposed project have been established. Also, under the TTF-07 project, preliminary tsunami risk assessments have been undertaken in select sites in Philippines and Sri Lanka, making best use of available data. The proposed project shall refine the risk maps produced in these sites, using survey data. Myanmar and Sri Lanka are also TTF-16 project countries; the proposed project shall add a multi-hazard dimension to local level activities in these countries. Furthermore, Myanmar, Sri Lanka, Philippines, and Thailand represent countries of differing degree in risk assessment capabilities, from least to more capable, in terms of technical and human resource capacities. Engagement in Myanmar shall aim to build basic tsunami risk assessment capacity; in Sri Lanka to enhance existing capacity; in the Philippines, to offer low-cost methodology and robust tools, noting the large area exposed to tsunamiogenic sources that require risk mapping; and in Thailand to provide science-based tools for risk and evacuation mapping, in response to request from the Ministry of Interior.

Myanmar, Sri Lanka, and Philippines shall receive the full suite of training programs proposed under this project (Annex 14), while focus in Thailand shall be on INSPIRE and ESCAPE. Thailand’s Hydrographic Department of the Royal Thai Navy (HDRTN) and the Royal Thai Survey Department (RTSD) are well resourced in undertaking bathymetric and topographic surveys. After the 2004 Indian Ocean tsunami, the HDRTN, on one hand, focused on re-survey of 16 areas along the west coast of Thailand, from Ranong to Satun provinces1. The HDRTN is equipped with modern equipment, such as multi-beam echosounders, side-scan sonar, and high accuracy GPS/DGPS, survey boats and multi-purpose vessel for hydrographic survey, and trained and experienced technical staff2. The RTSD, on the other hand, focused on production of aerial photographs of the affected areas and conducted GPS network adjustment to rectify deformations caused by the tsunamiogenic mega-thrust earthquake3. The RTSD continually develops its GPS network and updates geographic details of a location every 5 years, using aerial photography and satellite images from SPOT5 and SRTM DTED 24. Also, after the 2004 Indian Ocean tsunami, a government agency-academe team conducted a detailed building survey of the affected area, and archived survey results in a database. Products of these efforts after the 2004 tsunami were used by RIMES in validating the low-cost survey methodologies for near-shore bathymetric, topographic, and exposure surveys.

Participating countries in the RIMES Council meeting in February 2011 emphasized the need for regional data sharing and regional interaction of forecasters during a tropical cyclone event to

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1 HDRTN Country Report in the 7th meeting of the North Indian Ocean Hydrographic Commission, 27 February-2 March 2007, Pattaya
2 HDRTN National Report to the 11th meeting of the North Indian Ocean Hydrographic Commission, 1-2 March 2011, New Delhi
improve warning information generation, provision, and utilization in planning and decision-making. These were then added to the list of RIMES priorities, and reflected in the latest update of the RIMES Master Plan (Annex 3).

D. Target Group

The project aims to build capacities of:

a) Technical government agencies involved in the generation of near-shore bathymetric and topographic maps and exposure data: i) Myanmar – Myanmar National Hydrographic Center and Department of Land Survey; ii) Philippines – National Mapping and Resource Information Authority (NAMRIA); and iii) Sri Lanka – National Aquatic Resources Research and Development Agency (NARA) and the Survey Department

b) Technical agencies involved in tsunami risk assessment: i) Myanmar – Department of Meteorology and Hydrology (DMH), ii) Philippines – Philippine Institute for Volcanology and Seismology (PHIVOLCS), iii) Sri Lanka – Coast Conservation Department, and iv) Department of Disaster Prevention and Mitigation (DDPM) – Thailand

c) Research institutions/ universities involved in risk assessment

d) Users of risk assessment products: i) Myanmar – DMH and General Administration Department/ Relief and Resettlement Department, ii) Philippines – PHIVOLCS and National Disaster Risk Reduction and Management Council (NDRMMC), iii) Sri Lanka – Department of Meteorology (DoM) and Disaster Management Center (DMC), and iv) Department of Disaster Prevention and Mitigation (DDPM) – Thailand

e) Local authorities and other disaster management organizations at the pilot sites, such as the National Red Cross Society, NGOs, and CBOs

f) Members of the RIMES Council, consisting of National Meteorological and Hydrological Services (NMHSs) and/or technical agencies mandated to generate and provide early warning (Annex 1)

E. Project Strategy

The project shall be implemented in collaboration with NMHSs/NTWCs as national focal points for implementation, and NDMOs as local level focal points, and in consultation with relevant UNESCO/IOC IOTWS/ICG working group. This implementation arrangement is already in existence in the target countries through previous projects. Also, these NMHSs/NTWCs are RIMES Member State focal points, and constitute the RIMES Council (Annex 13).

A project initiation meeting in each country, involving the NTWC/NMHS, NDMO, and national mapping agencies shall be organized to receive feedback on the project framework and agree on a project work plan, clarify institutional arrangements for tsunami risk mapping and application, update on completed and ongoing relevant efforts in the countries, and identify the proposed project’s synergies with these efforts.

RIMES shall build tsunami risk assessment capacity in Myanmar, Philippines, Sri Lanka, and Thailand through training, demonstration of tool application, and transfer of equipment, software, systems, and training manuals to these countries. INSPIRE and ESCAPE are fully-automated tools, with user-friendly interfaces. They are web-based, with data servers hosted at RIMES, allowing the countries to access them through the Internet at a minimum connection speed of 512
kbps. For practice purposes, RIMES shall install a system prototype of each, with technical agencies in charge of risk assessment, as indicated in the previous section.

Trainings shall be done in-country, with the focal point sharing with the local costs (training venue and accommodation for trainers for those having facilities on-site, like PHIVOLCS). User manuals for field survey, INSPIRE, and ESCAPE have been developed, including the methodology for DEM generation (Annexes 4, 7, and 8). RIMES technical staff shall provide the training, with the training team consisting of the Coastal Hydrodynamics Scientist; Technical Specialists for remote sensing, GIS, and bathymetric, topographic, and exposure surveys; and Coastal Hazards Researcher, who were all involved in tool development and testing. RIMES shall organize the trainings in close collaboration with and involvement of focal points from the hydrographic department, land survey department, agency mandated to undertake tsunami risk assessment, NTWC, and NDMO. Selection of participants shall be based on appropriate educational background, relevant experience, and current role and responsibilities in the NTWC, technical agencies concerned with near-shore bathymetric and topographic surveys and risk assessment, research support institutions, NDMO, and other disaster management organizations.

Demonstrations shall be conducted in one pilot location in each country, preferably the sites covered by ESCAP’s TTF-07 project, for which RIMES has run INSPIRE using the best available data (Annex 9 provides the risk assessment outputs from TTF-07). The field surveys shall increase data resolution and, hence, improve risk assessment outputs. In Myanmar, pilot sites of ESCAP’s TTF-16 project shall be considered. In the Philippines, the site targeted by the American Red Cross-supported coastal community resilience project, which RIMES implemented during 2009-2011, may also be considered (Annex 10). All these sites were selected and endorsed by NTWCs/NMHSs; final site selection for this project shall be confirmed by respective NDMOs, for which ESCAPE products and their testing would be useful. As elaborated under Section C, demonstrations shall not be conducted in Thailand, since high quality survey maps and datasets are already available for the western coast of the country; INSPIRE and ESCAPE products shall complement risk and evacuation maps already available for high-risk areas.

Potential demonstration sites are:

- Myanmar: Kunyangon/ Labutta
- Philippines: San Fernando/ Dagupan/ Sipalay City
- Sri Lanka: Hambantota/ Trincomalee/ Kalmunai

For Thailand, data for Patong or Kamala, which were used during tool development, shall be used as input data for INSPIRE and ESCAPE.

Evacuation routes generated by ESCAPE, using risk assessment outputs from INSPIRE, shall be tested in a drill. A simulation exercise shall be designed and undertaken in each site, involving RIMES for providing tsunami information, NTWC for providing warning, and NDMO and local authorities for organizing warning response. UNESCO/IOC’s guidelines on how to plan, conduct, and evaluate tsunami exercises (Annex 11) shall be adapted to develop an exercise manual for the pilot site that is also consistent with NDMO procedures. Manual development shall consider all other major hazards in the site, in addition to tsunami. Exercise evaluation outcomes shall be provided as feedback to IOC, RIMES, NTWC, NDMO, and local authorities, for improving warning information generation and dissemination, tools, and the early warning system as a whole.

To facilitate tool adoption, equipment used in the field survey in each country (Annex 12) and software used in data processing and DEM generation shall be provided to respective national survey and mapping agencies, to enable them to replicate the work in other sites.
RIMES shall strengthen multi-hazard early warning systems and regional resource sharing by: a) tabling, for adoption by the RIMES Council (which consists of heads of NMHSs, national scientific and technical agencies generating multi-hazard early warning information, having mandates of making policy decisions concerning the regional early warning arrangement) a policy document on regional data sharing, including a mechanism for forecaster interaction during tropical cyclone events in the region for improving warning coordination on transboundary 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.

Two RIMES Council meetings shall be held within this project period. The first meeting shall:

- a) Consider and provide inputs for policy and mechanism development for data sharing. RIMES Program Unit shall assist the Council in drafting the data sharing policy and mechanism, for finalization and adoption during the second meeting, including the preparation and resourcing of an action plan. RIMES Program Unit has initiated the bringing of local hydro-meteorological data from Bangladesh, Nepal, and Sri Lanka to the regional center, wherefrom these countries could access data other than their own. RIMES Program Unit uses these data in providing improved simulation products to the countries. RIMES funds this effort, which involves provision of dedicated data server to the NMHS and travel by RIMES System Analyst to the country to set-up the data sharing system.

- b) Consider and provide inputs for development of mechanism for regional online interaction of forecasters during tropical cyclone occurrence. The Council could assign Member States to lead respective efforts in the South China Sea and Bay of Bengal. Progress/actions made during the monsoon shall be reported in the second meeting.

- c) Share experiences, lessons/successes of this proposed project, and provide feedback.

The second meeting shall make follow-up actions as above; share experiences, lessons/successes of this project; and identify activities and funding sources for replication.

F. Results Framework

- What is the longer-term goal (positive impact) the project aims to contribute to?

  The project’s long-term goal is strengthened early warning and response systems for tsunami and extreme weather events.

- What are the outcomes (changes in policy and institutional capacity) the project aims to contribute to (what will change as a result of the project)? For each outcome, please include performance indicators specifying how you will know if the outcome has been accomplished.

The project aims to contribute to the following outcomes:

1) Tsunami risk assessment capacities built within relevant technical agencies and research institutions

   *Performance indicators:*

   - a) At least 6 technical staffs of technical agencies in charge of bathymetric and topographic surveys each in Myanmar, Philippines, and Sri Lanka trained in 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.

b) At least 10 technical staffs of technical agencies and research institutions involved in tsunami risk assessment each in Myanmar, Philippines, Sri Lanka, and Thailand trained in data preparation and management, tsunami simulation and risk assessment, and tsunami hazard and risk mapping, using INSPIRE.

c) Technical agencies in charge of bathymetric and topographic surveys in Myanmar, Philippines, and Sri Lanka received survey methodology, equipment, materials, and software used during the training.

d) Technical agencies in charge of tsunami risk assessment received INSPIRE system used during the training.

2) Improved tsunami warning capabilities within national tsunami warning centers and response capabilities within disaster management organizations and communities

*Performance indicators:*

a) At least 15 staffs of NTWC, NDMO, and relevant risk information user agencies and institutions each in Myanmar, Philippines, Sri Lanka, and Thailand trained in the interpretation and use of tsunami risk maps.

b) At least 10 staffs of NDMO each in Myanmar, Philippines, Sri Lanka, and Thailand trained in data preparation and management and evacuation mapping, using ESCAPE.

c) At least 20 staffs of NDMO, relevant agencies, and local authorities and disaster management organizations from one pilot site, each in Myanmar, Philippines, and Sri Lanka, practiced in tsunami evacuation using ESCAPE outputs and UNESCO/IOC guidelines.

d) NDMOs in Myanmar, Philippines, Sri Lanka, and Thailand installed ESCAPE system and received multi-hazard exercise planning, implementation, and evaluation manual that were used in training.

3) Regional resource sharing for improved warning information generation and dissemination

*Performance indicators:*

a) Regional data sharing policy and mechanism agreed to and adopted by RIMES Member States.

b) Mechanism for regional online interaction of forecasters during tropical cyclone occurrence agreed to and adopted by RIMES Member States.

c) At least 5 countries not covered by this proposed project learn from experiences and lessons/successes shared through RIMES Council meetings, and identify activities and funding sources for replication.

- Outputs

The project shall produce the following outputs:

1) Printed user manuals on:
   a) Near-shore bathymetric, topographic, and exposure field surveys
   b) DEM generation
   c) INSPIRE
   d) ESCAPE
   e) Planning, implementation, and evaluation of multi-hazard exercises

2) Tsunami hazard and risk maps for one site each in Myanmar, Philippines, Sri Lanka, and Thailand.
3) Evacuation maps for one site each in Myanmar, Philippines, Sri Lanka, and Thailand

4) Training reports in:
   a) Near-shore bathymetric, topographic and exposure surveys
   b) Data generation, quality control, and preparation for tsunami risk assessment
   c) Tsunami hazard and risk mapping
   d) Tsunami evacuation mapping and testing

5) Regional data sharing policy and mechanism document

6) Mechanism for regional online interaction of forecasters document

7) Project monitoring and evaluation reports:
   a) Semi-annual progress and financial performance reports
   b) Final evaluation report
   c) Final project completion report

G. Contribution to regional coordination and cooperation

Consistent with the UNESCO/IOC vision, the early warning system for coastal hazards in the Indian Ocean and Southeast Asian region is envisioned as a coordinated network of national systems and capacities, with each country having the responsibility to issue warnings within its territory, and with regional service providers assisting in the generation and provision of warning information, as part of the global network of early warning systems. The proposed project contributes to regional coordination in the following way:

- Utilization of the RIMES Council mechanism for ensuring that efforts are demand-driven, contribute to addressing priority gaps and needs, and are in synergy with ongoing efforts in the region
- Development of data sharing policy and mechanism for improving early warning information products
- Development of mechanism for regional interaction of forecasters during a tropical cyclone event for improving forecasts and warning lead time
- Active linkages between RIMES regional center – national warning centers – disaster management center – communities at-risk
- Sharing of project experiences, successes, lessons, and feedback to UNESCO/IOC, RIMES Council, NTWCs/NMHSs, NDMOs for improving early warning systems, and other ESCAP partners, such as ADPC.

H. How will the project address gender inequalities?

The project shall take the following measures to address gender inequalities:

- Training participants shall be selected according to appropriate educational background, experience, and role and responsibilities in the organization.
- Training shall be conducted in a manner that meets gender-specific needs and sensitivities, particularly during field surveys
- Conduct of tsunami evacuation exercise shall be sensitive to gender-specific needs and as demanded by cultural specificities
- Assignment of tasks to the project team shall be according to ability and merit

I. Partners

Project partners and their key roles are:
1) NTWCs/NMHSs (RIMES country focal points; also RIMES Council members):
   o Coordinate with in-country institutions for implementing activities at national and local levels
   o Depute technical staff for training
   o Integrate methodology and tools into warning operations
   o Maintain active linkage with NDMOs for providing tsunami warning that is more useful for decision-making
   o Provide inputs to manual preparation for multi-hazard exercise planning, implementation, and evaluation
   o Provide inputs to development of regional data sharing policy and mechanism
   o Provide inputs to mechanism development for regional interaction of forecasters during a tropical cyclone event
   o Provide feedback on project implementation processes and outputs

2) NDMOs
   o Depute technical staff for training on hazard and risk assessment, and evacuation mapping and testing
   o Use hazard, risk, and evacuation maps in emergency preparedness and response planning and decision-making
   o Provide inputs to manual preparation for multi-hazard exercise planning, implementation, and evaluation
   o Facilitate community processes and activities
   o Provide feedback on project implementation processes and outputs

RIMES shall closely coordinate efforts under this project with UNESCO/IOC. RIMES shall provide feedback to ICG/IOTWS on capacity building on tsunami risk assessment, utilizing the INSPIRE tool, which was developed using the guidance provided by the risk assessment working group of ICG/IOTWS, as well as on tsunami exercises, which shall be implemented using UNESCO/IOC guidance on tsunami exercise planning, implementation, and evaluation.

J. Capacity of RIMES

RIMES developed the methodology and tools that shall be transferred to the proposed target groups (Annexes 4, 6, 7, and 8). It has in-house capacity in near-shore bathymetric, topographic, and exposure surveys, DEM generation, tsunami hazard and risk assessment, training, emergency preparedness and response planning, and documentation and communication of results and experiences.

RIMES Council meetings are avenues for review and development of policies and regional cooperation mechanisms related to early warning.

K. Knowledge Management and Results Dissemination

Results and experiences from the project shall be collated and documented through:

   a) Monthly update meetings and reporting of the project team
   b) Quarterly feedback from project partners
   c) Participation of RIMES Information, Communications and Knowledge Management (ICKM) Manager in major activities
   d) Semi-annual visit by the ICKM Manager to at least 1 project country
   e) Reporting of project focal points in annual RIMES Council meeting

Communication of project results and experiences shall be through:
a) Quarterly project updates sent by email to project stakeholders at local, national, and regional levels
b) RIMES electronic newsletter sent by email at least twice a year to RIMES stakeholders, including ADPC, UNDP, and UNESCO/IOC, including relevant IOTWS/ICG working groups.
c) Project page at RIMES website for the general public
d) Project brief in print, published annually, featuring the project framework, partners, results, and experiences
e) Presentation materials for RIMES visitors, partners, meetings, and relevant conferences to which RIMES is invited
f) Written updates and presentation materials as part of Regional Tsunami Service Provider (RTSP) reporting to UNESCO/IOC
g) Progress reporting to UNESCAP
h) Presentation at the ESCAP Disaster Risk Reduction Committee session, planned in July 2013

All information and knowledge products, listed under Sections F and K, including web news articles, shall acknowledge UNESCAP support, for example: “Produced with financial assistance from ESCAP under the Multi-Donor Trust Fund for Tsunami, Disaster and Climate Preparedness in Indian Ocean and Southeast Asia.” As may be allowed by ESCAP, its logo can be prominently displayed in all information and knowledge products, including banners during workshops and signboards at the sites, alongside logos of RIMES and national focal points and partners. A signboard shall be placed at each site, in consultation with local authorities, with the following message printed in the local language: “Name of site is a partner of ESCAP, RIMES, name of NTWC, name of NDMO, and name of local government in enhancing tsunami warning and response capacities for safer and resilient communities”.

L. Sustainability

The approach to training is to “cast the net wider”, that is to target institutions, which are concerned with tsunami risk assessment and product application in emergency response planning. These institutions could then support replication/upscaling efforts. For example, research institutions could provide research support and mobilize resources to complement efforts. Strong partnerships between government agencies in charge of tsunami risk assessment and these institutions would be crucial. Involvement of these institutions in the early warning forum, in target countries where such forums exist, would promote such partnerships and collaboration.

Demonstration of the tools' value in tsunami warning should convince NTWCs and NDMOs to integrate these tools and their products into their operation. Transfer of user manuals, survey equipment and materials, and installation of the INSPIRE and ESCAPE systems would help in this integration, and ensure that tools are available for trained personnel's use to enable replication. RIMES shall promote, within the project period, the integration of tsunami risk assessment and evacuation planning into relevant agency program and budget. In partnership with universities, the relevant tsunami risk assessment agency could encourage students to take up tsunami risk assessment as research interest, train them, and draw and implement a research plan that would contribute to replication.

For countries where funding is a big challenge, or integration into budgets is a long process, RIMES can assist on a cost-sharing basis.

RIMES Program Unit shall play a key role in implementing the regional data sharing policy and mechanism, as it is crucial to improving its products provided to RIMES Member States.
M. Counterpart contributions

Expected counterpart in-kind contribution from RIMES is USD 201,366.

National focal points shall contribute in the following ways:

- Provide training venue, including equipment, such as computers, LCD projector, etc.
- Accommodate RIMES trainers in their visitors' accommodation units, if available (example PHIVOLCS)
- Facilitate the acquisition of imagery processing and mapping software through their partner academic institutions to avail of discounted prices, according to the budget

RIMES contribution includes:

- Staff time
- Tax component of personnel daily rates
- Acquisition and installation of low-cost tide gauge in each country
- Travel (airfare, local travel, accommodation, and per diem) of other RIMES Member States: Comoros, India, Mozambique, Papua New Guinea, Seychelles, and Uzbekistan

N. Monitoring, evaluation and audit

Monitoring and evaluation of project implementation shall be made through:

a) Monthly meetings of the project team for reporting of progress updates, including delivery of outputs, problems met and solutions needed, and activity planning and coordination

b) Quarterly reporting from key project partners (NTWC, NMHS, and NDMO) on progress of national and local level activities, and efforts in sustaining project activities

c) Semi-annual meetings among country project coordinator, NTWC, NMHS, and NDMO to review project progress and follow-up actions, and receive feedback

d) Annual meeting of all NTWC/NMHS and NDMO partners, back-to-back with RIMES Council meeting, for mid-term and final project review, sharing of experiences, successes, and lessons, and efforts in sustaining project activities

Six monthly progress reports will be provided to ESCAP as per requested format. External project evaluation shall be undertaken towards the end of the project, according to the guidelines provided by ESCAP. Financial audit shall be undertaken on the last month of project implementation.

O. Payment Schedule

Below are the milestones at the end of each semester. A payment of US$ 78,898 will be made upon signature of the agreement, to cover activities 1.1, 2.1, 5.1, and 5.2. The advance payment would help RIMES in implementing the project, noting that institutional support from ongoing process under TTF-08 may not come in time before implementation of this proposed project.
Table 1: Project milestones

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<td>○ Feedback from project partners on project implementation plan and strategy received</td>
<td>○ Training 2.1 completed in 2 countries; and 2.2, 2.3, and 3.1 in 1 country</td>
<td>○ Training 2.1 and 2.3 completed in 3 countries; and 2.2 and 3.1 in 2 countries</td>
<td>○ Field surveys and evacuation exercises completed in Myanmar, Philippines, and Sri Lanka; Training on INSPIRE and ESCAPE completed in all 4 countries</td>
</tr>
<tr>
<td>○ Training 2.1 and 2.2 completed in 1 country</td>
<td>○ Tsunami risk and evacuation maps prepared for 1 site (1 country)</td>
<td>○ Tsunami risk and evacuation maps prepared for 3 sites (3 countries)</td>
<td>○ Tsunami risk and evacuation maps prepared in all 4 sites (4 countries)</td>
</tr>
<tr>
<td>○ Project brief printed and disseminated before project initiation meeting</td>
<td>○ Multi-hazard exercise planning, implementation, and evaluation tool adapted in 1 country</td>
<td>○ Multi-hazard exercise planning, implementation, and evaluation tool adapted in 2 countries</td>
<td>○ Multi-hazard exercise planning, implementation, and evaluation tool adapted in all 3 countries</td>
</tr>
<tr>
<td>○ 1st Progress report</td>
<td>○ Mid-term external evaluation completed</td>
<td>○ Policy and mechanism on data sharing and forecaster interaction drafted, agreed to, and adopted</td>
<td>○ Survey equipment and materials, data processing software, and training manuals provided to Myanmar, Philippines, and Sri Lanka; INSPIRE and ESCAPE prototypes provided to Thailand</td>
</tr>
<tr>
<td>○ 2nd Progress report</td>
<td>○ Project experiences, successes, and lessons published and disseminated</td>
<td>○ RIMES Council took stock of project accomplishments and provide a way forward</td>
<td></td>
</tr>
<tr>
<td>○ 3rd Progress report</td>
<td>○ Project experiences, successes, and lessons published and disseminated</td>
<td>○ Final evaluation and audit completed</td>
<td>○ Final report</td>
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</table>

Table 2: Anticipated payment schedule

<table>
<thead>
<tr>
<th>Upon agreement signature</th>
<th>After ESCAP acceptance of 1st Progress Report</th>
<th>After ESCAP acceptance of 2nd Progress Report</th>
<th>After ESCAP acceptance of 3rd Progress Report</th>
<th>After ESCAP acceptance of Final Report</th>
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<tbody>
<tr>
<td>USD 78,898</td>
<td>USD 204,182</td>
<td>USD 118,867</td>
<td>USD 54,795</td>
<td>USD 28,247</td>
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P. Annexes

<table>
<thead>
<tr>
<th>Annex Number</th>
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<tbody>
<tr>
<td>1</td>
<td>RIMES Member States</td>
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<tr>
<td>2</td>
<td>Report of the Second Meeting of RIMES Executive Board</td>
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<tr>
<td>3</td>
<td>RIMES Master Plan 2010-2014, updated June 2011</td>
</tr>
<tr>
<td>4</td>
<td>Guidelines for Field Survey and Data Processing</td>
</tr>
<tr>
<td>5</td>
<td>INSPIRE System Development</td>
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<tr>
<td>6</td>
<td>Brief on ESCAPE</td>
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<tr>
<td>7</td>
<td>INSPIRE User Manual</td>
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<tr>
<td>8</td>
<td>DEM Data Generation for Tsunami Modeling and Risk Assessment</td>
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<tr>
<td>9</td>
<td>Report on Tsunami Hazard and Risk Assessment in Select Sites in Bangladesh, Maldives, Sri Lanka, Thailand, Philippines, and Vietnam</td>
</tr>
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<td>Annex Number</td>
<td>Annex Name</td>
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<td>10</td>
<td>American Red Cross-supported coastal community resilience project</td>
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<td>11</td>
<td>UNESCO/IOC guidelines on tsunami exercise planning, implementation, and</td>
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<td>evaluation</td>
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<td>Equipment and material specifications for near-shore bathymetric,</td>
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<td>topographic, and exposure surveys</td>
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<td>13</td>
<td>About RIMES</td>
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<td>14</td>
<td>Proposed training program</td>
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