ESCAP
Multi-donor Voluntary Trust Fund on Tsunami
Early Warning Arrangements in the Indian
Ocean and Southeast Asia

TERMINAL REPORT

<table>
<thead>
<tr>
<th>PROJECT TITLE</th>
<th>ENHANCING TSUNAMI RISK ASSESSMENT AND MANAGEMENT, STRENGTHENING POLICY SUPPORT AND DEVELOPING GUIDELINES FOR TSUNAMI EXERCISES IN INDIAN OCEAN COUNTRIES</th>
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<td>ORGANIZATION</td>
<td>INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION OF UNESCO</td>
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<th>Total project budget</th>
<th>US$480,947</th>
<th>Funding received to date</th>
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<td>Interest earned on funding received from ESCAP</td>
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<td>Date of signature of LoA</td>
<td>24 July 2012</td>
<td>Date of project completion</td>
<td>30 June 2015</td>
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ANNEXES

1. Covering letter
2. Pre-final financial statement as of 31 August 2015
3. Monitoring and Evaluation Report
4. Project output documents (18) provided in soft copy — see list of Project Output Documents on page 2 and 3 of this report.

I certify the accuracy of the substantive and financial information contained in this report.

This terminal report is accepted.

A. I. Blikberg
Alf Blikberg, Programme Officer
Trust Fund for Tsunami, Disaster and Climate Preparedness

Shantha Rtnasingam
Chief, Private and Multilateral Funding Sources
Bureau for Strategic Planning
OVERALL ASSESSMENT

Key Project Outcomes

- The Guidelines: "Tsunami Risk Assessment and Mitigation for the Indian Ocean: knowing your tsunami risk - and what to do about it" have been revised, published and 300 copies were printed for distribution to key stakeholders in the Indian Ocean region.
- A methodology for improved wave height forecasting has been developed and documented. The methodology has been applied to a case study for the Port City of Galle, Sri Lanka.
- Capacity in training in Coastal Hazards and Tsunami Risk Assessment and Management was enhanced by conducting a regional workshop.
- A policy document on sustainable training and continued professional development in tsunami and coastal hazard mitigation has been developed and published.
- National capacity for tsunami response has been strengthened in Bangladesh, Myanmar and Timor Leste.
- Models of national policy support for tsunami exercises were established in Myanmar and Timor Leste.
- 18 output documents have been developed and published and are available on the IOC UNESCO and IOTIC websites.

Project Output Documents: Tsunami Risk Assessment:

1. IOTWS - Operations and Limitations (30/05/15). Christopher Ryan

2. Tsunami Risk Assessment and Mitigation for the Indian Ocean; knowing your tsunami risk - and what to do about it (06/10/15). IOC/2009/MG/52 Rev

3. Risk Assessment and Mitigation within a Tsunami Forecasting and Early Warning Framework: Case Study - Port City of Galle (20/06/15). S.S.L.Hettiarchchi, S.P.Samarawickrama, N. Wijeratne, A.H.R Ratnasooriya and R.S.M Samarasekera


5. Training Workshop Manual on: "Coastal Hazard Assessment: Applications in Risk Assessment, Management and Mitigation" (02/06/15). Russell Arthurton

7. Establishing a sustainable mechanism for training in coastal hazards and tsunami risk assessment and management for continuing professional development (29/06/15). Russell Arthurton and TRATE Project Team

**Project Output Documents: Tsunami Exercises:**

8. Module on Policy Support for Tsunami Risk Reduction (01/06/15). IOC UNESCO

9. Module on Tsunami Exercise (01/06/15). IOC UNESCO

10. Regional Workshop on Training Modules for Tsunami Exercises Policy Support (06/07/15). IOC UNESCO

11. Tsunami Exercise: How to Plan, Prepare for, Conduct and Evaluate national and local Tsunami Exercises to improve Tsunami Preparedness in Myanmar (01/06/15). IOC UNESCO

12. Tsunami Exercise: How to Plan, Prepare for, Conduct and Evaluate national and local Tsunami Exercises to improve Tsunami Preparedness in Myanmar (Burmese) (01/06/15). IOC UNESCO


15. Tsunami Exercise: How to Plan, Prepare for, Conduct and Evaluate national and local Tsunami Exercises to improve Tsunami Preparedness in Timor Leste (01/05/15). IOC UNESCO

16. Tsunami Exercise: How to Plan, Prepare for, Conduct and Evaluate national and local Tsunami Exercises to improve Tsunami Preparedness in Timor Leste (Tetum) (01/09/14). IOC UNESCO

17. Recommendation for Policy Support for Tsunami Disaster Risk Reduction and Tsunami Exercise in Timor-Leste (01/06/15). IOC UNESCO

18. Recommendation for Policy Support for Tsunami Disaster Risk Reduction and Tsunami Exercise in Timor-Leste (Tetum) (01/06/15). IOC UNESCO
Result 1: Guidelines on Tsunami Risk Assessment and Mitigation for the Indian Ocean upgraded and revised to include the impact of marine hazards on marine infrastructure and hazard mitigation in risk management.

Outcomes
The Guidelines: "Tsunami Risk Assessment and Mitigation for the Indian Ocean; knowing your tsunami risk – and what to do about it" were revised, published and 300 copies were printed for distribution to key stakeholders in the Indian Ocean region. The revision was coordinated by a consultant, Mr Russell Arthurton, in association with a project Task Team convened to provide technical guidance. The authors contributing additional material to this edition were: Dilanthi Amaratunga and Richard Haigh (University of Huddersfield, United Kingdom), Juan Carlos Villagran de Leon (UN-OOSA, Bonn), Sam Hettiarachchi and Priyan Dias (University of Moratuwa, Sri Lanka), Edi Kissing (ETH, Zurich), Harkunti Rahayu (Bandung Institute of Technology, Indonesia), Rajesh Sharma (UNDP, Bangkok) and Russell Arthurton (IOC-UNESCO Consultant).

New material includes a chapter reviewing the current and recent initiatives in institutional risk assessment and management with in a disaster risk reduction (DRR) framework and a chapter addressing the rationale and key steps to be followed in the sequence of risk assessment and risk reduction procedures. There is a new chapter on case studies, which provides summary accounts of strengths and weaknesses in the delivery of early warning for the major tsunami events in the Indian Ocean and Pacific Ocean regions since the beginning of 2004. Additionally, there is a new chapter on tools and/or methods associated with tsunami propagation models, post-event surveys, integrating inundation models into land use planning, risk-based land use planning, and community-based disaster risk management.

The revised Guidelines were used as a basis for the regional workshop: "Coastal Hazard Assessment: Applications in Risk Assessment, Management and Mitigation", which was held in Colombo, Sri Lanka, 2-5 June 2015 (See Result 3).

Performance Indicators
1. Guidelines on Tsunami Risk Assessment and Mitigation for the Indian Ocean were upgraded and revised, and 300 copies published for distribution to key stakeholders in the Indian Ocean region.

Activity - Revision and expansion of Guidelines on Tsunami Risk Assessment and Stock Taking of Country supporting Policies for DRR and Tsunami Exercises
- A meeting of the Task Team for the revision and expansion of the Guidelines on Tsunami Risk Assessment was held in Colombo, Sri Lanka, 27 February – 1 March 2013, hosted by the Disaster Management Centre and the University of Moratuwa. The Task Team reviewed the structure of the existing guidelines, proposed a structure for the revised guidelines and decided on areas to be covered by the guidelines. The Task Team established core groups to assist the implementation and identified resource persons who would be invited to contribute text/case studies etc of the revised guidelines.
• Prof Sam Hettiarachchi attended the UN-ISDR Global Platform to meet representatives from agencies, universities and professionals who were able to contribute to the revised Guidelines. During the same visit the Prof Hettiarachchi also visited ETH and Swiss RE, Zurich both important contributors to proposed revision and in the case of ETH, additional input on proposed training materials to be developed from the revised guidelines.

• A consultant was engaged to advise the project team on the IOTWS operational philosophy and methodology, and the limitations and uncertainties inherent in TSP products. The consultant, Mr Chris Ryan, was engaged for 2 man weeks and completed his assignment by 30 May 2015. This report (Output 1) fed into the main consultancy described below and was included as part of the revised guidelines.

• A consultant was engaged to review the original guidelines; collate contributing authors inputs and draft revised guidelines; review and finalise guidelines; develop training material and facilitate training workshop; and develop a policy document. The consultant, Mr Russell Arthurson, worked for three man months spread over a period of six calendar months.

• The consultant reviewed the original guidelines, collated contributing authors' inputs and drafted the revised guidelines, which were then reviewed by the authors and the project Task Team before finalising. The consultant also developed training material for the regional training workshop (see Result 3).

• The Guidelines on Tsunami Risk Assessment and Mitigation for the Indian Ocean were updated and revised, reviewed by the contributing authors and the project Task Team, and 300 copies were printed for distribution to the key stakeholders in the Indian Ocean region (Output 2).
**Result 2:** Methodology that serves real time operational needs and hazard/risk assessment needs within a tsunami forecasting framework developed. The methodology will strengthen the institutional capacity of early warning centres and disaster management institutions.

**Outcomes**
A methodology for improved wave height forecasting has been developed and documented. The methodology has been applied to a case study for the Port City of Galle, Sri Lanka. The objective of the methodology is to integrate the forecasts from the Tsunami Service Providers with inundation model results to improve tsunami wave height forecasting on complex shorelines. The study confirmed that within a bay, tsunami wave heights can increase as much twice to that corresponding to straight and uniform slope shoreline. The study has identified the importance of energy focusing along shorelines of varying geometry and the need to engage in inundation modeling and to prepare data bases for cities at high risk along such coastlines.

**Performance Indicators**
1. Case Study on Tsunami Risk Assessment within a Tsunami Forecasting Framework has been completed. Although not distributed directly to the IOTWS Tsunami National Contacts, the report and case study have been made available on the IOC UNESCO website.
2. A follow up survey to determine the applicability and usefulness of the case study has not been conducted. However the case study was presented at the regional workshop on Coastal Hazard Assessment (see Result 3).

**Activity** - Enhance the capability in conducting tsunami risk assessment within a tsunami forecasting and early warning framework

- Professor Sam Hettiarachchi visited the University of Western Australia, Perth from 11-17 June 2015 to collaborate on modelling and finalization of issues with web based facilities developed for the ComMIT model. The principal contact person at Ocean Institute of UWA Perth was Dr Sarath Wijetane, Assistant Professor. A wide range of issues were discussed including: a review of scenario databases used in ComMIT; issues relating to nearshore/onshore modelling using ComMIT for Risk Assessment; issues relating to the use of 100km coastal cells by the IOTWS Tsunami Service Providers; the outcomes of the Port City of Galle Case Study; finalisation of the Case Study illustrating a capability that serves real time operational needs, hazard/risk assessment needs and research/development opportunities through the use of a standard tsunami forecast system that includes tsunami characterization, measurements and forecast models.
- A graduate civil engineer from the University of Moratuwa, Mr Sameera Maduranga Samarasekara, assisted Prof Hettiarachchi with the case study. As a prelude to the detailed case, a preliminary study was implemented on how to use the databases developed for the MOST/ComMIT tsunami model. The outcome of the preliminary study enabled a similar approach to be adopted when using data bases available at the Tsunami Service Providers (TSP).
The Research Assistant visited INCOIS 19-23 May 2014 to collaborate on modelling related to hazard detection, warning at regional level and issues on coastal units used for regional warning, inundation, local warning. Mr Sameera met with GIS and modelling experts and conducted inundation modelling using ComMIT and Tsunami N2 for different scenarios for Port City of Galle.

The following draft reports were finalised and submitted for review: 1) The Galle City Risk assessment and management Case Study. 2) Improved Tsunami Wave Height Forecasting- An Integrated Approach for the analysis of results from Early Warning Systems and Inundation Modelling for Risk Assessment.

The draft reports were reviewed by Prof. J. Wijetunga, University of Peradeniya, Sri Lanka and published (Output 3 and Output 4). Note that the title of the second report was changed to "Tsunami Wave Height Forecasting at coastlines with complex geometries - An Integrated Approach for the analysis from Early Warning Systems and Inundation Modelling for Risk Assessment".
Result 3 Capacity in training in Coastal Hazards and Tsunami Risk Assessment and Management enhanced through the development of training modules and teaching materials

Outcomes
Capacity in training in Coastal Hazards and Tsunami Risk Assessment and Management was enhanced by conducting a regional workshop. The overall objectives of this four-day workshop were to raise the levels of awareness and understanding of tsunami risk and mitigation within a context of Disaster Risk Reduction. The workshop programme addressed the topics and issues as described in the Second Edition of the Guidelines, “Tsunami Risk Assessment and Mitigation for the Indian Ocean: knowing your tsunami risk – and what to do about it” shortly due to be published in the UNESCO-IOC Manuals and Guides Series. The programme included an additional topic, considering the institutional role in disaster risk reduction. The objective of the workshop was to establish understanding of the linkages in the risk assessment and management procedure as described in the revised Guidelines, also to demonstrate the relevance and importance of the processes described.

The training sessions were supplemented by presentations of four national case studies – one each from Mozambique and Oman and two from Sri Lanka. Exercise modules were designed around a fictitious “Regional Training Scenario” depicted by layers of physical and socioeconomic information held in an open-source Geographical Information System (GIS), as used successfully in previous training workshops. The scenario provided trainees with a hands-on opportunity to appraise vulnerability, preparedness and mitigation issues in the context of exposure to potential tsunami impacts from various sources.

The intention of the Task Team at the planning stage was that the workshop should aim at “training-the-trainer”, with participants selected on the understanding that they would relay their learnt training to trainees in their respective countries. In the event, this aim proved overambitious. The workshop is considered to have fallen short of achieving this goal in part because of the training approach used and in part because of a limited potential of the selected trainees as trainers.

Performance Indicators
1. A design and planning workshop was conducted to prepare training material, attended by 9 people, including the consultant.
2. A regional training workshop on Coastal Hazard Assessment: Applications Risk Assessment, Management and Mitigation was conducted, attended by 24 participants, including 16 participants from UNESCAP Indian Ocean Member States.
3. Training modules and teaching materials for the regional workshop were developed and published. However, the modules and material cannot be considered suitable for “training of trainers” and further work will be required to achieve this.
Activity – Establishment of a sustainable mechanism for training in tsunami risk assessment and management for Indian Ocean states.

- A Design and Planning workshop was held at the University of Moratuwa, Colombo, Sri Lanka, 29 September – 1 October 2014. The meeting was attended by the project Task Team: Prof Sam Hettiarachchi, Dr Harkunti Rahayu, Juan Carlos Villagran, Rajesh Sharma, Dilanthi Amartunga, Richard Haigh, Priyan Dias, Russell Arthurton and Tony Elliott.

- Following the Design and Planning workshop, the consultant developed the training manual and other material for the regional training workshop (Output 6).

- A regional workshop on Coastal Hazard Assessment: Applications Risk Assessment, Management and Mitigation, was held at the Mount Lavinia Hotel, Colombo, 2-5 June 2015. The workshop was attended by 25 participants from 18 countries, 12 trainers from 7 countries and 1 M&E consultant. The workshop was co-sponsored by UNESCO, supporting 17 participants from 10 countries (Bangladesh, India, Indonesia, Iran, Malaysia, Myanmar, Pakistan, Sri Lanka, Thailand, Timor Leste), with IOC UNESCO supporting 8 participants from 8 countries (Comoros, Kenya, Madagascar, Mauritius, Mozambique, Oman, Seychelles, Tanzania). The overall objectives of the workshop were to raise the levels of awareness and understanding of tsunami risk and mitigation within a context of Disaster Risk Reduction. The programme addressed the topics and issues outlined in the Second Edition of the Guidelines, “Tsunami Risk Assessment and Mitigation for the Indian Ocean: knowing your tsunami risk and what to do about it” published in the UNESCO-IOC Manuals and Guides Series. They reflected the Guidelines’ structure, with a sequential treatment of the various aspects of the hazard, vulnerability and risk assessment processes followed by sections dealing with risk reduction through improved preparedness and mitigation. The objective of the workshop was to establish understanding of the linkages in the risk assessment and management procedure as described in the revised Guidelines, also to demonstrate the relevance and importance of the processes described.

Training was delivered in sessions divided into modules that reflected the structure and content of the revised Guidelines. The training sessions were supplemented by presentations of four national case studies – one each from Mozambique and Oman and two from Sri Lanka. Exercise modules were designed around a fictitious “Regional Training Scenario” depicted by layers of physical and socioeconomic information held in an open-source Geographical Information System (GIS), as used successfully in previous training workshops. The scenario provided trainees with a hands-on opportunity to appraise vulnerability, preparedness and mitigation issues in the context of exposure to potential tsunami impacts from various sources.

A report of the workshop is provided in Output 6.
Result 4: Policy document on sustainable training and continued professional development in tsunami and coastal hazard mitigation developed.

Outcomes
A policy document on sustainable training and continued professional development in tsunami and coastal hazard mitigation has been developed and published. The document considers a number of "options for progress", makes suggestions for training content, and addresses monitoring and certification issues.

Performance Indicators
1. A policy document on a sustainable mechanism for training and continued professional development in tsunami and coastal hazard risk management has been prepared and published, and is available on the IOTWMS website.

Activity – Preparation of a policy document
- A policy document and strategic plan for "establishing a sustainable mechanism for training in coastal hazards and tsunami risk assessment and management for continuing professional development" was prepared by the consultant, Mr Russell Arthurton, in association with members of the Tsunami Risk Assessment and Mitigation Task Team established for this project (Output 7).
Result 5: Strengthen national capacity of the Indian Ocean Member States in tsunami response through tsunami exercises.

Outcomes
National capacity for tsunami response has been strengthened in Bangladesh, Myanmar and Timor Leste. Two separate tsunami exercise training modules were developed: one module was on policy support and the other on how to plan and implement tsunami exercises. At the design and planning expert group meeting held in Jakarta in May 2013 it was agreed that the policy support document should be broadened to cover tsunami risk reduction policy.

Two training workshops were then conducted in each of Bangladesh, Myanmar and Timor Leste, the first on policy support and the second on exercise planning and implementation. Of the 3 countries, Myanmar was better prepared to formulate policy recommendations than the other 2. It was found that Bangladesh and Timor Leste have not fully evaluated their tsunami risk and it was therefore difficult for these countries to engage stakeholders in framing policy recommendations or understanding the need for tsunami exercise training. Nevertheless, by the end of the project key stakeholders in each country had been identified and had participated in the training workshops and it is likely that all countries will participate in future IOWave exercises at NTWC, DMO and hopefully community level.

A regional workshop to share lesson learned during the implementation of the project was held in Jakarta at the end of the project. The overall objectives of the three day workshop were to: 1) introduce the two training modules developed under the project; 2) share lessons learned from the three pilot countries; and 3) to get input on the follow up activities to be addressed after the project. The valuable lessons learnt taken from the countries’ presentations is the importance of developing and applying tsunami policy and tsunami exercise plans to improve awareness of tsunami risk reduction as well strengthening institutions and systems for better preparedness.

Performance Indicators
1. Apart from IOWave exercises, Bangladesh has not conducted any additional national exercises or drills. Myanmar regularly conducts tsunami exercises at the local level, including an evacuation drill at Aung Hlaing in 2014 as part of a RIMES project funded by ESCAP. Timor Leste combined a national exercise (SIMEX) with the IOWave14 exercise.
2. All 3 countries participated in the IOWave14 exercise
3. Myanmar and Timor Leste attended the 10th Session of the ICG/IOTWS in Muscat, Oman in March 2015. Bangladesh had registered to attend but could not get clearance from the relevant line ministry in time so had to cancel.
Activity: - Tsunami exercise training module development

- Tsunami exercise training module development. Training modules on policy support for tsunami exercises (Output 8) and training modules on how to plan and implement tsunami exercises (Output 9) have been developed. An expert group on development of training modules for policy support and tsunami exercise guidelines was held in UNESCO Office Jakarta 13 – 16 May 2013. The meeting resulted in two training module structures to be implemented in two separate training/workshops in the three pilot countries. The first training/workshop focuses on the important aspects to be considered, and how to develop policy support to have a sustainable tsunami exercise programme in a country. The second training/workshop focus on how to plan and implement tsunami exercises. This module structures were then developed into training modules with specific topic objectives, contents, methodology of delivery, and time needed for each topic.

Activity: - Two National Workshops (in Bangladesh, Myanmar, and Timor Leste) on country policy support and guideline formulation for tsunami exercises

- Training Workshop in Dhaka, Bangladesh (6-11 October 2013).
  The workshop was successfully implemented and attended by 27 participants representing different stakeholders related to tsunami exercise. The participants actively discussed the topic of policy support, inter-agency coordination as well as in country self-evaluation. Bangladesh has strong policy on disaster risk reduction which is stated in the Standing Orders on Disaster (SOD) and the National Action Plan on Disaster Management (NPDM). Although tsunami hazard is included in the SOD and NPDM, there is still debate by the decision makers and general public if tsunami hazard is to be considered as one of the priority hazards, and therefore no significant actions have been taken to strengthen the country's preparedness for tsunami hazards. The workshop provided a new platform for BMD and DDM to work on tsunami preparedness and their early warning system.

- Training workshop in Dili, Timor Leste (4-7 February 2014)
  The training was jointly organized with the National Disaster Management Directorate of the Ministry of Social and Solidarity. Thirty (30) Participants from 15 different agencies representing national and district level attended the training. The trainer/facilitator for this training was Mrs. Irina Rafiana, Mr. Ardito M. Kodijat, and Mrs. Vidiarina Henny Dwi, Tsunami Early Warning Expert of GIZ. The training discussed and analyzed the National Disaster Risk Management Policy, Hazard Assessment and Map of Timor Leste; and the Emergency Response SOP. Based on geological assessment, studies and preliminary research indicated that there is possible threat of local tsunami as well as distance tsunami in the north coast as well as the south coast of Timor Leste and has been included as the country's natural hazards. However tsunami has not been a priority of the decision makers and needs to be included in the country's policy.

- Training workshop in Nay Pyi Taw, Myanmar (11-14 March 2014)
  The training was jointly organized with Myanmar Department for Meteorology and Hydrology. Twenty five (25) participants from different 3 regions of Myanmar, representing 8 organizations participated in the training. The trainer/facilitator for this training was Dr. Harkunti Pertiwi Rahayu, and Mr. Ardito M. Kodijat, and Mr. Tony Elliott, Head of ICG/IOTWS Secretariat. The training discussed and analyzed three main documents of Myanmar: Myanmar Multi-hazard Risk Assessment in Nargis Affected Area; Natural Disaster Management Law (The Pyidaungsu Hluttaw Law No. 21, 2013); and Myanmar National Action Plan on Disaster
Risk Reduction 2009 -2015. The training concluded that the Myanmar Action Plan for Disaster Risk Reduction 2009-2015 have implicitly cover for the Tsunami Risk Assessment; Tsunami Early Warning System and Dissemination; Tsunami Education, preparedness and awareness; and Community Based Disaster Preparedness. However it has not cover the need for Tsunami Risk Assessment; Tsunami Early Warning System and Dissemination; Tsunami Evacuation Planning; Tsunami Exercise; Tsunami Mitigation (i.e. land use planning).

- **Training in Dili, Timor Leste II, 14-17 July '14**
  The training was jointly organized with the National Disaster Management Directorate of the Ministry of Social and Solidarity. The training was opened by the Mr. Francisco do Rosario, the Director of the National Disaster Management Directorate. Twenty six (26) participants from 15 different agencies representing national and district level attended the full 4 days training. These participants are from national and districts (Manufahi, Covalima, Viqueque dan Los Palos) government as well as other organization involved in tsunami exercise activities in Timor Leste.

- **Training in Dhaka, Bangladesh II, 25-28 August '14**
  The training was jointly organized with the Bangladesh Meteorological Department. There were 26 people listed as participants; however each day there were only 24 participants attending the training. These participants are from national and districts (Nhoakali, Satkhira, Cox’s Bazar, Borguna, and Patnakhali) government as well as other organization involved in tsunami emergency response and tsunami exercise activities in Bangladesh.

- **Training in Nay Pyi Taw, Myanmar II, 1-4 September '14**
  The training was jointly organized with Myanmar Department for Meteorology and Hydrology. There were 25 participants attending fully the 4 days training. These participants are from national government Institutions and districts disaster management agencies (Laputta, Mon, and Yangon) as well as other organization involved in tsunami emergency response and tsunami exercise activities in activities in Myanmar.

**Activity**: Regional workshop and lessons learned on tsunami exercises for Indian Ocean based on experience of pilot countries

- A regional workshop on: "Training Modules for Tsunami Exercises Policy Support" was held in Jakarta, Indonesia 15-17 June, 2015. 39 participants from 19 Indian Ocean countries attended this workshop. The workshop was co-sponsored by UNESCO, supporting 31 participants from 11 countries (Bangladesh, India, Indonesia, Iran, Malaysia, Maldives, Myanmar, Pakistan, Sri Lanka, Thailand, Timor Leste), with IOC UNESCO supporting 8 participants from 8 countries (Comoros, Kenya, Madagascar, Mauritius, Mozambique, Oman, Seychelles, Tanzania.). The participants represented Disaster Management Offices, Meteorology Departments, and other disaster management related institutions and agencies of their countries. Five trainers and two consultants facilitated the workshop.

- The overall objectives of this three day Workshop were to: 1) introduce the two training modules developed under the same project: Tsunami Risk Reduction Policy Support and Tsunami Exercise. Through this project these modules have been piloted in Bangladesh, Myanmar, and Timor Leste; 2) share lessons learned from the three pilot countries; and 3) to get input on the follow up activities to be done after the project ends.
The workshop addressed the topics and issues as described in the Modules on Policy Support for Tsunami Risk Reduction and Tsunami Exercise. These topics were discussed in five sessions and the participants were divided into 3 groups. The group discussion was conducted using Fishbowl Methodology. Each group led by a facilitator and each of participants were given an opportunity and took turn in giving their inputs, comments, and suggestion on particular topics that have been set out by the Facilitator Team. The topics were reflected from the modules' structure that includes: 1) Disaster (Tsunami) Risk Reduction Policy, 2) Policy Support for Tsunami Preparedness, 3) Tsunami Exercise, 4) Indicators of Successful Tsunami Exercise, 5) Expectation to WG 1 ICG/IO/TWS, and Expectation of IOTIC.

A report of the workshop is provided in Output 10.
Result 6: Models of national policy support for tsunami exercises established

Outcomes
Models of national policy support for tsunami exercises were established in Myanmar and Timor Leste through the assistance of national consultants appointed to work with the key stakeholders to assess the regulatory framework and to make recommendations to strengthen country tsunami risk reduction programmes and activities within an overall tsunami risk reduction policy framework. In Myanmar and Timor Leste this resulted in the publication of 2 documents: 1) a tsunami exercise guidebook and 2) recommendations for policy support for tsunami risk reduction and tsunami exercises. In the case of Myanmar, 8 potential projects were identified to enhance tsunami preparedness and in Timor Leste, 10 recommendations to strengthen tsunami preparedness were made.

Performance Indicators
1. A stock taking exercise was completed in each of the 3 target countries at the beginning of the project. However, it was not possible to undertake follow up surveys within the timeframe of the project. It is proposed to conduct these as an activity of ICG/IOWTS Working Group 1 after the project.
2. There were no tsunami events in the Indian Ocean region during the project timeframe. All 3 target countries participated in the IOWave14 exercise and their feedback is provided in the report of the exercise ([IOC/2015/TS/113Vol 2]). All 3 countries participated from national to provincial/local level and reported their results but did not report conducting any community evacuations.

Activity: Stock taking and Review of Indian Ocean State Policies for DRR and Tsunami Exercise
- Stock taking survey tools have been developed and stock taking surveys have been conducted in the three pilot countries: Timor Leste, 26 February – 1 March 2013 conducted by Ardito M. Kodijat; Bangladesh, 3-7 June 2013 conducted by Irina Rafiliana and Tony Elliott; and Myanmar, 15-20 July 2013 conducted by Harkunti Rahayu and Ardito M Kodijat.

Activity: Strengthening in country policy support for tsunami exercises
- The project also implemented activities to support the target countries in detailed assessment of their national regulatory frameworks on Disaster Risk Reduction, i.e. national action plan on DRR; Disaster Management Law; Standing Order on DRR, etc, to determine if these regulatory frameworks addressed the need for tsunami risk reduction, especially on building preparedness through tsunami exercises. National based consultants were contracted to work with the National Tsunami Warning Centres and the National Disaster Management Offices to assess the regulatory framework and to recommend policy support to strengthen the country’s tsunami risk reduction programme and activities.
• In Myanmar, Mr. Loy Regeo, a disaster risk reduction consultant based in Yangon, was contracted to work with The Department of Meteorology and Hydrology and the Relief and Resettlement Department to work on 1). Developing a guidebook on Tsunami Exercise, based on the IOC/UNESCO manual no 58 and referring to the training workshop on Tsunami exercise that was conducted in Nay Pyi Taw; and 2). Develop Myanmar recommendations on policy support for tsunami risk reduction as follow up to the training/workshop activity on Policy Support for Tsunami Risk Reduction that was conducted in Nay Pyi Taw. The project produced two publications for Myanmar:

1. Tsunami Exercise Guidebook: How to Plan, Prepare for, Conduct and Evaluate national and local Tsunami Exercises to improve Tsunami Preparedness in Myanmar. This guidebook is available in English (Output 11) and Myanmar Language (Output 12). This guidebook gives step by step guide on how to organize tsunami exercise based on Myanmar context and organizational settings;

2. Myanmar Tsunami Preparedness and Risk Reduction (TPRR Programme) 2015-2020, in English (Output 13) and Myanmar (Output 14) Language. This booklet gives a list of 8 potential projects for Myanmar to set up better tsunami preparedness.

• In Timor Leste, Mrs. Vidiarina, a tsunami preparedness consultant based in Indonesia was contracted to work with the National Disaster Management Directorate to work on 1). Developing guidebook on Tsunami Exercise, based on the IOC/UNESCO manual no 58 and referring to the training workshop on Tsunami exercise that was conducted in Dili; and 2). Develop Timor Leste recommendations on policy support for tsunami risk reduction as follow up of the training/workshop activity on Policy Support for Tsunami Risk Reduction that was conducted in Dili.

As Mrs. Vidiarina was not based in Timor Leste, she was required to conduct two missions: the first mission was to engage with the stakeholders and to agree on the framework of the guidebook and policy recommendation. Mrs. Vidiarina then worked in Indonesia by keeping constant email communication with the stakeholders. Upon finishing the draft of the guidebook and policy recommendation, Mrs. Vidiarina conducted a second mission to present the draft and to finalize it with the stakeholders. The finalization of writing the result was done in Indonesia supervised by IOTIC. As output of this activity, the project produced two publications for Timor Leste:

1. Tsunami Exercise Guidebook: How to Plan, Prepare for, Conduct and Evaluate national and local Tsunami Exercises to improve Tsunami Preparedness in Timor Leste. This guidebook is available in English (Output 15) and Tetum (Output 16) Language. This guidebook gives step by step guide on how to organize tsunami exercise based on Timor Leste context and organizational settings;

2. Recommendation for Policy Support for Tsunami Disaster Risk Reduction and Tsunami Exercise in Timor Leste in the form of flyers, this is available in English (Output 17) and Tetum (Output 18) Language. This booklet gives a list of 10 agreed principle and recommendation to strengthen tsunami preparedness in Timor Leste.
In Bangladesh, the project worked with Prof Ainun Nishat, DRR professor of BRAC University, Dhaka, Bangladesh, as recommended by Bangladesh Meteorological Department (BMD). This activity in Bangladesh started very late due to difficulties in identifying a national based consultant and obtaining the agreement of the national partners, the Bangladesh Meteorological Department (BMD) and Department of Disaster Management (DDM), to work with the consultant. The call for consultancy work was conducted 3 times, before it was finally agreed that Prof. Ainun Nishat would undertake the work for Bangladesh. The work in Bangladesh was conducted after the results in Myanmar and Timor Leste, and during the final regional workshop in Jakarta in June 2015. Prof Ainun Nishat attended and was requested to be resource person at this regional workshop. Unfortunately, upon returning from the regional workshop Prof. Ainun Nishat had health problems and was not able to finish the task given to him. Several efforts have been taken to mitigate this, i.e. giving no-cost extension of his contract, requesting the support of BMD to liaise and work with Prof. Ainun Nishat. Unfortunately, until the closing of the project in July 2015, Prof. Ainun Nishat could not deliver the results of the contract and his contract had to be terminated. At the end of the project no project publication were delivered for Bangladesh.
Monitoring and Evaluation.

A consultant was engaged to conduct a full evaluation of the project. The consultant, Mr Harald Spahn, attended the 2 regional workshops held in Colombo and Jakarta and was given full access to all project documentation. The evaluation was based on a thorough document review, key informant interviews, focus group discussions with experts and trainers and direct observations by attending two regional workshops: 1) "Coastal Hazard Assessment: Applications in Risk Assessment, Management and Mitigation" held in Colombo, Sri Lanka, 2-5 June 2015, and (2) "Training Modules for Tsunami Exercises Policy Support ", held in Jakarta, Indonesia, 15-17 June 2015.

The consultant’s recommendations for follow up activities are particularly helpful and insightful and are strongly endorsed by the project team

The evaluation report has been forwarded to ESCAP separately.
### ACTIVITY WORK PLAN

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time Frame</th>
<th>Trust Fund Contribution</th>
<th>Trust Fund Contribution spent</th>
<th>Description of progress</th>
</tr>
</thead>
</table>
Consultant Costs: $32,550  
Travel Costs: $27,918  
Meeting Costs: $1,200  
Printing Costs: $5,000  
Operational costs: $4,200  
Sundry/Communications costs: $1,600 | Staff Costs: $7,110  
Consultant Costs: $27,950  
Travel Costs: $19,901  
Meeting Costs: $1,923  
Printing Costs: $4,743  
Operational costs: $4,199  
Sundry/Communications costs: $1,569 | Progress to 31 October 2013 |

**Tsunami Risk Assessment**

A meeting of the Task Team for the revision and expansion of the Guidelines on Tsunami Risk Assessment was held in Colombo, Sri Lanka, 27 February – 1 March 2013, hosted by the Disaster Management Centre and the University of Moratuwa. The Task Team reviewed the structure of the existing guidelines, proposed a structure for the revised guidelines and decided on areas to be covered by the guidelines. The Task Team established core groups to assist the implementation and identified resource persons who would be invited to contribute text/case studies etc of the revised guidelines.

Prof Sam Hettiarachchi attended the UN-ISDR Global Platform to meet representatives from agencies, universities and professionals who will be able to contribute to the proposed revision. During the same visit the Prof Hettiarachchi also visited ETH and Swiss RE, Zurich both important contributors to proposed revision and in the case of ETH, additional input on proposed training materials to be developed from the revised guidelines.

**Tsunami Exercises**

Stock taking surveys have been conducted to the three pilot countries:

1. Timor Leste, 28 February – 1 March 2013 conducted by Ardito M. Kodjigat
2. Bangladesh, 3-7 June 2013 conducted by Irina Radjana and Tony Elliott

The stock taking survey used a format that was adapted from a preparedness assessment tools developed by the TOWS-WG Task Team.
survey questionnaire and format was adjusted to be able to review and assess existing national policy for disaster risk reduction, focusing on, but not limited to, tsunami exercises. The review and assessment looked at how far tsunami risk assessment has been done in the country, has there been any policy related to tsunami preparedness and tsunami exercise, has these policies taken into account in the national disaster risk reduction plan, whether there is already SOP related to tsunami early warning and response in the country.

Progress 1 November 2013 - 30 April 2014

Tsunami Risk Assessment
The components of hazard, vulnerability, risk assessment and management of existing guidelines has been reviewed.

7 submissions have been received. Submissions on new areas include: Risk Financing by insurance; Indian Ocean Tsunami Warning System; Risk Assessment within an early warning.

Progress 1 May 2014 - 31 October 2014

Tsunami Risk Assessment
A consultant was engaged to advise the project team on the IOTWS operational philosophy and methodology, and the limitations and uncertainties inherent in RTSP products.

A consultant has been engaged to: review the original guidelines, collate contributing authors' inputs and draft revised guidelines, review and finalise guidelines, develop training material and facilitate training workshop, and develop a policy document.

Progress 1 November 2014 - 30 June 2015 update

Tsunami Risk Assessment
2. Enhance the capability in conducting tsunami risk assessment within a tsunami forecasting and early warning framework and tsunami exercises guideline formulation:
   1. Meeting at University of Western
   2. Meeting at INCOIS Hyderabad
   3. Preparation of case study by dedicated research assistant
   4. Review of Case Study and Publication
   5. Two National Workshops (in Bangladesh, Myanmar, and Timor Leste) on country policy support and guideline formulation for tsunami exercises
   6. Strengthening in country policy support for tsunami exercises

| Month 7 - 17 | Staff Costs: $13,914  
Consultant Costs: $13,076  
Sub-contract Costs: $43,500  
Travel Costs: $64,750  
Meeting Costs: $15,750  
Equipment costs: $4,000  
Operational costs: $8,892  
Sundry/Communications costs: $3,910 | Staff Costs: $13,914  
Consultant Costs: $9,034  
Sub-contract Costs: $36,343  
Travel Costs: $42,734  
Meeting Costs: $15,731  
Equipment costs: $4,000  
Operational costs: $4,000  
Sundry/Communications costs: $3,895 | Progress to 31 October 2013

Tsunami Risk Assessment
A graduate civil engineer from the University of Moratuwa has assisted Prof Hettiarachchi since 1st July and is working on a case study on Sri Lanka. As a prelude to the detailed case study of this component, a preliminary study was implemented on how to use the databases developed for MOST/ComMIT tsunami models. The outcome of the preliminary study enables a similar approach to be adopted when using databases available at the Regional Tsunami Service Providers (RTSPs).

Tsunami Exercises
One national workshop has been done in Bangladesh using the training module developed within this project. The first training in Bangladesh was held in Dhaka, 06-11 October 2013. The workshop has been successfully implemented attended by 27 participants representing different stakeholders related to tsunami exercise. The participants has been very actively engage with the training and actively discussed on the topic of policy support, the inter-agency coordination as well as in country self-evaluation. Bangladesh has strong policy on disaster risk reduction which is stated in their Standing Orders on Disaster (SOD) and the National Action Plan on Disaster Management (NPDM). However, it seems this policy document has not been sensitized to some of the organization.
participants involved in the training. Although tsunami hazard is included in the SOD and NPDM, however there is still debate by the decision makers and general public if tsunami hazard is to be considered as one of the priority hazards, and therefore no significant actions has been taken strengthen the country's preparedness of tsunami hazards. The workshop has become a new platform for BMD and DDM to work on tsunami preparedness and their early warning system.

Progress 1 November 2013 - 30 April 2014

**Tsunami Risk Assessment**
Case Study- Port City of Galle: Hazard Assessment using ComMIT was carried out for a number of scenarios. These were also compared with results obtained using other models. Further investigations on impacts of tsunamis in the vicinity of bays and headlands and the influence of breakwaters.

Vulnerability Assessment using a Single Dimension Approach was carried with important parameters under Human, Physical, Socio-Economic, Environmental, Functional and Administrative categories. Several discussions were held with key officials and residents on identifying the important parameters.

Hazard Mitigation-Modelling carried out to investigate the impact of an offshore breakwater on inundation within a bay, by studying the extent of inundation without and with an offshore breakwater

Developing a detailed Case Study for Port City of Galle continues.

**Tsunami Exercises**
Training workshop in Dili, Timor Leste (4-7 February 2014). The training was jointly organized with the National Disaster Management Directorate of the Ministry of Social and Solidarity. Thirty (30) Participants from 15 different agencies representing
national and district level attended the training. The training discussed and analyzed the National Disaster Risk Management Policy, Hazard Assessment and Map of Timor Leste; and the Emergency Response SOP. Training workshop in Nay Pyi Taw, Myanmar (11-14 March 2014). The training was jointly organized with Myanmar Department for Meteorology and Hydrology. Twenty five (25) participants from different 3 regions of Myanmar, representing 8 organizations participated in the training. The training discussed and analyzed three main documents of Myanmar: Myanmar Multi-hazard Risk Assessment in Nargis Affected Area; Natural Disaster Management Law (The Pyidaungsu Hluttaw Law No. 21, 2013); and Myanmar National Action Plan on Disaster Risk Reduction 2009 -2015

Progress 1 May 2014 - 31 October 2014

Tsunami Risk Assessment
The following draft reports have been produced: 1) The Galle City Risk assessment and management Case Study. 2) Improved Tsunami Wave Height Forecasting- An Integrated Approach for the analysis of results from Early Warning Systems and Inundation Modelling for Risk Assessment. The drafts are being refined with further modelling scenarios before review and finalisation.

Tsunami Exercises
Three additional training activities were implemented in the period of June – October 2014: in Dili, Timor Leste II, 14-17 July ‘14; and in Nay Pyi Taw, Myanmar II, 1-4 September ‘14. These trainings were the second training in each country with focus on tsunami exercise. The training workshops were organized at national level with participants as the national task team from relevant agency of local government, meteorological agency, national disaster management office, emergency response organizations, community organization, non-government organization, and media.
Consultants were engaged to support the country to draft their national guideline for tsunami exercise. Two consultants were hired for Myanmar and Timor Leste. We have had difficulties to engage a consultant for Bangladesh.

*Progress 1 November 2014 - 30 June 2015*

**Tsunami Risk Assessment**
Professor Sam Hettiarchchi visited the University of Western Australia, Perth from 11-17 June to collaborate on modeling and finalization of issues with web based facilities developed for the ComMIT model. A wide range of issues were discussed including: a review of scenario databases used in ComMIT; issues relating to nearshore/onshore modelling using ComMIT for Risk Assessment; issues relating to the use of 100km coastal cells by the IOTWS Tsunami Service Providers; the outcomes of the Port City of Galle Case Study; finalisation of the Case Study illustrating a capability that serves real time operational needs, hazard/risk assessment needs and research/development opportunities through the use of a standard tsunami forecast system that includes tsunami characterization, measurements and forecast models.

The Research Assistant at University of Moratuwa conducting a study to enhance the capability in conducting tsunami risk assessment within a tsunami forecasting and early warning framework (sub activity 2.3), visited INCOIS 19-23 May 2014 to collaborate on modelling related to hazard detection, warning at regional level and issues on coastal units used for regional warning, inundation, local warning. Mr Sameera met with GIS and modelling experts and conducted inundation modelling using ComMIT and Tsunami N2 for different scenarios for Port City of Galle.
The following draft reports were finalised and submitted for review: 1) The Galle City Risk assessment and management Case Study, 2) Improved Tsunami Wave Height Forecasting-An Integrated Approach for the analysis of results from Early Warning Systems and Inundation Modelling for Risk Assessment.

The above reports were reviewed by Prof. J. Wijetunga, University of Peradeniya, Sri Lanka and were thereafter published.

**Tsunami Exercises**

In Myanmar, Mr. Loy Rego was contracted to work with The Department of Meteorology and Hydrology and the Relief and Resettlement Department to work on 1). Developing a guidebook on Tsunami Exercise, based on the IOC/UNESCO Manual no 58 and referring to the training workshop on Tsunami exercise that was conducted in Nay Pyi Taw; and 2). Develop Myanmar recommendations on policy support for tsunami risk reduction as follow up to the training/workshop activity on Policy Support for Tsunami Risk Reduction that was conducted in Nay Pyi Taw. The project produced two publications for Myanmar: 1) Tsunami Exercise Guidebook: How to Plan, Prepare for, Conduit and Evaluate national and local Tsunami Exercises to improve Tsunami Preparedness in Myanmar, available in English and Myanmar Language, and 2) Myanmar Tsunami Preparedness and Risk Reduction (TPRR Programme) 2015-2020, also available in English and Myanmar Language.

In Timor Leste, Mrs. Vidiarina was contracted to work with the National Disaster Management Directorate to work on 1). Developing guidebook on Tsunami Exercise, based on the IOC/UNESCO manual no 58 and referring to the training workshop on Tsunami exercise that was conducted in Dili; and 2). Develop Timor Leste recommendations on policy support for tsunami risk reduction as follow up of the
training/workshop activity on Policy Support for Tsunami Risk Reduction that was conducted in Dili. The project produced two publications for Timor Leste: 1) Tsunami Exercise Guidebook: How to Plan, Prepare for, Conduct and Evaluate national and local Tsunami Exercises to improve Tsunami Preparedness in Timor Leste, available in English and Tetum Language; and 2) Recommendation for Policy Support for Tsunami Disaster Risk Reduction and Tsunami Exercise in Timor Leste in the form of flyers, also available in English and Tetum Language.

In Bangladesh, Prof Ainun Nishat was contracted to work with the Bangladesh Meteorological Department (BMD) and the Department of Disaster Management (DDM). This activity started very late due to difficulties in identifying a national based consultant and obtaining the agreement of the BMD and DDM to work with the consultant. Unfortunately, Prof. Ainun Nishat developed health problems and was not able to finish the tasks given to him. Several efforts were made to mitigate this, but at the closing of the project in July 2015, Prof. Ainun Nishat could not deliver the results of the contract and his contract had to be terminated. At the end of the project no project publication were delivered for Bangladesh.

| 3. Establishment of a sustainable mechanism for training in tsunami risk assessment and management for Indian Ocean states and training module for tsunami exercises with pilot in Bangladesh, Myanmar, and Timor Leste: | Month 14 - 24 | Staff Costs: $7,695 Consultant Costs: $7,538 Travel Costs: $109,518 Meeting Costs: $12,730 Operational costs: $5,900 Sundry/Communications costs: $1,830 |
| Tsunami Exercises |
| Tsunami exercise training modules have been developed through this project. An expert group on development of training modules for policy support and tsunami exercises guidelines was held in UNESCO Office Jakarta 13 – 16 May 2013. The meeting resulted in two training module structures to be implemented in two separate training/workshops in the three pilot countries. The first training/workshop will focus on the important aspects to be considered, and how to develop policy support to have a sustainable tsunami | Progress to 31 October 2013 |
| Staff Costs: $7,695 Consultant Costs: $5,292 Travel Costs: $82,089 Meeting Costs: $21,136 Operational costs: $3,898 Sundry/Communications costs: $1,789 |
planning workshop in Jakarta.
2. Regional workshop in Jakarta based on training the trainer approach
3. Preparation of policy document
4. Tsunami exercise training module developments
5. Regional workshop and lessons learned on tsunami exercises for Indian Ocean based on experience of pilot countries

- Exercise programme in a country. The second training/workshop focus on how to plan and implement tsunami exercises. The module structures were then developed into training modules with specific topic objectives, content methodology of delivery, and time needed for each topic. These training modules are now ready for use.

**Progress 1 November 2013 – 31 October 2014**

**Tsunami Risk Assessment**
A Design and Planning workshop was held at the University of Moratuwa, Colombo, Sri Lanka, 29 September – 1 October 2014. The meeting was attended by the project Task Team: Prof Sam Hettiarachchi, Dr Harkunti Rahayu, Juan Carlos Villagran, Rajesh Sharma, Dilanthi Amartunga, Richard Haigh, Priyan Dias, Russell Arthurton and Tony Elliott.

**Progress 1 November 2014 - 30 June 2015**

**Tsunami Risk Assessment**
A regional workshop on Coastal Hazard Assessment: Applications Risk Assessment, Management and Mitigation, was held at the Mount Lavinia Hotel, Colombo, 2-5 June 2015. The workshop was attended by 24 participants from 18 countries, 12 trainers from 7 countries and 1 M&E consultant. The workshop programme addressed the topics and issues outlined in the Second Edition of the Guidelines, “Tsunami Risk Assessment and Mitigation for the Indian Ocean: knowing your tsunami risk – and what to do about it” published in the UNESCO-IOC Manuals and Guides Series. They reflected the Guidelines’ structure, with a sequential treatment of the various aspects of the hazard, vulnerability and risk assessment processes followed by sections dealing with risk reduction through improved preparedness and mitigation. Training was delivered in sessions divided into modules that reflected the structure and content of
the revised Guidelines. The training sessions were supplemented by presentations of four national case studies – one each from Mozambique and Oman and two from Sri Lanka. Exercise modules were designed around a fictitious “Regional Training Scenario” depicted by layers of physical and socioeconomic information held in an open-source Geographical Information System (GIS), as used successfully in previous training workshops. The scenario provided trainees with a hands-on opportunity to appraise vulnerability, preparedness and mitigation issues in the context of exposure to potential tsunami impacts from various sources.

A policy document and strategic plan for "establishing a sustainable mechanism for training in coastal hazards and tsunami risk assessment and management for continuing professional development" was prepared by a consultant in association with members of the Tsunami Risk Assessment and Mitigation Task Team established for this project. The policy document provides a number of "options for progress" and also suggests the training content, and addresses monitoring and certification issues.

**Tsunami Exercises**

A regional workshop on: "Training Modules for Tsunami Exercises Policy Support" was held in Jakarta, Indonesia 15-17 June, 2015. 39 participants from 19 Indian Ocean countries attended this workshop. The workshop was co-sponsored by UNESCAP, supporting 31 participants from 11 countries (Bangladesh, India, Indonesia, Iran, Malaysia, Maldives, Myanmar, Pakistan, Sri Lanka, Thailand, Timor Leste), with IOC UNESCO supporting 8 participants from 8 countries (Comoros, Kenya, Madagascar, Mauritius, Mozambique, Oman, Seychelles, Tanzania). The participants represented Disaster Management Offices, Meteorology Departments, and other disaster management related institutions and agencies of their countries. Five trainers and two
4. Administrative Support  
Month 1 - 24  
Staff Costs: $29,000  
Operational costs: $17,760  
Sundry/Communications costs: $3,200

The overall objectives of this three-day Workshop were to: 1) introduce the two training modules developed under the same project: Tsunami Risk Reduction Policy Support and Tsunami Exercise; 2) share lessons learned from the three pilot countries; and 3) get input on the follow up activities to be done after the project ends. The workshop addressed the topics and issues as described in the Modules on Policy Support for Tsunami Risk Reduction and Tsunami Exercise. These topics were discussed in five sessions and the participants were divided into 3 groups. The topics were reflected from the modules' structure that includes: 1) Disaster (Tsunami) Risk Reduction Policy, 2) Policy Support for Tsunami Preparedness, 3) Tsunami Exercise, 4) Indicators of Successful Tsunami Exercise, 5) Expectation to WG 1 ICG/IOTWS, and Expectation of IOTIC.

5. Monitoring & Evaluation  
Month 1 - 24  
Consultant costs: $10,000  
Travel costs: $8,000  
Operational costs: $1,000  
Sundry/Communications costs: $1,000

A consultant was engaged to conduct a full evaluation of the project. The consultant attended the 2 regional workshops held in Colombo and Jakarta and was given full access to all project documentation. The evaluation was based on a thorough document review, key informant interviews, focus group discussions with experts and trainers and direct observations by attending two regional workshops: 1) "Coastal Hazard Assessment: Applications in Risk Assessment, Management and Mitigation" held in Colombo, Sri Lanka, 2-5 June 2015, and (2) "Training Modules for Tsunami Exercises Policy Support ", held in Jakarta, Indonesia, 15-17 June 2015.
LESSONS LEARNED

Lack of time was a critical factor in the implementation of this project and the major lessons learned for future projects are a) to allow more time for implementation, particularly to allow for unforeseen circumstances, and b) to engage consultants to undertake the main activities and to engage them earlier in the project cycle. Project management was provided by the ICG/IOTWS Secretariat and IOTIC in addition to their normal day-to-day duties. This is not sustainable for projects of this complexity and extra project-specific resources should be identified for future projects, either in-kind support from IOTWS Member States or from consultants.

It was not possible to develop the intended "Train the Trainer" approach for the risk assessment training. With the benefit of hindsight, it was too ambitious to accomplish this with the limited resources and time available for the project. However, the need for such training has been clearly identified and will be brought to the ICG/IOTWS for further development.

Difficulties were experienced in hiring local in-country consultants to support policy development for tsunami exercises. This led to delays in implementing Sub Activity 2.6 - Strengthening in-country policy support for tsunami exercises. The problem was addressed by identifying international consultants for these activities, with more focus on shorter duration, high impact interventions. However, further problems were experienced with the consultant engaged to provide support in Bangladesh, resulting in non-delivery of the intended project outputs for this country. The lesson learned here, again, is the need to identify and engage consultants earlier in the project cycle.

SUSTAINABILITY

Please elaborate on any progress towards ensuring that this project results in a long-term benefit to the project stakeholders.

The project has been implemented within the framework of the ICG/IOTWS and the Indian Ocean Tsunami Information Centre (IOTIC), to provide a sustainable mechanism for continuous dissemination of project outcomes. The Chairs of Working Group 1 on Tsunami Risk Assessment and Reduction and Working Group 3 on Tsunami Awareness and Response have coordinated with national focal points to ensure the sustainability of outcomes.

The project focused on capacity development and included concepts for a sustainable mechanism for training in coastal hazards and tsunami risk assessment and management for continuing professional development. Both project components developed training modules that complement the already existing training portfolio of ICG/IOTWS. The project integrated very well with the ongoing workplans of the ICG/IOTWS, which provides a high likelihood that its outputs and outcomes will be used and built upon by the ICG in its future training programmes.