

# Capacity Assessment of Tsunami Preparedness in the Indian Ocean

Status Report, 2018

**Capacity Assessment of Tsunami  
Preparedness in the Indian Ocean  
Status Report, 2018**

By the ICG/IOTWMS Task Team on Capacity  
Assessment of Tsunami Preparedness

IOC Technical Series, 143  
Paris, April 2020  
English only

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**For bibliographic purposes, this document should be cited as follows:**

UNESCO/IOC. 2020. *Capacity Assessment of Tsunami Preparedness in the Indian Ocean –Status Report, 2018*. Paris, UNESCO, IOC Technical Series No. 143.

National Reports of participating countries are compiled in a supplement to this report.

Report prepared by: ICG/IOTWMS Task Team on  
Capacity Assessment of Tsunami Preparedness

Published in 2020  
by United Nations Educational, Scientific  
and Cultural Organization  
7, Place de Fontenoy, 75352 Paris 07 SP

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(IOC/2020/TS/143)

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## ACKNOWLEDGMENTS

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The Capacity Assessment of Tsunami Preparedness in the Indian Ocean region was the primary activity of the intersessional Task Team on Capacity Assessment of Tsunami Preparedness. The Task Team convened from 2017 to 2019 under the governance of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWMS) chaired by Dr Andi Eka Sakya. (2017–2019) and currently by Prof. Dwikorita Karnawati.

The Task Team on Capacity Assessment of Tsunami Preparedness was chaired by Dr Harkunti Rahayu (Indonesia) with Vice-chair Ms Vijaya Sunanda Manneela (India). Membership of the Task Team included Dr Yuelong Miao (Australia), Mr Budiarta (Indonesia), Ms Eny Supartini (Indonesia), Mr Ardito Kodijat (IOTIC), Mr Saw Bun Liong (Malaysia), Mr Al-Yaqdan Al-Siyabi (Oman), Dr Dilanthi Amaratunga and Dr Richard Haigh (both invited experts from the University of Huddersfield's Global Disaster Resilience Centre).

The underpinning survey was designed by the Task Team on Capacity Assessment of Tsunami Preparedness during a series of meetings and testing trials with select Member States. The questionnaire assimilated and built upon the existing ICG/IOTWMS National Reports, Post-IOWave Surveys and IOC/UNESCO Post-Event Assessment Surveys. The survey

was constructed on SurveyMonkey, an online survey platform.

The ICG/IOTWMS Secretariat circulated the online survey to the Tsunami National Contacts of ICG/IOTWMS Member States. The Tsunami National Contacts oversaw and coordinated the completion of the survey through consultation with national stakeholders involved in end-to-end tsunami warning including the National Tsunami Warning Center and Disaster Management Agencies.

The dataset underpinning the regional analysis for Capacity Assessment of Tsunami Preparedness includes timely survey responses from 20 IOTWMS Member States, namely Australia, Bangladesh, Comoros, France (Indian Ocean Territories), India, Indonesia, Iran, Kenya, Madagascar, Malaysia, Mauritius, Mozambique, Myanmar, Oman, Pakistan, Singapore, Sri Lanka, Tanzania, Thailand and Timor Leste.

The survey results were analysed and compiled by Dr Richard Haigh, Dr Dilanthi Amaratunga and Dr Pournima Sridarran and Dr Harkunti Rahayu. Dr Srinivasa Kumar Tummala, Mr Tony Elliott and Ms Nora Gale made substantive contributions to authoring this report.

The report greatly benefited from reviews by Dr Thorkild Aarup and Mr Ardito Kodijat of IOC/UNESCO.

## FOREWORD

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In response to the destructive tsunami of 26 December 2004 in the Indian Ocean, which killed almost 228,000 people, the Intergovernmental Oceanographic Commission of UNESCO received the mandate from the United Nations to establish three new regional tsunami warning systems to complement the first system in the Pacific Ocean. Following the formal establishment of the Indian Ocean Tsunami Warning and Mitigation System (IOTWMS), its governing organ, the Intergovernmental Coordination Group for IOTWMS (ICG/IOTWMS), facilitated missions to assess the state of tsunami readiness in 16 countries that had been affected by the 2004 Indian Ocean tsunami. The findings were published in the 2005 Assessment of Capacity Building Requirements for an Effective and Durable Tsunami Warning and Mitigation System in the Indian Ocean (IOC/INF-1219) and provided critical inputs to the eventual design and development of the IOTWMS. The three regional tsunami warning systems established in 2005 are now operational in the Caribbean and adjacent seas (CARIBE-EWS), the North-East Atlantic, Mediterranean and connected seas (NEAMTWS) and the Indian Ocean.

Recognising the importance of knowing the current status of tsunami preparedness in the Indian Ocean region, the ICG/IOTWMS at its 11th session (Putrajaya, Malaysia, April 2017) established a Task Team on Capacity Assessment of Tsunami Preparedness in the Indian Ocean. In 2018, the Task Team designed and conducted an extensive online survey covering all aspects of the end-to-end tsunami warning and mitigation system. The online questionnaire was built upon the ICG/IOTWMS National Report Template, Post-IOWave Exercise Surveys, and IOC/UNESCO Post-Event Assessment Surveys. It included five sections: basic information; risk assessment and reduction; detection, warning and dissemination; public awareness, preparedness and response; and a narrative text within each section to be prepared by different stakeholders to reflect

national specifics within an end-to-end tsunami warning and mitigation system.

With 20 ICG/IOTWMS Member States responding, the 2018 assessment provides a new baseline of the status of tsunami preparedness capacity in the region. It also identifies specific gaps and prioritises capacity development requirements at both regional and national levels. The results clearly indicate that there has been considerable improvement across all components of the IOTWMS since 2005. Nevertheless, the IOTWMS is not a static system and must further improve, evolve, and adapt to better serve the needs of its Member States. A case in point are the 2018 Palu and Sunda Strait tsunami events in Indonesia that highlighted the need to strengthen warning capabilities and enhance preparedness to deal with near-field and atypical sources of tsunami such as coastal landslides and volcanic flank collapse.

I trust that the important findings of this report will encourage Member States to continue and increase efforts towards enhancing tsunami policies, plans and guidelines; hazard and risk assessments; tsunami detection warning and dissemination; and step up awareness and response. The IOC, through the IOTWMS Secretariat, generously supported by Australia and Indian Ocean Tsunami Information Center (IOTIC), generously supported by Indonesia, will continue to coordinate and facilitate the efforts of Member States to bridge gaps in capacities and strengthen the end-to-end tsunami warning and mitigation system. The upcoming UN Decade of Ocean Science for Sustainable Development (2021–2030) offers a great opportunity to build collaborations and pursue activities that will lead to transformative enhancements of tsunami and multi-hazard early warning systems. I warmly congratulate ICG/IOTWMS, its Task Team on Capacity Assessment of Tsunami Preparedness, and, most importantly, all Member States and experts who contributed to this important assessment.

Vladimir Ryabinin  
Executive Secretary of IOC  
Assistant Director-General of UNESCO

## EXECUTIVE SUMMARY

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The Indian Ocean tsunami of 26 December 2004 was associated with a magnitude 9.1 earthquake located 160 km off of the west coast of northern Sumatra, Indonesia. The tsunami waves resulted in over 230,000 casualties and displacement of over 1 million people in coastal communities around the Indian Ocean making it the most destructive tsunami in history. Recognising the need for a tsunami early warning system in the Indian Ocean region, the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWMS) was established in 2005 as a subsidiary body of the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization (IOC/UNESCO), with the objective to mitigate the hazard posed by local and distant tsunamis in all parts of the Indian Ocean.

After several years of international cooperation and development coordinated by the IOC/UNESCO, the IOTWMS became fully operational on 31 March 2013 when the Tsunami Service Providers (TSPs) of Australia, India and Indonesia assumed full responsibility for the provision of tsunami advisory services for the Indian Ocean region. The Secretariat of the ICG/IOTWMS was established at the Perth Programme Office in support of IOC/UNESCO and has been funded and hosted by the Australian Bureau of Meteorology (BoM) since 2005. The Indian Ocean Tsunami Information Centre (IOTIC) is based in Jakarta, Indonesia, and has been funded and hosted by the Indonesian Agency for Meteorology, Climatology and Geophysics (BMKG) since 2014.

Between May and September 2005, IOC/UNESCO coordinated missions to 16 Indian Ocean Member States, namely Bangladesh, Comoros, Indonesia, Kenya, Madagascar, Malaysia, Mauritius, Mozambique, Myanmar, Oman, Pakistan, Seychelles, Somalia, Sri Lanka, Tanzania and Thailand, to identify capacity building requirements for an effective and durable tsunami warning and mitigation system in the Indian Ocean. The findings of these missions contributed to the *Assessment of Capacity Building Requirements for an Effective and Durable Tsunami Warning and Mitigation System in the Indian Ocean (IOC/INF-1219)*. The 2005 capacity assessment provided a regional overview of existing capacity and identified support requirements of Member States to build regional capacity in tsunami warning and mitigation.

Considering the importance of conducting an up-to-date capacity assessment of the tsunami preparedness in the Indian Ocean 13 years after the first survey, the ICG/IOTWMS at its 11th session (Putrajaya, Malaysia, April 2017) established the inter-sessional Task Team on Capacity Assessment of Tsunami Preparedness. The Task Team designed and conducted an online survey questionnaire covering all aspects of the end-to-end tsunami warning and mitigation system. Twenty (20) ICG/IOTWMS Member States, namely Australia, Bangladesh, Comoros, France Indian Ocean Territories, India, Indonesia, Iran, Kenya, Madagascar, Malaysia, Mauritius, Mozambique, Myanmar, Oman, Pakistan, Singapore, Sri Lanka, Tanzania, Thailand and Timor-Leste, provided timely inputs to the assessment. This publication provides a baseline of the current status of tsunami preparedness capacity in the region, identifies specific gaps and prioritises capacity development requirements at both the regional and national levels with an overarching view of strengthening the end-to-end tsunami warning and mitigation system in the Indian Ocean.

The *IOTWMS Medium Term Strategy, 2019-2024 (IOC/2019/TS/144)* provides a framework and forward direction for the development of the IOTWMS in the medium term. This 2018 capacity assessment of tsunami preparedness in the Indian Ocean complements the Medium Term Strategy by providing a new baseline of the status of the IOTWMS at the beginning of the five-year cycle. These two documents combined with the IOTWMS 2019



Factsheet<sup>1</sup> provide an overview of the governance and structure of the IOTWMS; details of its detection, warning and dissemination systems; the status of current capacity in end-to-end tsunami warning and mitigation; and an outline of the strategic objectives, plans and activities for the IOTWMS up to 2024. In addition, IOC/UNESCO and its ICG/IOTWMS have continued to facilitate dialogue by organizing international conferences, symposiums and meetings to exchange scientific knowledge and best practices for tsunami warning systems, and these have also provided guidance to the IOTWMS on charting its future direction and priorities.

The 2018 capacity assessment reviews the high-level strategic documents and progress in end-to-end tsunami warning and mitigation in Indian Ocean Member States. Specific reference has been made to the three pillars of end-to-end tsunami warning systems: (i) tsunami risk assessment and reduction; (ii) detection, warning and dissemination; and (iii) tsunami awareness, preparedness and response.

The capacity gaps and support requirements that have emerged from the 2018 Indian Ocean capacity assessment of tsunami preparedness are intended to provide recommendations for future capacity development activities in the Indian Ocean region ([section 5](#)) along the following four strategic elements of the end-to-end tsunami warning and mitigation system.

### Policies, Plans and Guidelines

It is encouraging that most countries are fairly advanced in terms of establishing tsunami policies and guidelines. Nineteen (19) countries have some form of national tsunami policy and 18 countries have some form of tsunami disaster risk reduction plans. Seventeen (17) countries have some form of national tsunami guidelines, 14 countries have national tsunami guidelines that address the preparedness phase and emergency response phase, whereas only 10 countries address the prevention, mitigation, and rehabilitation and construction phase. Across policies, plans and guidelines, as well as national to local levels, there is a recurring trend of greater focus on tsunami within the emergency phase of disaster management. While the rehabilitation and reconstruction phase may share many similarities with other hazards, the lack of tsunami specific focus for the preparedness, prevention and mitigation phases is more difficult to explain.

The most commonly identified support requirements include increasing availability of tsunami policies, plans and guidelines at the prevention and mitigation, preparedness, and recovery and reconstruction phases of disaster management with particular emphasis on the local level. The guiding documents can either be for only tsunami or for multiple hazards including tsunami.

### Risk Assessment and Reduction

Risk assessment and reduction initiatives are essential starting points for developing effective tsunami preparedness activities at the national level to enable disaster risk reduction. It is encouraging that most countries are fairly advanced in terms of conducting hazard and risk assessments. Notably, in all phases of disaster management there is a general trend such that the most initiatives have been undertaken at the national level, to a lesser extent at the local level, and the least at community level.

Hazard assessments have been carried out in all 20 participating countries and a large majority (18 countries) conducted these in a multi-hazard framework. Risk assessments,

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<sup>1</sup> *Tsunami warning and mitigation systems to protect coastal communities: Indian Ocean Tsunami Warning and Mitigation System (IOTWMS) 2005–2019*, IOC/BRO/2019/7.

which estimate likely effects of hazards, were conducted in 16 countries and 15 of these were conducted in a multi-hazard framework.

The most commonly identified support requirements include increasing both the engagement of national, regional or international actors in the carrying out of tsunami hazard and risk assessments and the availability of publicly accessible data for tsunami hazard and risk assessments. Notably capacity development is needed for tsunami hazard assessment, especially in the areas of hazard mapping, inundation mapping and evacuation mapping; for city, village and community level tsunami risk assessments; and for developing products from tsunami risk assessments, such as risk maps, evacuation maps, guidelines and action plans. The survey shows that capacity exists in some surveyed countries to deliver and share training on hazard mapping and inundation mapping in the region.

### Detection, Warning and Dissemination

An effective tsunami warning system involves the rapid detection and quantification of the earthquake source, forecasting and verification of wave propagation and the likely threatened areas, and development and dissemination of information about the threat to coastal communities to enable appropriate response. These initiatives have received much focus, particularly during the developmental phase of the Indian Ocean Tsunami Warning and Mitigation System (2005–2014) and underpin the downstream response.

All 20 countries reported that they have a national capacity to assess and/or receive potential tsunami threat information and advise/warn their coastal communities. Eighteen (18) countries reported that the organisation responsible for assessing and/or receiving potential tsunami threat information operates 24/7. Eighteen (18) countries reported producing national level threat forecast information, while 14 countries also produce local level information. Thirteen (13) countries reported having the capability of analysing real-time seismic and sea-level data for potential tsunami threat while 12 countries also reported having the capability for tsunami modelling to support generation of threat forecasts.

The most commonly identified support requirements are for increasing the capacity to analyse real-time seismic and sea-level data for tsunami threat and also for tsunami modelling to support generation of threat forecasts. The survey also revealed the need to increase the frequency of tabletop or similar tsunami warning exercises to review and test Standard Operating Procedures (SOPs) and reduce the potential for complacency among countries that have not recently experienced a tsunami event.

### Public Awareness, Preparedness and Response

It is essential that coastal communities that are vulnerable to the effects of tsunamis are knowledgeable of their underlying risks, effects to livelihood, and appropriate response strategies. The downstream response was highlighted as a key priority during the 10th Anniversary Conference of the Indian Ocean tsunami (Jakarta, November 2014) and has since gained momentum with the Indian Ocean Tsunami Ready initiative, which builds community capacity to respond to a tsunami threat.

Most countries have Standard Operating Procedures that address the operation of a 24/7 emergency operating centre (18 countries), receiving information from the National Tsunami Warning Centre (18 countries), and response criteria and decision-making (17 countries). Most countries (18) also have SOPs for downstream operations that address warning dissemination; communication with the NTWC; evacuation call procedures; communication with local government and other stakeholders; and media arrangements (17 countries). All countries took part in the Exercise Indian Ocean Wave 18 (IOC/2018/TS/138) organized by

the ICG/IOTWMS in 2018 and 10 countries reported conducting village or community level exercises.

Overall, despite Standard Operating Procedures being widely available for most aspects of upstream and downstream early warning operation, many countries are requesting further support to develop them, along with the associated human resources and infrastructure. The lack of community level evacuation Standard Operating Procedures is also notable and significantly worse than other aspects that were examined in this survey. The Palu and Sunda Strait tsunamis in Indonesia in 2018 have highlighted the need to develop SOPs that are appropriate for near-field, rapid onset events. This will be a challenge for the IOTWMS and specific SOP training will need to be developed for countries that are vulnerable to such hazards.

Countries indicated that they require support from the Indian Ocean Tsunami Information Centre (IOTIC) to develop or enhance public awareness including the development of tsunami awareness programmes, activities or campaigns, and participation by international agencies or experts. When assessing national status against the 11 indicators of Indian Ocean Tsunami Ready, the weakest areas include designated and mapped tsunami hazard zones and community risk reduction plans.

Support requirements are needed to improve country Standard Operating Procedures at the interface between upstream and downstream operations, including the operation of 24/7 emergency operation centre, receiving information from the NTWC, and response criteria and decision-making, as well as the associated human resources and infrastructure. Support for improving Standard Operating Procedures to address warning dissemination, communication with the National Tsunami Warning Centre, communication with other stakeholders, evacuating call procedures, communication with local government and media arrangements. The associated human resources and infrastructure are also required as is the development of community level evacuation Standard Operating Procedures. Furthermore, the willingness of countries to share their Standard Operating Procedures to share good practices across Member States should be capitalised upon. It was also noted that increased participation in global events such as Global Disaster Risk Reduction Day (13 October) and World Tsunami Awareness Day (5 November) would serve as a means of maintaining tsunami awareness in the Member States.

Fifteen (15) countries reported that their evacuation infrastructure is integrated within their evacuation plans. Training and sharing of Member States' experiences of different types of evacuation infrastructure would assist other countries to develop infrastructure that is appropriate for their needs and circumstances.

The issue of complacency among countries that have not experienced a tsunami event since 2004 is a potential risk to the long-term sustainability of the IOTWMS and is difficult to manage when many countries experience other more frequently occurring hazards such as cyclones and flooding. It is important to conduct tsunami exercises and drills to test SOPs and maintain public awareness. However, a balance needs to be struck between maintaining awareness and preparedness and over-sensitising communities to infrequent events, which could in itself lead to loss of interest and/or an increase in complacency. The incorporation of tsunami exercises at city, village, community and school levels will require countries to develop capacity in accordance with the Tsunami Ready indicators, which will require strong commitment at national government level. IOTIC can provide support through the Indian Ocean Tsunami Ready (IOTR) initiative but the countries themselves will need to provide the resources and have the commitment to achieve IOTR recognition.

Due to the infrequency of tsunami events, it is important that efforts are focused on strengthening the inter-generational awareness of communities to strengthen their long-term

resilience. In this regard, tsunami awareness, education and preparedness should be embedded in school curricula from an early age. IOTIC has a vital role to play in the development and sharing of tsunami related knowledge and the development and implementation of educational programmes, as well as organising workshops and training programmes together with the Secretariat to develop the capacity of IOTWMS Member States.

It is important to sustain operations of the IOTWMS Secretariat and IOTIC over the long term to ensure efficient functioning of the end-to-end Indian Ocean Tsunami Warning and Mitigation System.

## 1 INDIAN OCEAN TSUNAMI WARNING AND MITIGATION SYSTEM

The December 2004 Indian Ocean tsunami was caused by a magnitude 9.1 earthquake off of the west coast of northern Sumatra, Indonesia. The tsunami ranked the most destructive tsunami in the historical record resulting in over 230,000 casualties and more than one million people around displaced along the coasts of the Indian Ocean. Under the mandate of the Intergovernmental Oceanographic Commission (IOC) of UNESCO, an Intergovernmental Coordination Group (ICG) for the Indian Ocean Tsunami Warning and Mitigation System (IOTWMS) was formally established by [Resolution XXIII-12](#) at the IOC Assembly (Paris, June 2005).

### 1.1 GOVERNANCE AND STRUCTURE

The IOTWMS is an important component within the IOC/UNESCO framework for Tsunamis and Other Hazards related to Sea-Level Warning and Mitigation Systems (TOWS). The governance of IOTWMS is provided through an Intergovernmental Coordination Group (ICG), under IOC/UNESCO. All 28 Member States within and bordering the Indian Ocean are members of the ICG, which elects a Chairperson and two Vice-Chairpersons at the biennial sessions. The ICG/IOTWMS reports to the IOC Assembly. Intersessional work of the ICG is currently (2019–2021) pursued through the following bodies that provides for wide representation and contributions by all the IOTWMS Member States as well as other experts:

- Steering Group,
- Working Group 1 on tsunami risk, community awareness and preparedness,
- Working Group 2 on tsunami detection, warning and dissemination,
- Sub-regional Working Group for the North West Indian Ocean,
- Task Teams:
  - Capacity assessment of tsunami preparedness (2017–2019),
  - Indian Ocean wave exercise [renewed each session],
  - Tsunami preparedness for a near-field tsunami hazard (2019–2021), and
  - Scientific tsunami hazard assessment of the Makran subduction zone (2019–2021)

The Secretariat provides facilitation, coordination and support to the activities of the ICG/IOTWMS. Hosting and funding for the Secretariat is provided by the Government of Australia through its Bureau of Meteorology in Perth.

The Indian Ocean Tsunami Information Centre (IOTIC) provides support for the countries of the Indian Ocean region in disaster risk reduction, focusing on tsunamis, through the preparation and dissemination of awareness and preparedness materials and the development of educational programmes. Hosting of IOTIC is provided by the Government of Indonesia via the Agency for Meteorology, Climatology and Geophysics (BMKG) in Jakarta.

## 1.2 THE IOTWMS STRATEGIC PILLARS AND FOUNDATIONAL ELEMENTS

The IOTWMS Medium Term Strategy<sup>2</sup> describes the basic directions towards continuously improving the IOTWMS to meet stakeholder requirements during the period 2019–2024. It describes strategic objectives to ensure an effective and efficient tsunami warning and mitigation system that is interoperable with the other ocean basins and seas. This IOTWMS Status report outlines the current status of the system and complements the Medium Term Strategy which outlines the strategic pillars and objectives, foundational elements, plans and activities for the IOTWMS in the medium term. The IOTWMS is a fully integrated end-to-end warning system built on three strategic pillars: (i) tsunami risk assessment and reduction; (ii) tsunami detection, warning and dissemination and (iii) tsunami awareness, preparedness and response.

### 1.2.1 Risk Assessment and Reduction

Evaluation of tsunami risk consists of both hazard assessment (i.e. specifying potential tsunami sources, wave heights along the coast, inundation and estimated tsunami arrival times) and risk assessment (i.e. estimating the exposure and vulnerability of coasts likely to be affected by tsunami hazards and estimating damages to life and property). The objective is to determine where the dangerous locations are along a coast and how strongly a tsunami could affect those areas. Both hazard and risk assessments need to be conducted by each Member State, who is best placed to understand the natural environment and its vulnerability conditions (from social economics, physical and environment aspects) of its coastal area. These assessments might utilise recent and historical data, and hazard scenarios computed for Indian Ocean-wide and local tsunamis. Risk assessment is an essential starting point for developing efficient tsunami preparedness activities at the national level to enable disaster risk reduction activities that reduce community exposure and vulnerability to tsunami and other ocean-related threats. It is also fundamental to the two other pillars.

### 1.2.2 Detection, Warning and Dissemination

An effective tsunami warning system involves the rapid detection and quantification of the earthquake source, forecasting and verification of wave propagation and the likely threatened areas, and development and dissemination of information about the threat to the “last mile” to enable communities to respond. Detection involves the implementation and development of seismic and sea-level observing systems that enable rapid assessment and verification of the threat.

Warning involves the rapid analysis of local earthquakes capable of generating local tsunamis; forecasting of wave propagation and potential impacts for regional and ocean wide tsunamis; and conveying that information in interoperable message formats.

Dissemination involves the timely and accurate distribution of threat and warning information from and between warning centres, and from National Tsunami Warning Centres (NTWCs) to the community. Tsunami threat and warning information for the Indian Ocean should be harmonised with other ocean basins as far as possible, taking into account the recommendations of the Working Group on Tsunami and Other Hazards related to Sea-Level Warning and Mitigation Systems (TOWS-WG), which ensure global coordination, whilst recognising any specific requirements for the Indian Ocean.

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<sup>2</sup> UNESCO/IOC. 2019. *Indian Ocean Tsunami Warning and Mitigation System (IOTWMS): Medium Term Strategy, 2019–2024*. Paris, UNESCO. Technical Series No. 144. ([IOC/2019/TS/144](#))

The Indian Ocean has major tsunami sources in primarily two regions (related to the Sumatra-Sunda-Banda [Indonesia] and Makran [North West Indian Ocean] trenches) with warnings developed on national and regional (ocean-wide) scales. The following are descriptions of strategic developments for national warning systems and regional detection and threat information systems.

National tsunami warning systems are a critical component in the end-to-end system for both local and distant tsunamis, due to the inalienable, sovereign national responsibility of Member States for informing communities at risk and urging or ordering immediate evacuation. Regional tsunami services deal with tsunamis capable of propagating over a vast area of the Indian Ocean, affecting a number of countries. These systems use regional and global observational networks of seismic and sea-level data, and require prompt and reliable communication means to deliver threat information determined by Tsunami Service Providers (TSPs) to countries around the Indian Ocean. This tsunami threat information has the role of triggering the national warning procedure in each Member State for ocean-wide tsunamis.

### **1.2.3 Awareness, Preparedness and Response**

It is essential that the communities that are vulnerable to the effects of tsunamis are knowledgeable with their underlying risks, their effects to livelihood, and how to respond when they happen through simple cost-effective and culturally-sensitive awareness programmes, and whenever possible, mainstreamed to gender and livelihood issues. Such programmes would include developing participatory evacuation plans and disseminating information through the media, workshops/seminars, awareness materials, the internet, signage and billboards. If not already in existence, tsunami-related curriculum programmes should be developed to build that inherent capability in young adults and children.

Due to the nature of tsunamis, Member States must be able to respond quickly and efficiently. This is all the most important for Member States, which are threatened by near-field tsunamis that leave only a few minutes for community response. This requires putting in place systems and processes to enable cost-effective response coordination (preparedness). These systems and processes would include response management structures, evacuation plans and maps, communication systems amongst emergency services, emergency operation centres, shelters and other basic necessities to support evacuees/victims, as well as medical, search and rescue infrastructures.

Member States should also plan and conduct exercises on a regular basis to test early warning systems and evacuation planning and emergency response planning at all levels. To ensure that government officials, Non-Governmental Organisations (NGOs), private sector and community representatives are able to provide the required response, sustainable capacity-building programmes should be developed and delivered. Member States should consider the implementation of Indian Ocean Tsunami Ready guidelines<sup>3</sup> that provide a structured and systematic framework for building community preparedness. Considering the infrequent nature of tsunamis, effort should be made to pursue community preparedness using a multi-hazard approach.

### **1.2.4 Foundational Elements**

The Medium Term Strategy defines the following foundational elements that support the three strategic pillars:

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<sup>3</sup> *Guidelines for Indian Ocean Tsunami Ready Programme* – Indicators, Checklist, National Recognition and Pilot Implementation Plan. Version 7. IOTIC, 28 September 2017.

1. **Interoperability:** free, open and functional exchange of tsunami information;
2. **Research:** enhanced understanding and improved technologies and techniques;
3. **Capacity Building:** training, technology and knowledge transfer;
4. **Funding and Sustainability:** resources to sustain an effective IOTWMS;
5. **Outreach:** knowledge of system utilities, capabilities and limitations;
6. **Indian Ocean Tsunami Information Centre (IOTIC).**

Each of the foundational elements is important for supporting the vision, structure, strategic objectives and sustainability of the IOTWMS. In the context of this report, capacity building, funding and sustainability, outreach and the activities of IOTIC are particularly relevant elements as they relate to the overall preparedness of the IOTWMS and the survey of Member States informs an assessment of gaps and identification of requirements for further support to develop capacity for strengthening the IOTWMS at regional, national and local levels.

### 1.3 IMPLEMENTATION

The IOTWMS Steering Group helps coordinate and monitor overall Medium Term Strategy implementation through and on behalf of the ICG/IOTWMS. This Capacity Assessment of Tsunami Preparedness (CATP) report forms a new baseline over which progress of the IOTWMS can be routinely monitored by the ICG. The survey will be repeated biennially to coincide with every ICG session allowing the ICG to assess the status of the IOTWMS against Key Performance Indicators (KPI), monitor progress, identify gaps and prioritise requirements of the Member States based on survey inputs to this report. Effective implementation of the Medium Term Strategy will lead to strengthening of the national and regional systems, in addition to valuable contributions towards implementation of international frameworks such as the Sendai Framework for Disaster Risk Reduction (2015–2030), United Nations 2030 Agenda Sustainable Development Goals (SDGs) and the United Nations Decade of Ocean Science for Sustainable Development (2021–2030).

## 2 INDIAN OCEAN CAPACITY ASSESSMENT OF TSUNAMI PREPAREDNESS

### 2.1 BACKGROUND

Following the Indian Ocean tsunami of 26 December 2004, from May to September 2005, IOC/UNESCO coordinated an assessment of capacity building requirements for an effective and durable tsunami warning and mitigation system in the Indian Ocean by facilitating expert missions to 16 Member States<sup>4</sup> affected by the tsunami. The resulting 2005 Indian Ocean capacity assessment<sup>5</sup> provided a regional overview of existing capacity as well as important support requirements of Indian Ocean Member States to build regional capacity in tsunami

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<sup>4</sup> Bangladesh, Comoros, Indonesia, Kenya, Madagascar, Malaysia, Mauritius, Mozambique, Myanmar, Oman, Pakistan, Seychelles, Somalia, Sri Lanka, Tanzania and Thailand.

<sup>5</sup> UNESCO/IOC, UN-ISDR/PPEW, WMO. 2005. *Assessment of Capacity Building Requirements for an Effective and Durable Tsunami Warning and Mitigation System in the Indian Ocean: Consolidated Report for 16 Countries Affected by the 26 December 2004 Tsunami*. Paris, UNESCO. (IOC/INF-1219)



warning and mitigation. The most common support requirements identified by most countries in the region included:

- Assistance to harmonise existing practices and protocols in data collection, monitoring, evaluation, and warning communication to achieve international standards and interoperability of tsunami early warning systems in the region.
- Assistance to establish real-time regional and local seismic and sea level networks with real-time data acquisition, display, and analysis to support the monitoring and detection of tsunami hazards.
- Equipment upgrade and capacity building in Global Telecommunication System (GTS) to upgrade communications lines and capacities to National Meteorological Services responsible for the receipt and issuance of tsunami warnings and enable them to disseminate warnings more effectively to the designated stakeholder and authorities.
- Training and software for numerical modelling to support the development of inundation maps and for evaluation of tsunami hazards and vulnerability.
- Educational modules on multi-hazards and their impacts including tsunami targeted at various stakeholders (trainers of risk managers, schools) including school curriculum on the tsunami and other hazards early warning system process.
- Regional training activities on overall multi-hazards early warning system process to strengthen linkages between key organisations, including media, technical agencies, and risk managers.
- Need for equipment upgrades and capacity building related to utilisation of satellite information for multi-hazard early warning systems including tsunami.

Other common support requirements identified by three to five countries in the region were:

- Upgrade dissemination mechanisms for marine warnings.
- Assistance to strengthen GIS capabilities and applications to disaster management to aid in planning and preparedness, event emergency response, and post-disaster recovery to aid in planning and preparedness, event emergency response, and post-disaster recovery.
- Electronic versions of existing materials on tsunamis and other disasters that can be adapted, translated and disseminated.

Considering the importance of conducting an up-to-date capacity assessment of the tsunami preparedness in the Indian Ocean, the ICG/IOTWMS at its 11th session (Putrajaya, Malaysia, April 2017) established the inter-sessional Task Team on Capacity Assessment of Tsunami Preparedness (TT-CATP, 2017–2019). This Task Team was chaired by Dr Harkunti Rahayu (Indonesia) with representatives from Australia, India, Indonesia, Oman, Malaysia, the Indian Ocean Tsunami Information Centre (IOTIC), ICG/IOTWMS Working Groups and invited experts from the Global Disaster Resilience Centre of the University of Huddersfield. Further details on the membership of TT-CATP are provided in [Annex I](#).

## 2.2 PROGRESS TO DATE AND FRAMEWORK FOR FUTURE DEVELOPMENT OF IOTWMS

Much progress has been made in establishing the IOTWMS since 2005. Risk Assessment Guidelines<sup>6</sup> have been created, observing networks have been enhanced (>150 seismic stations, >100 sea level stations, 11 tsunameters), awareness material generated and the IOTWMS continues to conduct communication tests, capacity development workshops and tsunami drills. A comprehensive overview of the IOTWMS in 2019 can be found in the IOTWMS Factsheet 2019 (IOC/BRO/2019/7, including details of the seismic and sea-level networks, communications tests, tsunami drills and IOTWMS performance against Key Performance Indicators.

The IOTWMS has been designed and implemented through the joint efforts and contributions of its Member States and other partners under the coordination of IOC/UNESCO. In the early years of the IOTWMS, considerable effort and resources were directed towards developing the upstream, detection, warning and dissemination components of the system. The IOTWMS became fully operational on 31 March 2013 when the TSPs of Australia, India and Indonesia assumed full responsibility for the provision of tsunami advisory services for the Indian Ocean region. At this important juncture, the IOTWMS turned its attention to identifying gaps in the system and work that still needed to be done. Current and future work of the ICG/IOTWMS is now focused towards sustainability of and improvements to the system, as well as enhancing community awareness and response mechanisms in its Member States. In addition to the work of its Steering Group and Working Groups, the ICG/IOTWMS has been guided by the decisions and recommendations of the Working Group on Tsunamis and Other Hazards related to Sea-Level Warning and Mitigation Systems (TOWS-WG) of IOC/UNESCO, which coordinates and harmonises tsunami warning and mitigation systems at the global level. Additionally, IOC/UNESCO has facilitated dialogue by organizing international conferences, symposiums and meetings to exchange scientific knowledge and best practices for tsunami warning systems, and these have also provided guidance to the IOTWMS on charting its future direction and priorities, as outlined below:

### *International Conference to Commemorate the 10th Anniversary of the Indian Ocean Tsunami (Jakarta, Indonesia, 24–25 November 2014<sup>7</sup>)*

The objectives of this conference were to report on and document the achievements of the previous 10 years of the IOTWMS; to highlight gaps in the system and work that still needed to be done; and to seek the re-commitment of the IOTWMS Member States and other partners to continue investing in the system to ensure its long-term sustainability. The conference recognised that capacity development for public awareness and preparedness for self-protection should be a continuous programme at national level and recommended a more strategic approach to the integration of tsunami early warning into national and local disaster management. It also recommended a stronger focus on resilience by enhancing community engagement and improving skills and knowledge.

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<sup>6</sup> UNESCO/IOC. 2009. *Tsunami risk assessment and mitigation for the Indian Ocean: knowing your tsunami risk and what to do about it*. Paris, UNESCO, IOC Manuals and Guides No. 52, Second edition 2015 (English) (IOC/2009/MG/52 Rev.)

<sup>7</sup> UNESCO/IOC. 2015. *The Indian Ocean tsunami warning and mitigation system 10 years after the Indian Ocean tsunami: achievements, challenges, remaining gaps and policy perspectives: summary statement*. Paris, UNESCO. (IOC/BRO/2015/2)

*Advances in Tsunami Warning to Enhance Community Response  
(Paris, France, 12–14 February 2018<sup>8</sup>)*

The aims of the symposium were to review the latest and potential new technologies and procedures for estimating tsunami threat; to consider ways of estimating uncertainties in threat assessments; and to examine ways of utilizing enhanced tsunami threat information for emergency response decision-making. Recommendations for national and international initiatives were made. At the national level, countries were encouraged to work towards including tsunami risk management in multi-hazard legislative and policy frameworks. At international level, recommended initiatives included further support for Small Island Developing States (SIDS) and collaboratively improving and sharing tools, methodology, information and procedures in tsunami warning, emergency response, community awareness and preparedness.

*Scientific Tsunami Hazard Assessment of the Makran Subduction Zone  
(Kish Island, Islamic Republic of Iran, 8 March 2019<sup>9</sup>)*

The expert consultation was convened to bring regional and international experts together to collectively enhance understanding of the Makran Subduction Zone (MSZ). Priorities for future work were agreed including the enhancement of networks and exchange of seismic, sea-level and Global Navigation Satellite System (GNSS) data among MSZ Member States; further offshore active seismic profiling for constraining deformation mechanisms to quantify strain accumulation and earthquake potential; production of a Probabilistic Tsunami Hazard Assessment (PTHA) and the undertaking of tsunami risk assessments in coasts bordering the Makran region; and the review of tsunami early warning strategies against the background of experiences with near-field tsunami sources in Palu and Sunda Strait.

*Strengthening Tsunami Early Warning in the North West Indian Ocean Region  
through Regional Cooperation (Muscat, Oman, 1–6 September 2019<sup>10</sup>)*

Two meetings were convened to discuss strengthening tsunami early warning in the North West Indian Ocean. The first meeting reflected on national strategies for tsunami early warning and community preparedness especially in the context of near-field tsunamis. The meeting agreed to strengthen national coordination mechanisms for tsunami early warning by establishing National Working Groups comprising representatives from the National Tsunami Warning Centre (NTWC), National Disaster Management Organisation (NDMO), Local Disaster Management Organisations (LDMOs), media organisations and other stakeholders in end-to-end tsunami warning as well as national experts on seismology and tsunami modelling.

The second meeting was an expert meeting on unified tsunami hazard assessment of the MSZ that resulted in the formulation of a strategy for regional cooperation to develop a regional tsunami hazard map for the Makran region. The experts agreed that future research should be focused on building a comprehensive seismo-tectonic source model for the MSZ

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<sup>8</sup>IOC/UNESCO. 2018. *Advances in Tsunami Warning to Enhance Community Responses, 12–14 February 2018, Paris; Summary Statement*. Paris, UNESCO, pp.8. English. (IOC/BRO/2018/3)

<sup>9</sup>IOC/UNESCO. 2019. *Summary Statement from the Expert Consultation on Scientific Tsunami Hazard Assessment of the Makran Subduction Zone, 8 March 2019*. Perth, UNESCO. (IOC/BRO/2019/3 Rev.)

<sup>10</sup>ICG/IOTWMS. 2019. *Strengthening tsunami early warning in the North West Indian Ocean region through regional cooperation – Summary of Meetings, Muscat, Oman, 1–6 September 2019*. Perth, IOC (ICG/IOTWMS/MSZ/MR/Sep19).

and on the need to undertake a unified PTHA for the region. A community seismic model should also be developed to take into account the characteristics of the MSZ seismicity.

*Lessons Learnt from the 2018 Tsunamis in Palu and Sunda Strait.  
(Jakarta, Indonesia, 26–28 September 2019<sup>11</sup>)*

Indonesia was hit by two destructive tsunamis in late 2018, in Palu and Donggala on 28 September, and in Sunda Strait on 22 December. The atypical and complex nature of these tsunamis challenged traditional understanding of tsunami hazard, warning and response mechanisms and the international symposium was convened to promote scientific dialogue on tsunami science based on the lessons learnt from the events; to consider the future direction of tsunami early warning and mitigation systems for events of non-tectonic origins with short warning times; and to stimulate dialogue on the relevance of scientific findings to policies and actions. Key recommendations arising from the symposium were:

- More research needs to be done on tsunamis triggered by volcanoes and other atypical sources to enhance early warning and preparedness;
- Developing and maintaining a culture of self-evacuation is critical for saving lives from locally generated tsunamis;
- Ensure development of effective timeline driven early warning chains and Standard Operating Procedures to deliver simple and actionable messages to the public;
- Increase the focus over the next 10 years on downstream/last mile component of the end-to-end warning system; and
- Build capacity at community level to understand natural and official warnings and the appropriate response.

### 2.3 METHODOLOGY

The 2018 capacity assessment was designed to provide a benchmark of the current status of the IOTWMS, identify specific gaps and prioritise capacity development requirements at both the regional and national levels for strengthening the end-to-end tsunami warning and mitigation system in the Indian Ocean. The assessment was conducted through an online survey questionnaire covering all aspects of the end-to-end tsunami warning and mitigation system. The questionnaire assimilated and built upon the existing ICG/IOTWMS National Reports, Post-IOWave Surveys and IOC/UNESCO Post-Event Assessment Surveys. The survey was disseminated through [IOC Circular Letter 2742](#) with a unique link assigned to the designated Tsunami National Contact (TNC) for each of the 24 active<sup>12</sup> Member States of the ICG/IOTWMS. The survey had five distinct sections: basic information; risk assessment and reduction; detection, warning and dissemination; public awareness, preparedness and response; and narrative with each section requiring inputs from different stakeholders based on their national responsibility in the end-to-end tsunami warning and mitigation system.

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<sup>11</sup> IOC/UNESCO. 2020. *UNESCO-IOC and BMKG International Symposium: lesson learnt from the 2018 tsunamis in Palu and Sunda Strait, Jakarta, Indonesia, 26–28 September 2019: summary statement*. Paris, UNESCO. ([IOC/BRO/2020/1](#))

<sup>12</sup> Although the ICG/IOTWMS has 28 Member States, 4 Member States are inactive and do not participate in ICG activities. Nevertheless, the IOTWMS is designed to protect all ICG Member States whether active or inactive.

The dataset underpinning the regional analysis and preparation of the 2018 Capacity Assessment is based on the responses received from 20 of ICG/IOTWMS Member States by 10th January 2019<sup>13</sup>. The responding Member States were:

Australia, Bangladesh, Comoros, France (Indian Ocean Territories), India, Indonesia, Iran, Kenya, Madagascar, Malaysia, Mauritius, Mozambique, Myanmar, Oman, Pakistan, Singapore, Sri Lanka, Tanzania, Thailand and Timor-Leste.

Submission of responses was timed to coincide with Member States' formal reporting to the **twelfth session of the ICG/IOTWMS** (Kish, Islamic Republic of Iran, 9–12 March 2019) eliminating the need for countries to submit a separate national report. Information submitted by Member States was analysed by the TT-CATP for preparation of the IOTWMS Status Report. This report was presented for consideration of Member States at the ICG/IOTWMS-XII session and approved for publication as an IOC Technical Series document subject to incorporation of any inputs received from the Member States. In order to ensure that the status and progress of the IOTWMS is routinely and effectively monitored, future capacity assessments will also be timed to coincide with the biennial ICG sessions.

### 3 CURRENT STATUS

#### 3.1 POLICIES, PLANS AND GUIDELINES

High-level documents provide a structure and framework for the implementation of tsunami initiatives in a country and can assist with the designation of resources towards specific initiatives. Tsunami is often incorporated within a multi-hazard framework, which can effectively integrate and increase the visibility of tsunami within national frameworks.

##### 3.1.1 Policies

**Countries were asked to confirm the availability and type of national tsunami policy they have**, including whether it is multi-hazard or standalone, and which phases of the disaster management lifecycle it addresses, from prevention and mitigation, through to preparedness, emergency response, and rehabilitation and reconstruction (**Figure 1**).

The responses have indicated that 19 of the 20 countries (95%) have some form of national tsunami policy and the country without one commented that it is under development. A large majority have addressed tsunami as a part of a multi-hazard policy. Ninety percent (90%) of countries have a national policy that addresses the emergency response phase and 80% one that addresses the rehabilitation and reconstruction phase. Seventy-five percent (75%) of countries have a national policy that addresses the prevention and mitigation phase and/or the preparedness phase.

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<sup>13</sup> The report from South Africa was submitted after the regional analysis had already been completed and therefore it was not possible to include their responses in the analysis. However, their national report is included in the supplement to this report.

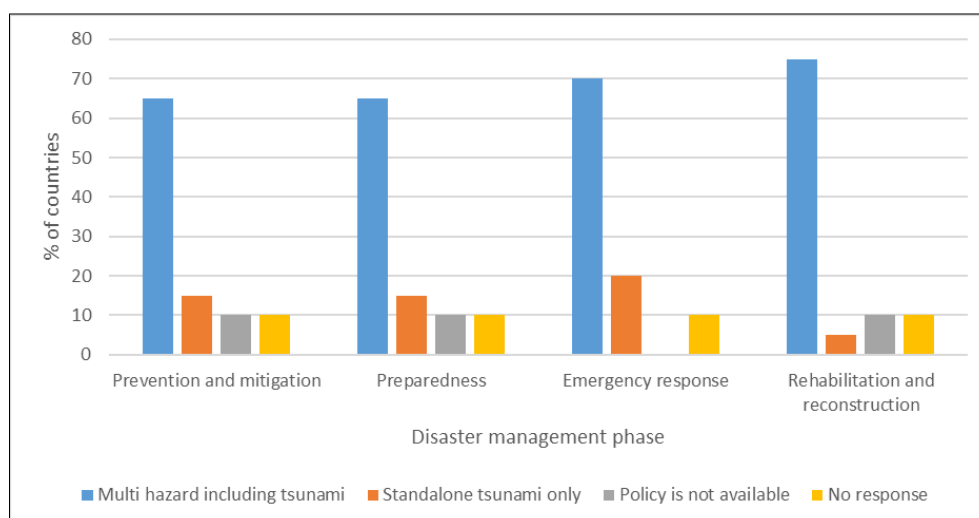


Figure 1. Types and phases of national tsunami policy

Using the same approach, countries were asked to confirm the availability and type of local tsunami policy they have, including whether it is multi-hazard or standalone, and which phases of the disaster management lifecycle it addresses, from prevention and mitigation, through to preparedness, emergency response, and rehabilitation and reconstruction (Figure 2). The responses indicated that 15 of the 20 countries (75%) have some form of local tsunami policy. Three of the countries without have commented that it is under development. For those countries with some form of local tsunami policy, the majority have included tsunami as a part of a multi-hazard policy. Seventy-five percent (75%) of countries (15) with a policy have addressed the emergency response phase, whereas for each of the other phases, only 55% countries have addressed tsunami, either as a standalone or multi-hazard policy.

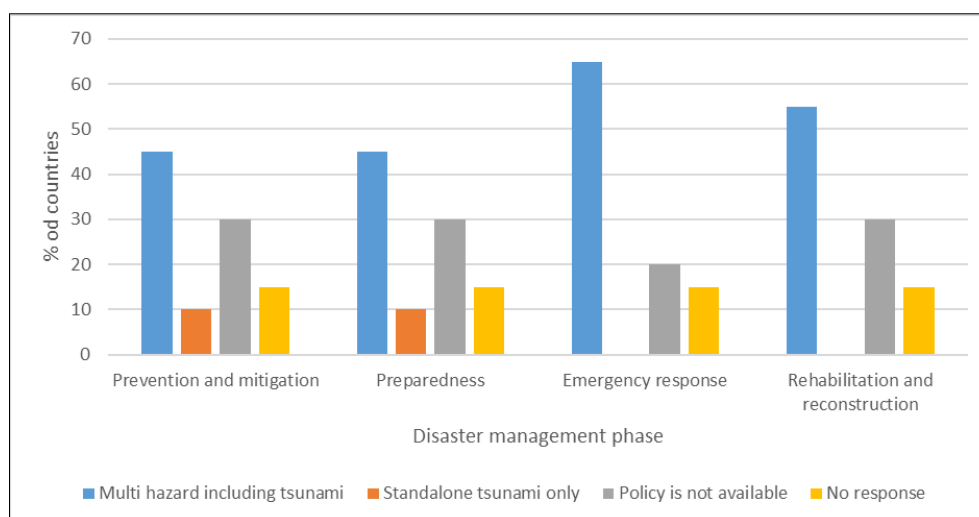


Figure 2. Types and phases of local tsunami policy

### 3.1.2 Plans

Countries were asked to confirm the availability, level and type of tsunami risk reduction plans they have, including whether it is multi-hazard or standalone, whether it is at the national, local or community level, and which phases of the disaster management lifecycle it addresses, from prevention and mitigation (Figure 3), through to preparedness

(Figure 4), emergency response (Figure 5), and rehabilitation and reconstruction phases (Figure 6).

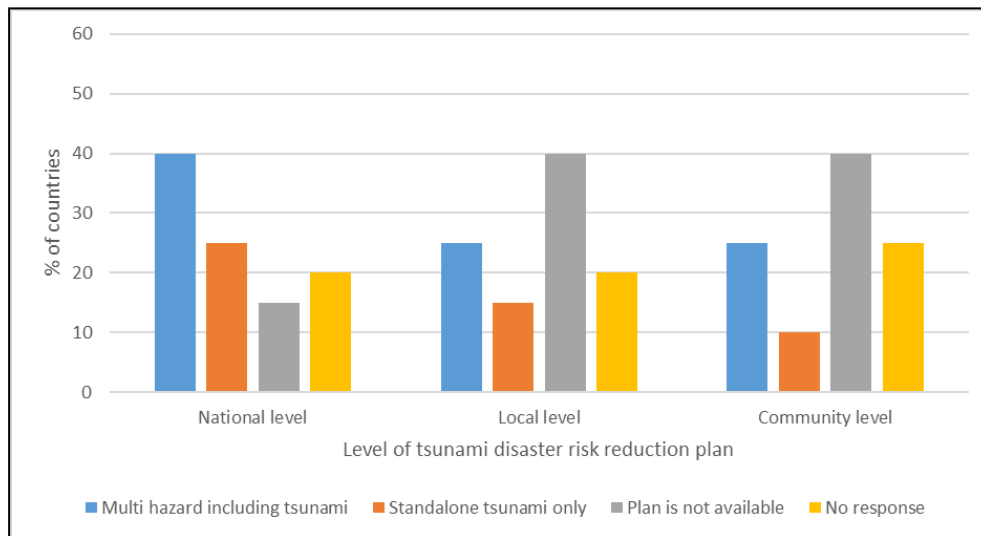


Figure 3. Availability of national, local and community level tsunami disaster risk reduction plans during prevention and mitigation phase

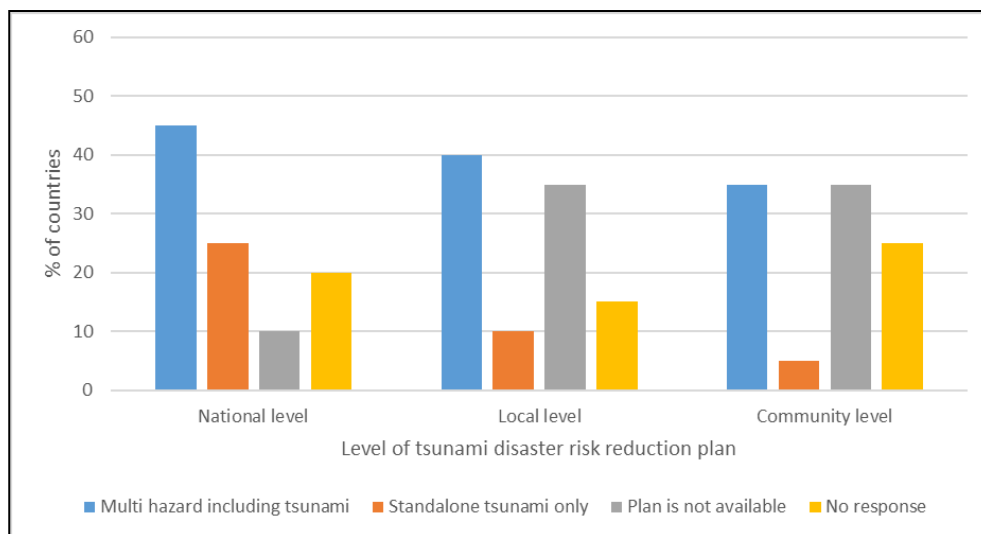
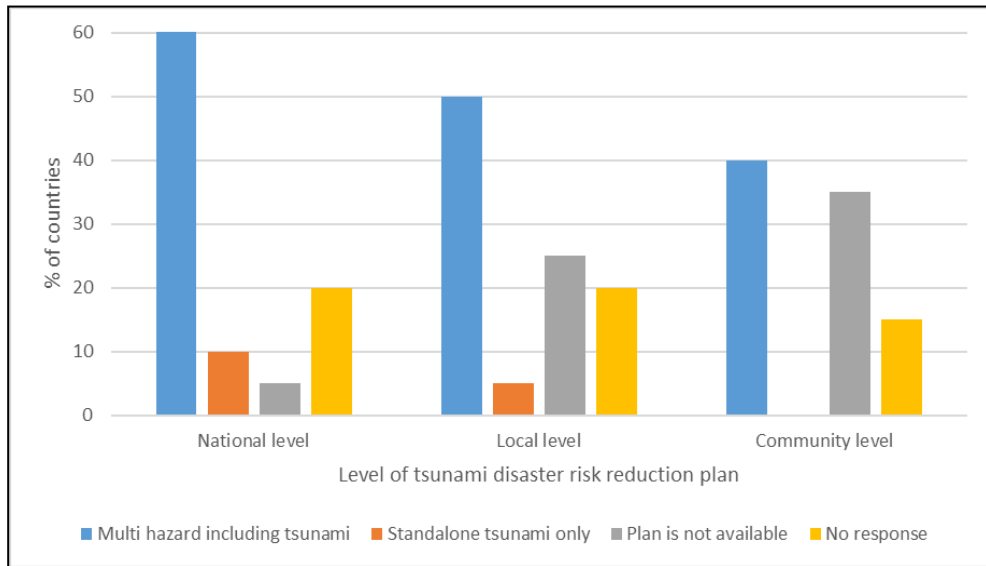
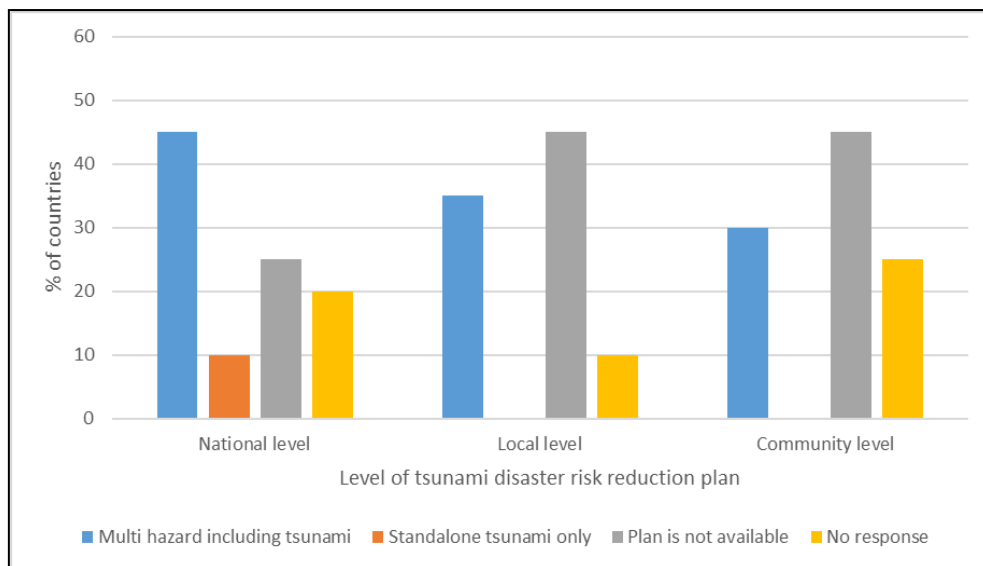


Figure 4. Availability of national, local and community level tsunami disaster risk reduction plans during preparedness phase



**Figure 5.** Availability of national, local and community level tsunami disaster risk reduction plans during emergency response phase



**Figure 6.** Availability of national, local and community level tsunami disaster risk reduction plans during rehabilitation and reconstruction phase

The responses have indicated that 90% of countries have some form of tsunami disaster risk reduction plans, while 1 out of 2 countries without plans commented that they are under development. A significant majority of countries have addressed tsunami risk reduction as a part of a multi-hazard plan, rather than as standalone plans.

Across all four phases of the disaster management lifecycle, availability of plans was significantly higher at the national level, followed by the local level. There was least availability at the community level. For example, at the emergency response phase 75% of countries have national level plans, while 55% have local and 40% have community level plans. This pattern was similar in all phases of disaster management.



Availability of tsunami plans was highest during the emergency phase. For example, the 75% of countries with national plans at the emergency phase exceeds those during the prevention and mitigation phase (65%), the preparedness phase (70%) and the rehabilitation and reconstruction phase (55%). This pattern was replicated at the local and community levels, with availability at the emergency phase exceeding other phases.

All countries (100%) reported that their tsunami disaster risk reduction plans were based on hazard and/or risk assessments.

### 3.1.3 Guidelines

**Countries were asked to confirm the availability and type of national tsunami guidelines they have**, including whether it is multi-hazard or standalone, and which phases of the disaster management lifecycle it addresses, from prevention and mitigation, through to preparedness, emergency response, and rehabilitation and reconstruction (Figure 7).

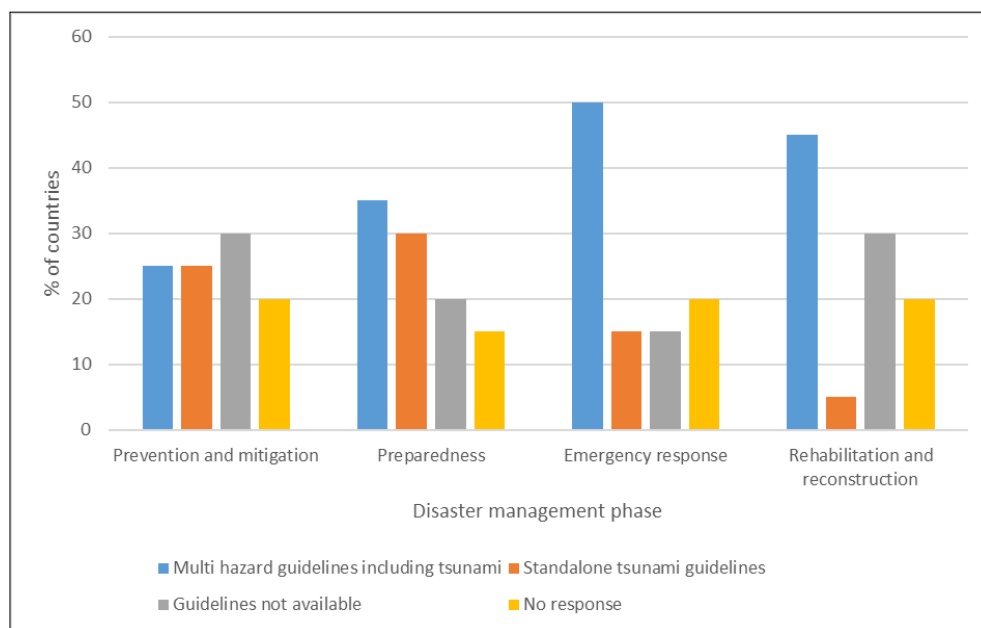


Figure 7. Types and phases of national tsunami guidelines

The responses indicate that 17 of the 20 countries (85%) have some form of national tsunami guidelines. At the prevention and mitigation phase and preparedness phase there was a mix of standalone guidelines and those that address tsunami as a part of a multi-hazard guidelines. At the emergency response phase, and rehabilitation and reconstruction phase, they predominantly addressed tsunami as a part of national multi-hazard guidelines.

Sixty-five percent (65%) of countries have national tsunami guidelines that have addressed the preparedness phase and emergency response phase, whereas only 50% of countries have addressed the prevention and mitigation, and rehabilitation and reconstruction phases.

**Using the same approach, countries were asked to confirm the availability and type of local tsunami guidelines they have**, including whether it is multi-hazard or standalone, and which phases of the disaster management lifecycle it addresses, from prevention and mitigation, through to preparedness, emergency response, and rehabilitation and reconstruction.

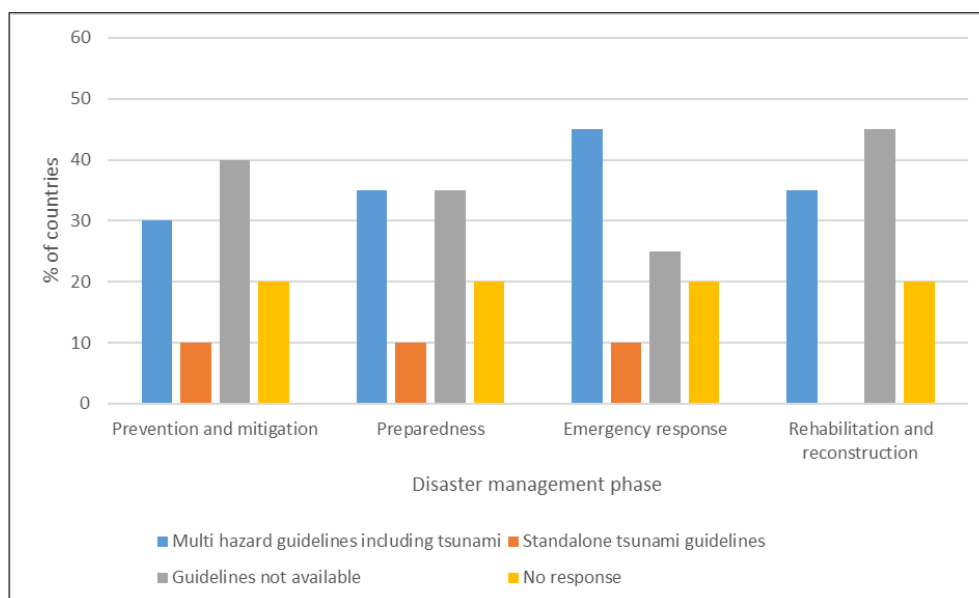


Figure 8. Types and phases of local tsunami guidelines

The responses indicate that 16 of the 20 countries (80%) have some form of local tsunami guidelines. Across the disaster management phases, the majority have addressed tsunami as a part of multi-hazard guidelines. Fifty-five percent (55%) of countries have local tsunami guidelines that have addressed the emergency response phase. They are not as commonly found in other phases, including preparedness (45%), prevention and mitigation (40%), and rehabilitation and reconstruction (35%).

## 3.2 RISK ASSESSMENT AND REDUCTION

### 3.2.1 Hazard Assessment

**Countries were asked to confirm whether a hazard assessment had been carried out, and if so, what type of assessment** (i.e. specifying potential tsunami sources, wave heights along the coast, inundation and estimated tsunami arrival times).

The results show that all 20 countries participating in this survey (100%) conducted hazard assessments to understand the threats to their territory.

Figure 9 shows the type of hazard assessment carried out by each country. Eighteen countries (90%) reported conducting a multi-hazard assessment that includes tsunami of which 2 countries (10%) both a single hazard assessment on tsunami and a multi-hazard assessment including tsunami. Two countries (10%) conducted a single hazard assessment on tsunami only.

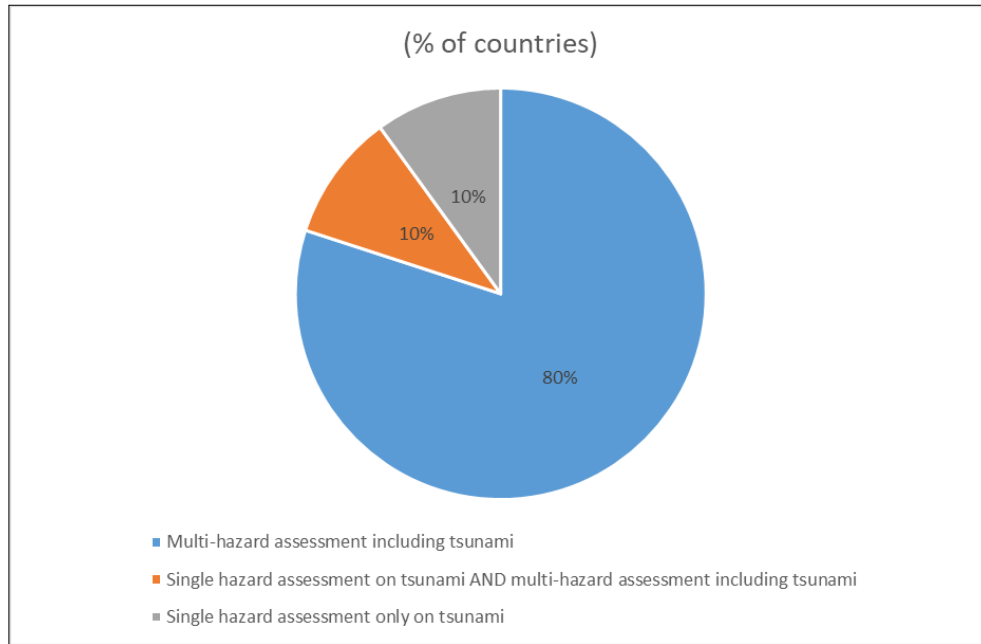


Figure 9. Type of hazard assessment

For those countries that carried out multi-hazard assessments, respondents were asked to identify the types of hazard that were included in the assessment.

Figure 10 shows the number of hazards included in the multi-hazard assessments conducted by each country. Out of the 18 countries that conducted a multi-hazard assessment, 1 country included 8 hazards, and 3 countries included 7 hazards covering tsunami, cyclone, drought, earthquake, epidemic, flooding, landslide, and volcanic eruption. Five countries included 6 hazards, 2 countries included 4 hazards, and 4 countries included 3 hazards.

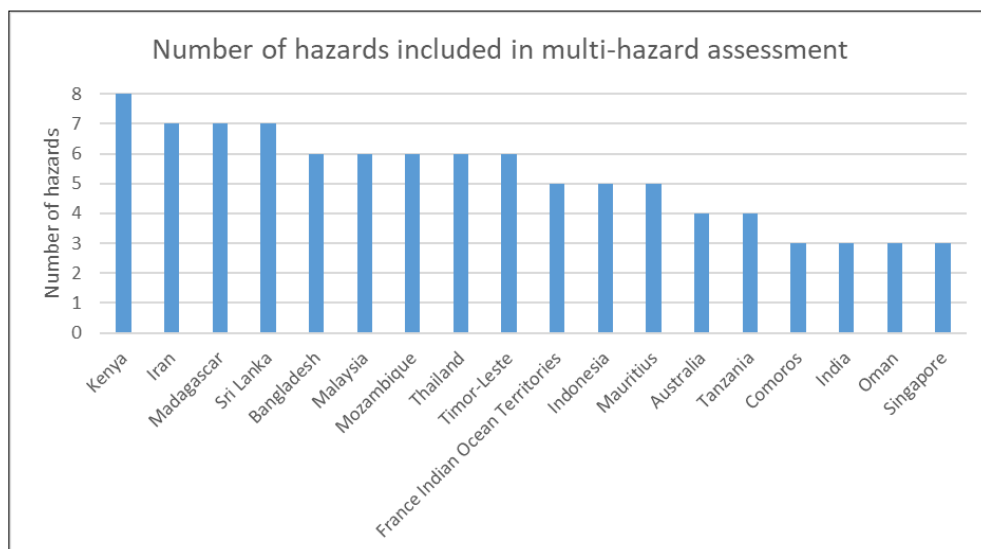


Figure 10. Number of hazards included in a multi-hazard assessment

As shown in Figures 9 and 11, all 20 respondent countries included tsunami in their hazard assessment. Seventeen (17) of the countries who did multi-hazard assessments also included flooding (85% of total), 15 included cyclones (75% of total) and 14 (70% of total)

included earthquakes (Figure 11). Less common hazards included were drought and landslides (55%), epidemics (35%) and volcanic eruptions (20%).

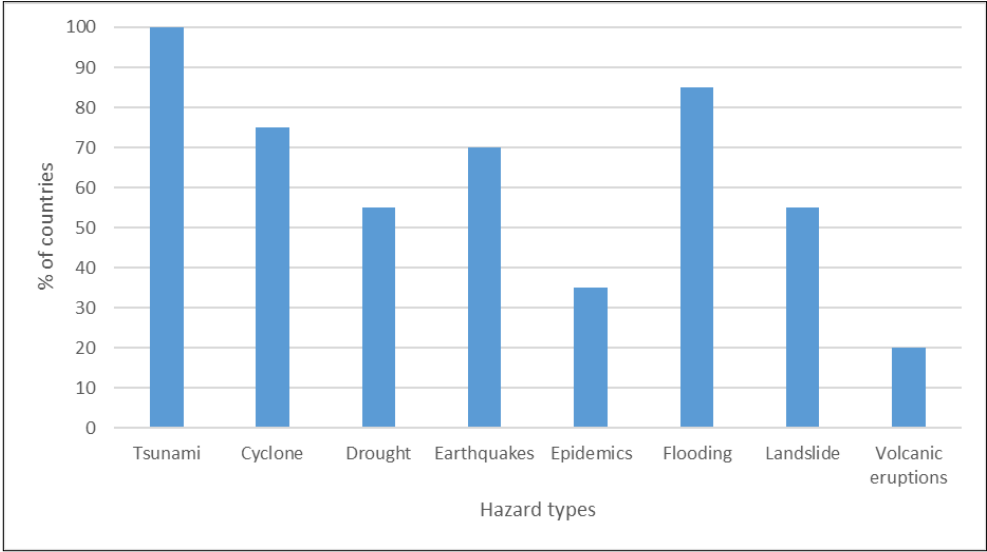


Figure 11. Types of hazard included in multi-hazard assessment

**Countries were asked to identify which organisation(s) is/are responsible for the tsunami hazard assessment and at what level they are carried out.**

Seventy-five percent (75%) of tsunami hazard assessments carried out by countries involved a national agency, 45% a national or local university, 40% a national or international consultant, and just 20% an international agency (Figure 12). Forty-five percent (45%) of tsunami hazard assessments involved multiple organisations.

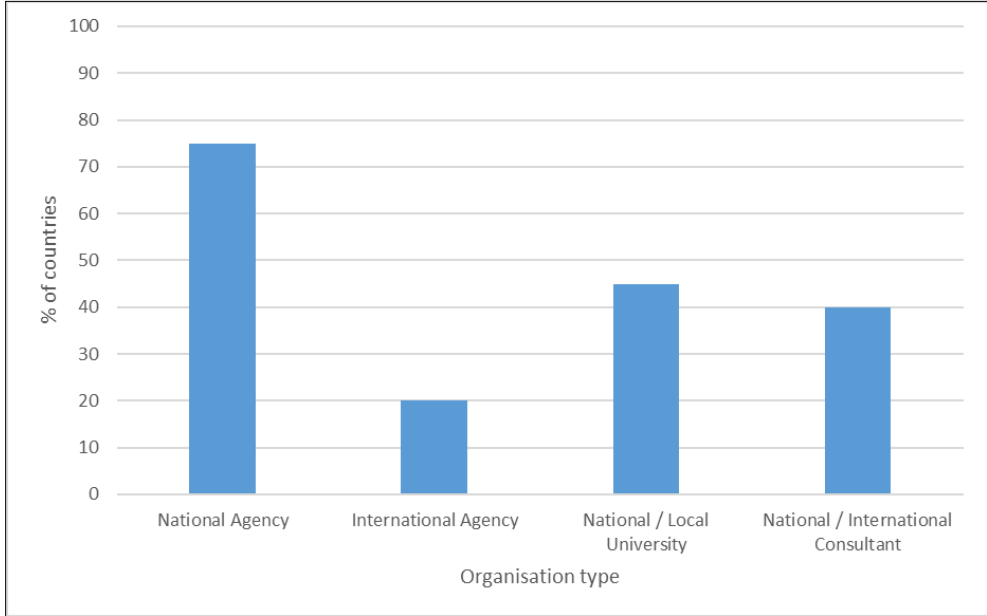


Figure 12. Organisation(s) responsible for the tsunami hazard assessment

Sixty-five percent (65%) of countries carried out the tsunami hazard assessment at the national level, 40% at the regional level, 45% at the city level and 30% at the village level (Figure 13). Fifty percent (50%) of countries carry out hazard assessments at multiple levels.

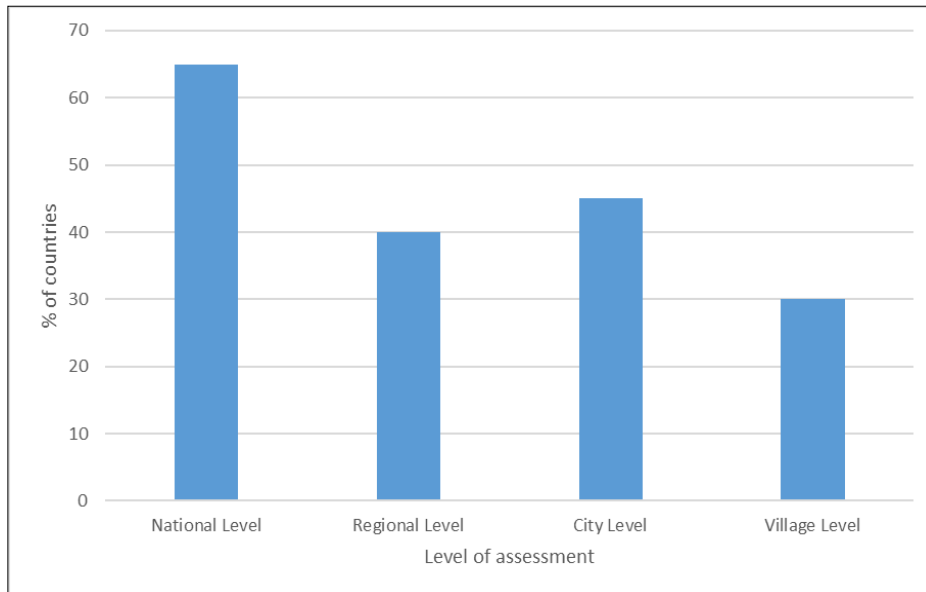


Figure 13. Level at which tsunami hazard assessment was carried out

**Countries were then asked to identify the type of data used to support their tsunami hazard assessment and whether that data is publicly available.**

17 countries (85%) identified two or more data types used to support their tsunami hazard assessment, while 3 countries did not identify any data types. Bathymetry and topography were the most widely used data to inform tsunami hazard assessment (Figure 14). Fifty-five percent (55%) of the 20 countries used seismo-tectonic models, and 55% of countries also used infrastructure details. However, none of the data sources are widely available to the public. Land cover data was reported as publically available in 7 of the 13 countries that used it, whereas infrastructure data was publicly available in just 3 of the 11 countries that used this data to inform tsunami hazard assessments.

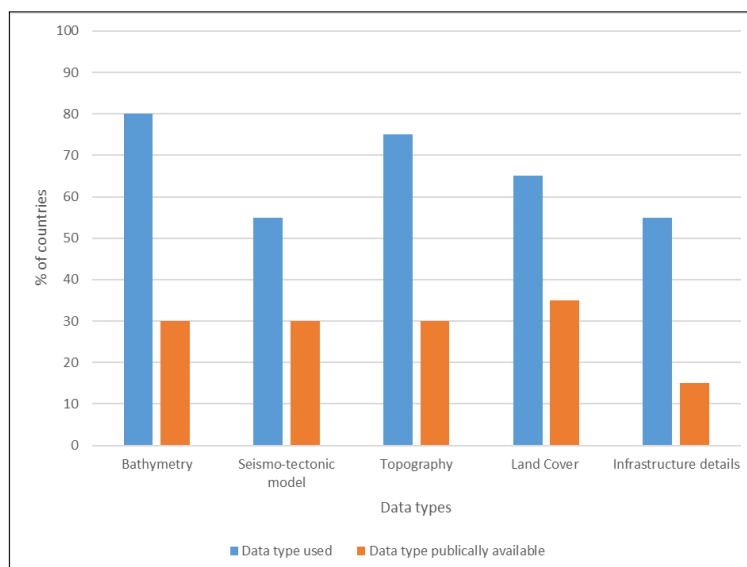


Figure 14. Data types used for tsunami hazard assessment

The number and type of products to emerge from the tsunami hazard assessment varied greatly across the 20 respondent countries. The most common products (Figure 15) were inundation maps (80%) and hazard maps (70%). The other products have been developed by less than 50% of countries.

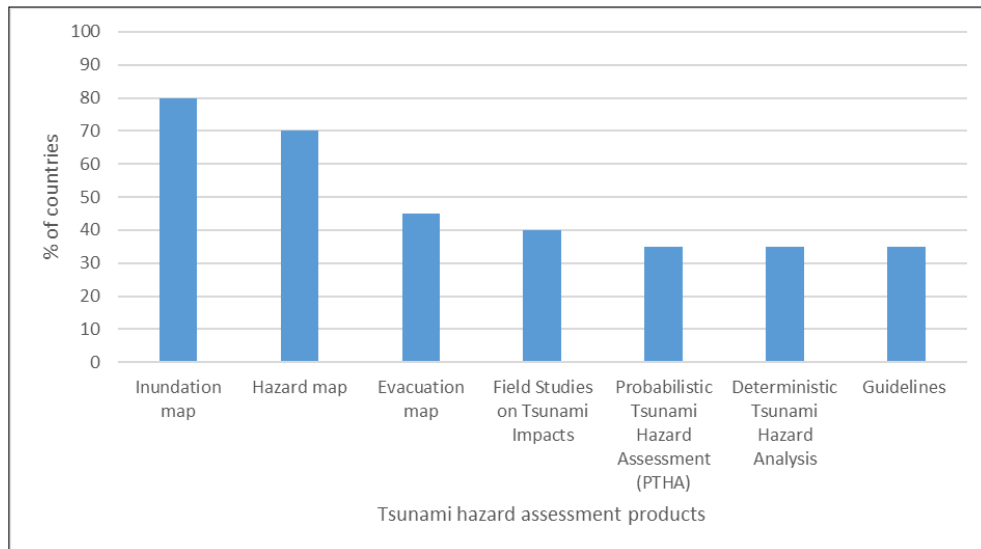


Figure 15. Products from tsunami hazard assessment

A majority of countries have produced 3 products or fewer while Thailand has produced all 7 products (Figure 16).

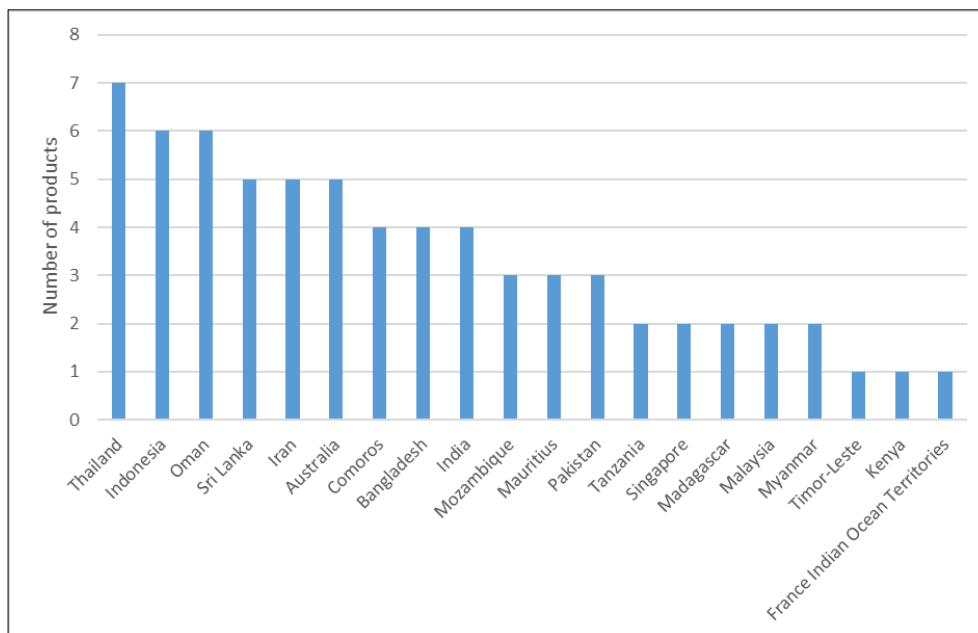


Figure 16. Number of tsunami assessment products

Countries were then asked to rate their capacity to undertake tsunami hazard assessment using a five-point scale, from very poor to very good (Figure 17). The responses indicated wide-ranging capacity across the 20 respondent countries. Forty-five percent (45%) of countries rated themselves as having very good or good capacity to

undertake tsunami hazard assessments, while 35% of countries rated themselves as having fair capacity. Twenty percent (20% of countries rated themselves as having poor capacity.

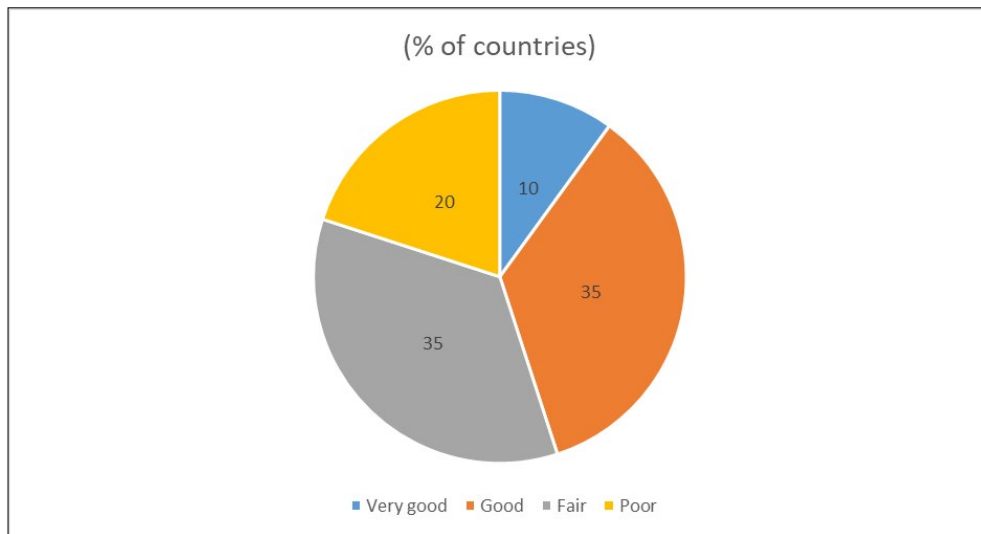


Figure 17. Capacity to undertake tsunami hazard assessments

In a similar manner, each respondent was then asked to rate their country’s priorities for capacity improvement across six areas of tsunami hazard assessment, using a five-point scale, from not a priority to essential (Figure 18). The responses indicated that all areas require capacity improvement in at least some countries, but using a weighted response across the 20 respondent countries<sup>14</sup>, evacuation mapping was ranked as the highest priority for capacity improvement, followed by hazard mapping and inundation mapping (Table 1).

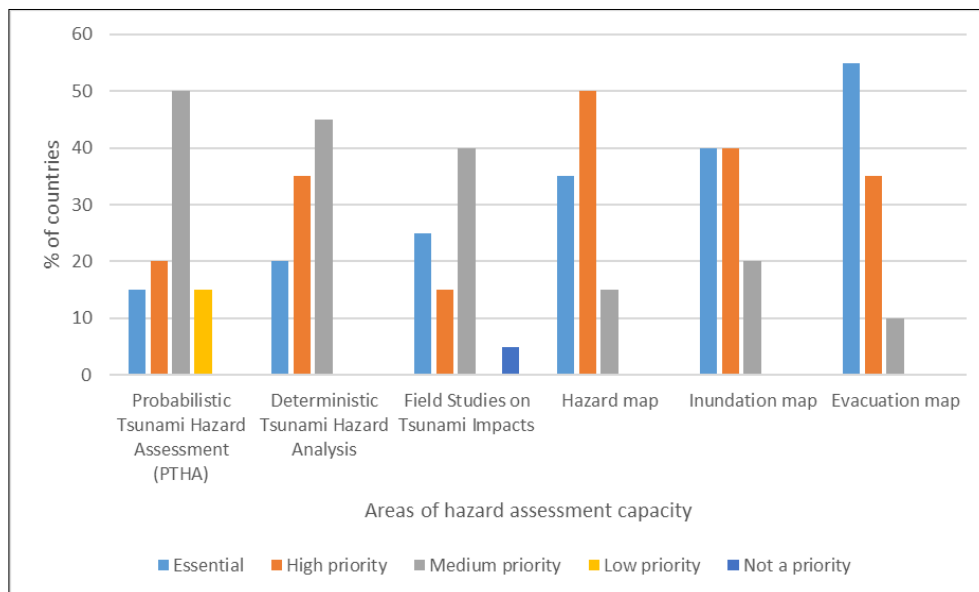


Figure 18. Capacity areas to undertake tsunami hazard assessments

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$$RII = \frac{\sum W}{A \times N} \quad (0 \leq R \leq 1)$$

Where RII is the weighted response, W is the weightage given to each factor, A is the highest weight, and N is the number of respondents

Areas of tsunami hazard assessment	RII <sup>3</sup>	Rank
Evacuation map	0.89	1
Hazard map	0.84	2
Inundation map	0.84	3
Deterministic Tsunami Hazard Analysis	0.75	4
Field Studies on Tsunami Impacts	0.72	5
Probabilistic Tsunami Hazard Assessment (PTHA)	0.70	6

Table 1. Ranking of priority areas for capacity improvement in tsunami hazard assessment

Countries were also asked to rate their capacity to give training and/or consultancy to other countries on the same six aspects of tsunami hazard assessment, using a five-point scale, from no capacity to very good capacity (Figure 19). Forty percent (40%) of the 20 respondent countries indicated very good or good capacity to give training on hazard mapping and inundation mapping, while 35% of countries indicated the same on evacuation mapping. For the other three areas, probabilistic tsunami hazard assessment, deterministic tsunami hazard analysis and field studies on tsunami impact, just 3 (15%) of the 20 countries indicated very good or good capacity.



Figure 19. Capacity to give training and/or consultancy on areas of tsunami hazard assessment to other countries.

### 3.2.2 Risk Assessment

Countries were then asked to consider the extent and nature of tsunami risk assessments carried out. (i.e. estimating likely tsunami effects to the coasts and estimating damages to life and property).

The results show that 16 of the 20 countries participating in this survey (80%) have conducted tsunami risk assessments.



Figure 20 shows the type of risk assessment carried out by each country. Twelve (12) countries (60% of the surveyed countries) reported conducting a multi-hazard risk assessment that includes tsunami, 3 countries (15%) both a single hazard assessment on tsunami and a multi-hazard assessment including tsunami, and 1 country (5%) a single hazard assessment on tsunami only.

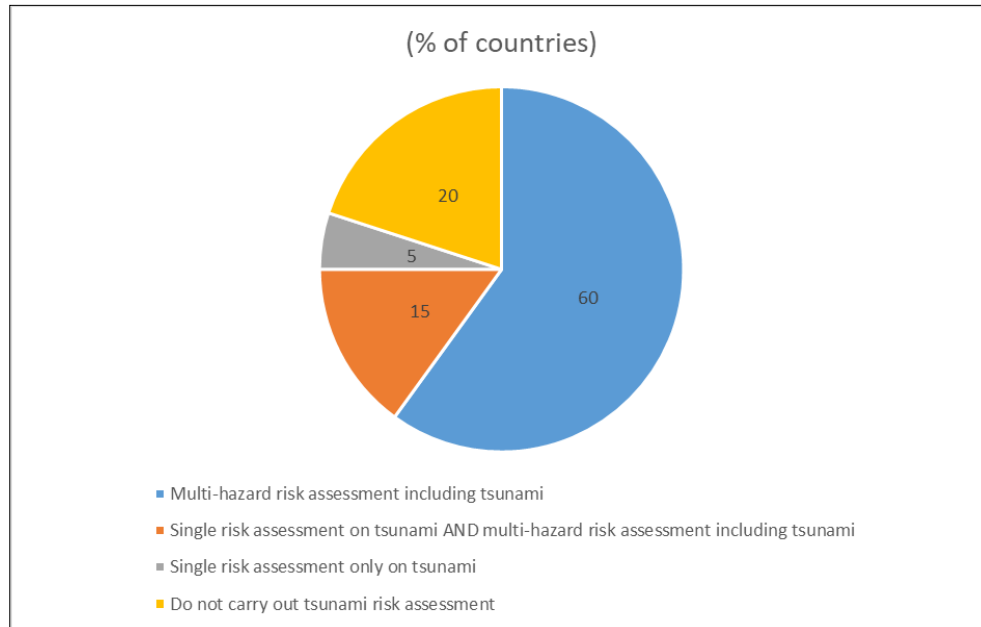


Figure 20. Types of risk assessment

Of all 15 countries that have carried out multi-hazard risk assessments including tsunami, 50% or more considered flooding, cyclones and earthquakes as the other types of hazard of their multi-hazard risk assessment (Figure 21). Less common hazards included were epidemics and volcanic eruptions. Strong winds, forest fires and lightning were each considered by one of the 15 countries that carry out multi-hazard risk assessments.

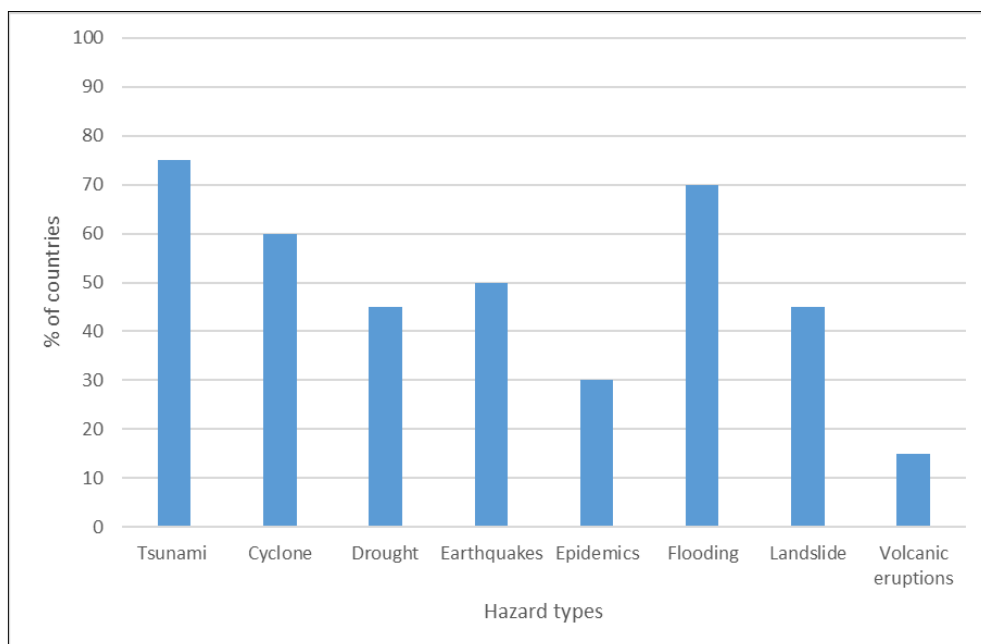


Figure 21. Types of hazard included in the multi-hazard risk assessment

**Countries were asked to identify the organisation(s) responsible for carrying out risk assessments and the level at which they are carried out.**

The organisation(s) responsible for carrying out tsunami risk assessments vary across the respondent countries (Figure 22). In 55% of countries, a national agency was fully or partially responsible, and a national or local university was at least partially responsible in 25% of countries. A national agency or international consultant was at least partially responsible in 25% countries, while 20% countries indicated that an international agency was at least partially responsible. In 20% of countries, the tsunami risk assessment was the responsibility of multiple actors.

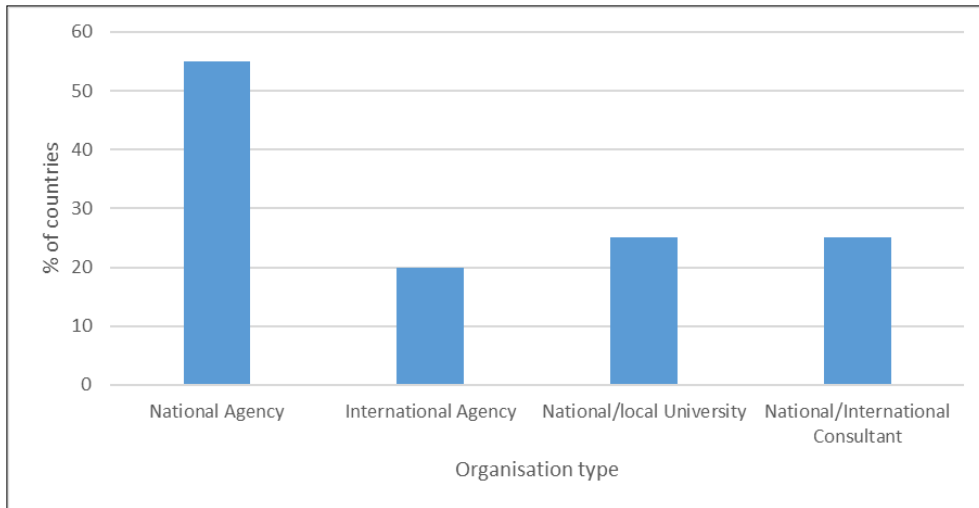


Figure 22. Organisation(s) responsible for the tsunami risk assessment

Of the 16 countries that carried out tsunami risk assessments, 11 conducted them at national level, 8 at regional level and 6 at city level (Figure 23). Only 4 countries have carried out village and/or community level risk assessments. Six (6) countries have carried out risk assessment at multiple levels.

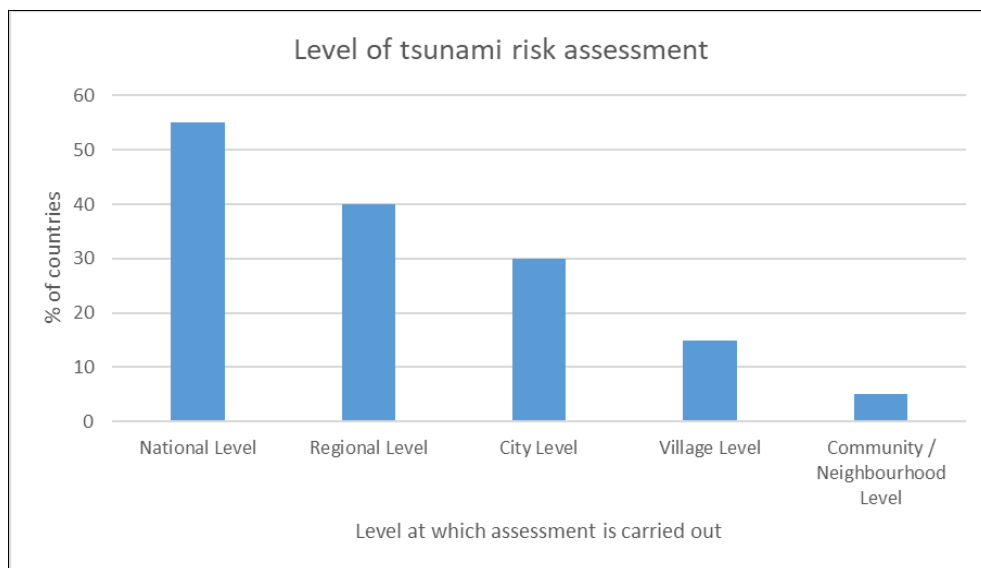


Figure 23. Levels at which the tsunami risk assessment is carried out

**Countries were then asked to identify the types of product that emerge from the tsunami risk assessment.**

The number and type of products that have been developed from the tsunami risk assessment varied across the respondent countries (Figure 24). A risk map was produced by 11 of the 16 countries (55% of all countries) that have conducted tsunami risk assessments. Evacuation maps, guidelines and action plans have also been produced, but each of them by less than half of the respondent countries that do tsunami risk assessments. Ten (10) countries have developed 2 or more products.

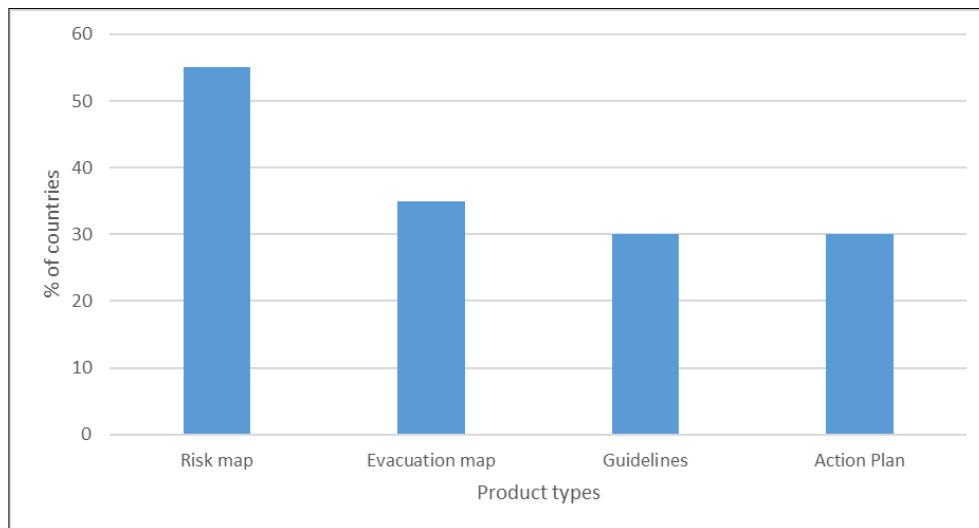


Figure 24. Types of product to emerge from the tsunami risk assessment

Each country was also asked to rate their capacity to undertake tsunami risk assessments using a five-point scale, from very poor to very good. The responses indicated wide-ranging capacity across the 20 respondent countries (Figure 25). Thirty-five percent (35%) of countries rated their capacity as very good or good. Twenty-five percent (25%) rated themselves as having fair capacity, and 35% of countries rated their capability as poor or very poor.

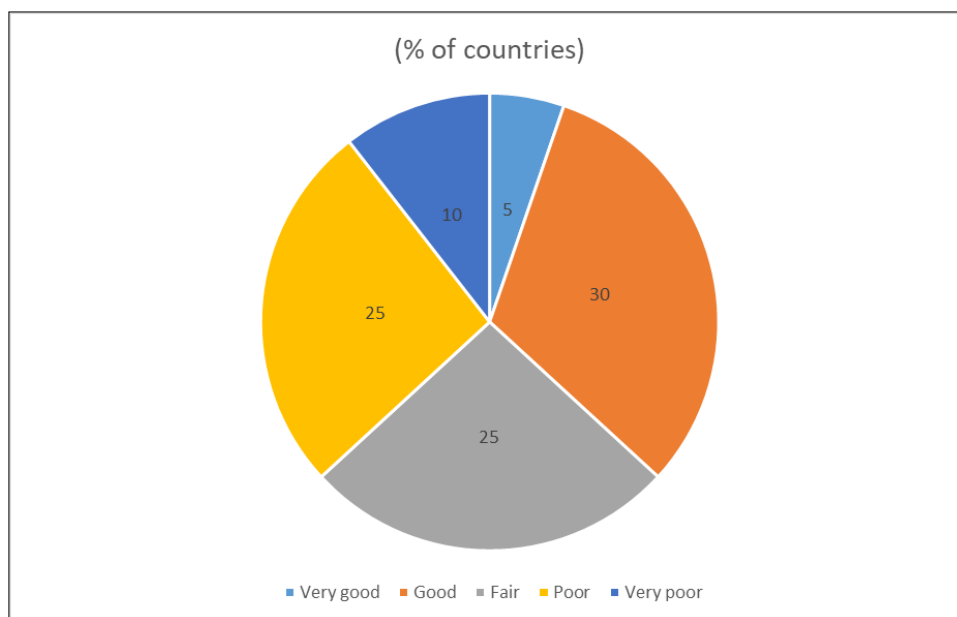


Figure 25. Capability to undertake tsunami risk assessment

Using a similar approach, each country was then asked to rate their priorities for capacity improvement across five level of tsunami risk assessment, using a five-point scale, from not a priority to essential (Figure 26).

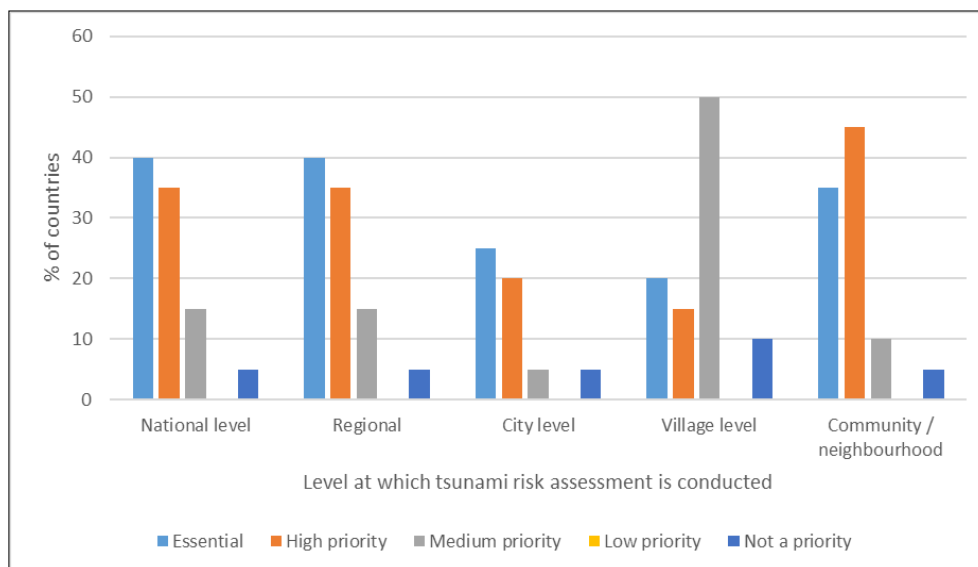


Figure 26. Priorities for improvement in capacity for tsunami risk assessment

The responses indicated that all areas require capacity improvement in at least some countries but using a weighted response across the 20 respondent countries<sup>15</sup>, city level risk assessment was ranked as the highest priority for capacity improvement, followed by village and community levels (Table 2).

Priority level	RII <sup>15</sup>	Rank
Tsunami risk assessment at city level	0.82	1
Tsunami risk assessment at village level	0.82	2
Tsunami risk assessment at community / neighbourhood level	0.82	3
Tsunami risk assessment at national level	0.73	4
Tsunami risk assessment at regional level	0.67	5

Table 2. Priorities for capacity improvement in tsunami risk assessment

Each country was also asked to rate their capacity to give training and/or consultancy to other countries on the same five levels of tsunami hazard assessment (from community to national), using a five-point scale, from no capacity to very good capacity (Figure 27). For each level, there were no countries that indicated very good capacity to deliver training on tsunami risk assessment. Thirty percent (30%) of countries rated themselves as having good capacity to give training at the national level, and 20% at the regional and city levels. Only 15% of countries rated themselves as having good capacity to deliver training at the village or community level.

<sup>15</sup>  $RII = \frac{\sum W}{A \times N}$  ( $0 \leq R \leq 1$ )

Where RII is the weighted response, W is the weightage given to each factor, A is the highest weight, and N is the number of respondents

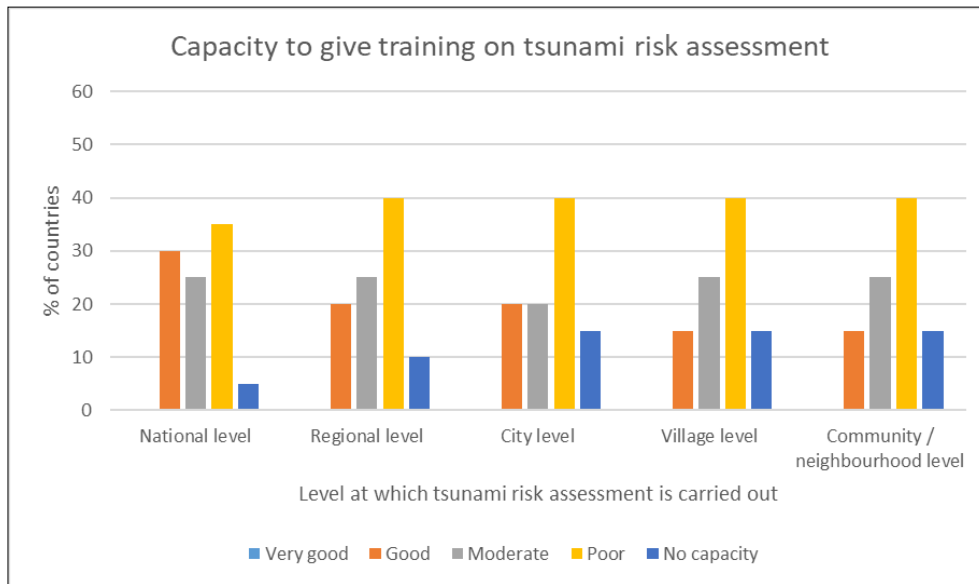


Figure 27. Capacity to give training on tsunami risk assessment (from community to national levels).

### 3.3 DETECTION, WARNING AND DISSEMINATION

#### 3.3.1 Detection and Warning

All countries (100%) reported that they have a national capability to assess and/or receive potential tsunami threat information and advise and/or warn their coastal communities.

Countries were asked to confirm the type of data they use for the coastal forecast zones (CFZs) of their coastline to determine national threats (Figure 28). Forty-five percent (45%) of countries rely solely on the data provided by the IOTWMS Tsunami Service Providers (TSPs) to identify CFZs, while 45% of countries use TSP data and their own threat assessment data. Five percent (5%) of respondent countries rely solely on their own threat assessment data.

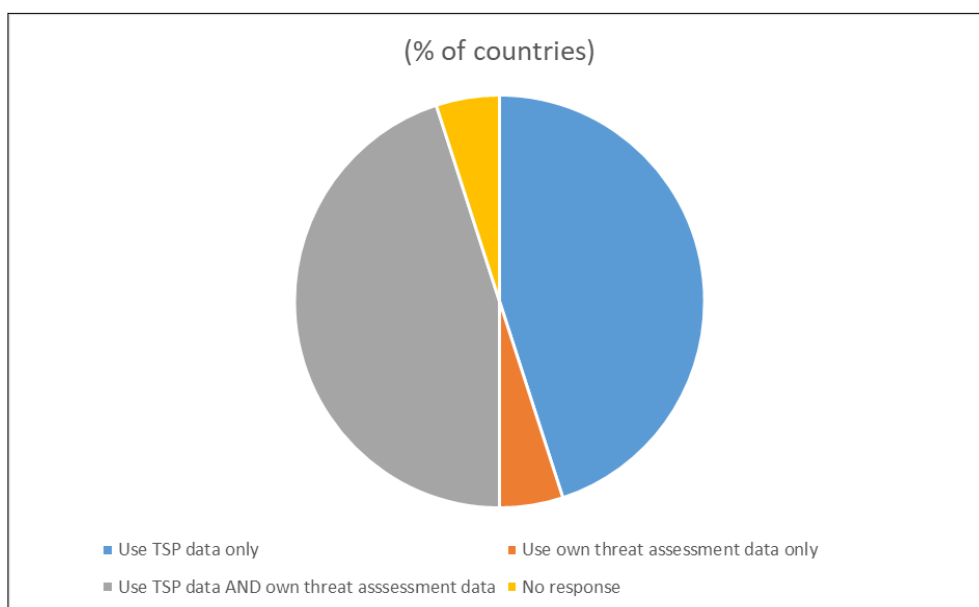


Figure 28. Data use for the Coastal Forecast Zones (CFZ) of a country's coastline to determine national threats.

Ninety percent (90%) of respondent countries reported that the organisation responsible for assessing and/or receiving potential tsunami threat information operates 24x7. Comoros reported operating 12 to 15 hours per day, and Iran is currently looking to move towards 24x7 operations.

**Countries were also asked to confirm what type of infrastructure is available to enable 24x7 operations (Figure 29).** Computers and the internet were reported by 100% of respondents, while landline telephones and mobile phones or cell phones were reported by over 90% of respondents. Fax, Global Telecommunication System (GTS) and Uninterruptible Power Supply (UPS) were also widely reported (over 70%). Satellite phones and Very Small Aperture Terminal (VSAT) were reported by 25% or less of respondents.

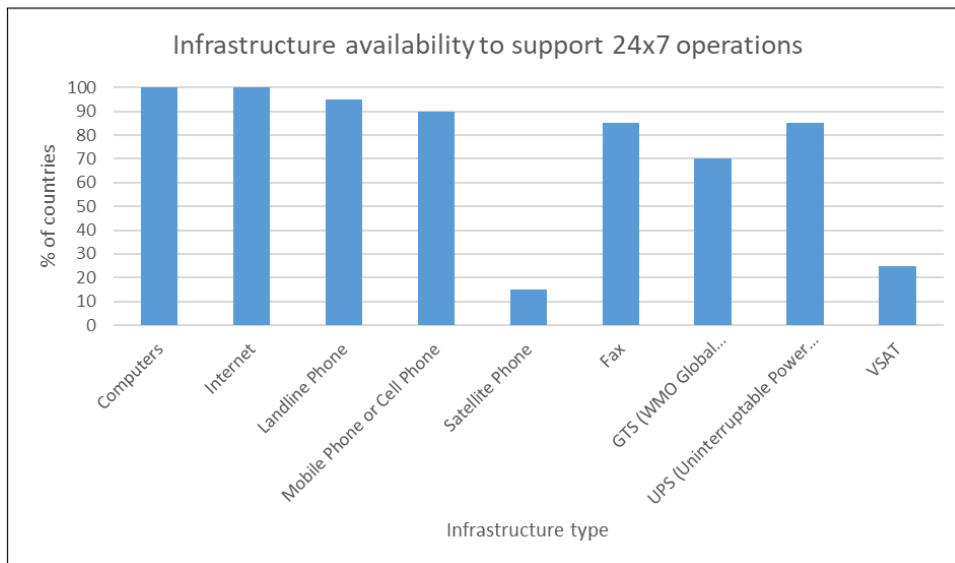


Figure 29: Infrastructure availability to support 24x7 operations

**Countries were asked to report the level of tsunami threat forecast information produced by the responsible organisation (Figure 30).** Ninety percent (90%) of countries have produced national level threat forecast information, while 70% of countries have produced local level information. Six (6) countries (30%) have produced ocean-wide information. 80% of countries have produced multiple levels of tsunami threat forecast information.

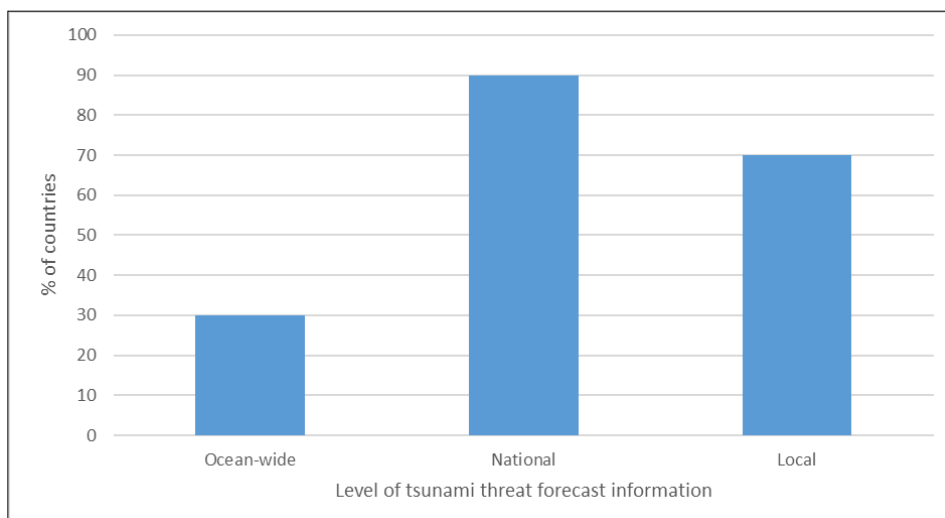


Figure 30: Level of tsunami threat forecast information is produced by the responsible organisation

**Countries were also asked about their access to national or international seismic networks, and access to national or international sea-level networks.** Ninety percent (90%) of respondent countries reported that the responsible organisation has access to national or international seismic networks. These ranged from a national seismic network to the California Integrated Seismic Network (CISN), the United States Geological Survey (USGS) Network, Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES), TSPs, Real-time seismic data from the International Monitoring System (IMS) of the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), and Incorporated Research Institutions for Seismology (IRIS).

Sixty-five percent (65%) of respondent countries reported that the list of broadband seismometers operated by their country is listed accurately in the **IOTWMS seismic network database**. Two countries reported that stations had been added to their network when compared to the database listing.

Eighty-five percent (85%) of respondent countries reported that they have access to national or international sea level networks.

Eighty-five percent (85%) of respondent countries reported that the list of sea level stations operated by their country is listed accurately in the **IOTWMS sea level network database**.

**Countries were also asked about other national observing networks used for tsunami early warning** (Figure 31). Fifty-five percent (55%) of countries (11) reported that they have no other observing networks in operation, and one country did not provide a response (5%). Fifteen percent (15%) of respondent countries have deployed Global Navigation Satellite System (GNSS) / Global Positioning System (GPS) stations, and a further 15% have deployed coastal radars. Fifteen percent (15%) of respondents identified other national observing networks, including Deep-ocean Assessment and Reporting of Tsunami (DART) buoys and high frequency (HF) radars.

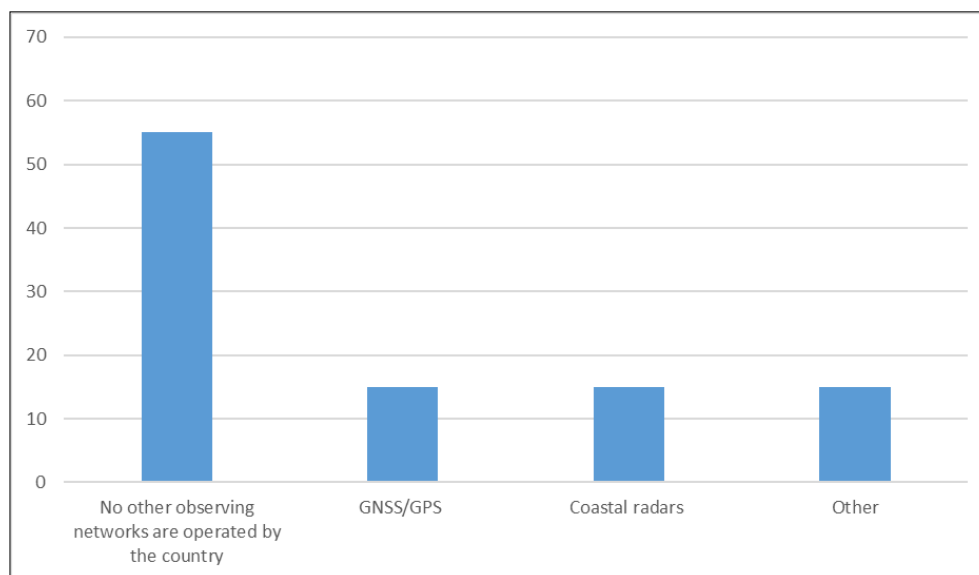


Figure 31. Other observing networks operated and used for tsunami early warning

**Countries were asked to report on their capacity to analyse real-time seismic and sea level data for tsunami threat, their capacity for tsunami modelling to support generation of threat forecasts, as well as the software tools they use to support these initiatives.** Sixty-five percent (65%) of respondent countries (13) have the capability of analysing real-time seismic and sea-level data for potential tsunami threat. The associated software used varies across the countries. Examples include: SeisComp3, JISView, Linuh,

OTPAS (Operational Tsunami Prediction and Assessment System), Tsunami Observation and Simulation Terminal (TOAST), Antelope, SeisAn, CSDP-IAS (Seismic data Analysis), Tide tool, Bulletin Hydra, and in-house developed applications for analysis of sea-level data.

Sixty percent (60%) of respondent countries also have the capability for tsunami modelling to support generation of threat forecasts, although two of these countries identified that their current tools are not adequate for accurate threat forecasts. Utilised software included ComMIT, WINITDB, TSUNAMI, TSUCAT, OTPAS, TOAST, easywave, Mhras, TUNAMI, COMCOT, MOST Model, Geoware proprietary software, In-house developed application which uses TUNAMI-N2 and ADCIRC models.

Eighty percent (80%) of the respondent countries reported that the organisation responsible for identifying a potential tsunami threat also issues national tsunami watches, advisories, alerts and/or warnings.

Countries were also asked to report on their participation in communication tests and drills. Ninety-five percent (95%) of respondent countries reported that their country's NTWC and/or TWFP participated in the 6-monthly communications tests conducted by the IOTWMS TSPs. Timor-Leste reported that it did not participate.

Twenty (20) of the respondent countries (100%) reported that their country's NTWC and/or Tsunami Warning Focal Point (TWFP) participated in the ocean-wide Tsunami Drill (e.g. IOWave exercise) conducted in the ICG/IOTWMS inter-sessional period.

**Countries were also asked to report on any recent experiences of tsunami, specifically those that occurred after 2004.** Twenty percent (20%) of respondent countries reported that they were impacted by a tsunami after the Indian Ocean tsunami on 26 December 2004. However, Indonesia was the only country to report damage/losses from events including Mentawai (2010), Aceh (2012), and Palu (2018).

Australia reported that although there was no major damaging tsunami affecting it, there were two noteworthy ones. The 17 July 2006 Java event generated a very localised impact to Steep Point of Western Australia where a camp site was destroyed and inundation reached 200 m inland. No tsunami warning was issued. A field impact assessment survey was subsequently conducted. Tide gauge observations along the Western coasts provided little clue to this very localised impact. For the 11 March 2011 Japan event, the Joint Australian Tsunami Warning Centre (JATWC) issued a National No Threat Bulletin to Australia for this event. A few tide gauges in Australia recorded tsunami waves up to 55 cm. Unusual currents and waves were noted at Port Kembla and Sydney Harbour. Several swimmers were washed into a lagoon at Merimbula NSW although it was inconclusive whether this was due to the tsunami. Overall, the impact to Australia is minor.

India reported that there was no event, which generated a major tsunami. However, on 11 April 2012 'twin' events (M 8.5 and M 8.2) generated a minor tsunami, and NTWC-India issued appropriate bulletins for those events.

### 3.3.2 Dissemination

**Countries were asked to report on how their tsunami information (warning, public safety action, etc.) is disseminated (Figure 32).** Email is used in all countries and Short Message Service (SMS) and television were used by 95% of the respondent countries (19). Telephone, fax, websites and radio were also widely used to disseminate tsunami information (85%). Social media, sirens, police/military and public alert systems were used in 50% or more of respondent countries. Less common methods (40% or less) include



megaphones, very high frequency (VHF) radio, Virtual Private Network (VPN) and door-to-door warnings.

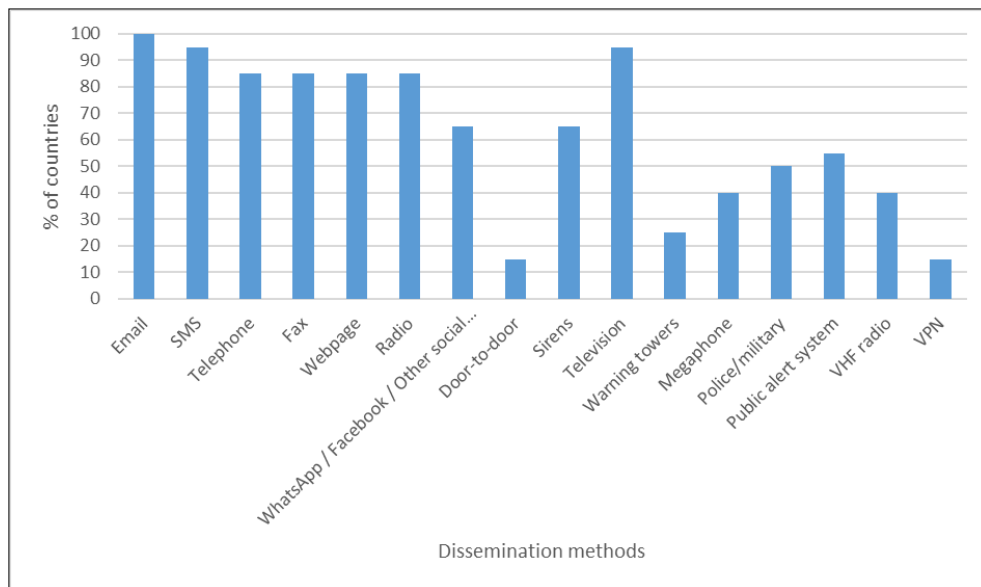


Figure 32. How tsunami information is disseminated

### 3.4 AWARENESS, PREPAREDNESS AND RESPONSE

#### 3.4.1 Standard Operating Procedures

Countries reported on the availability of standard operating procedures (SOPs) for emergency response during the upstream stages of tsunami early warning (Figure 33). The responses indicated that most countries have SOPs that address the operation of a 24/7 emergency operation centre (90%), receiving information from the NTWC (90%) and response criteria and decision-making (85%). However, many countries also require support to develop SOPs in all three aspects (60–70%). Similarly, they also require support to develop human resources in these areas, especially 24/7 emergency operations and response criteria / decision-making (70%). Support to develop infrastructure across all three aspects is also required in many countries (65–75%).

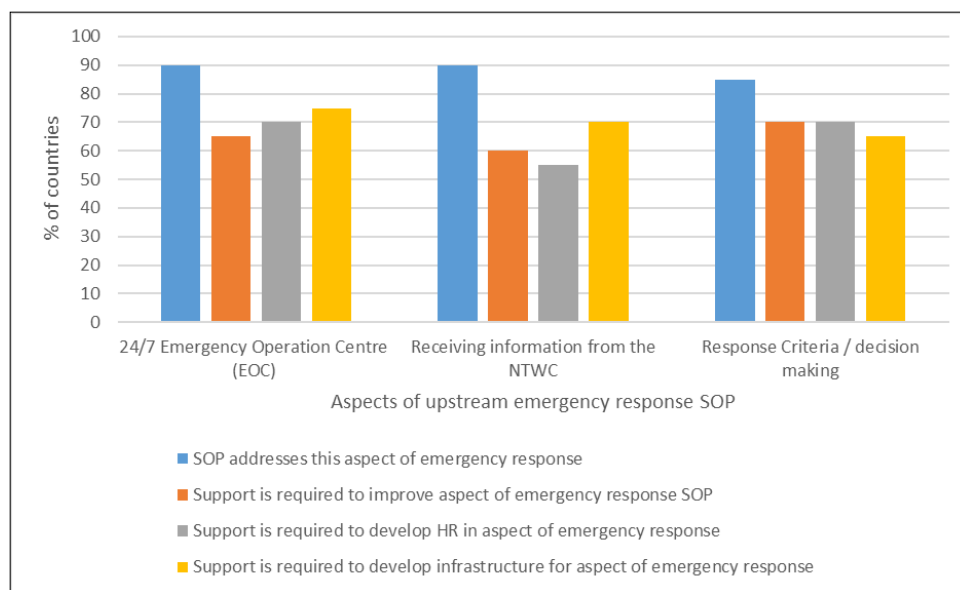


Figure 33. Support required to develop upstream emergency response SOP

Using the same structure, countries reported on the availability of SOPs for emergency response during the downstream stages of tsunami early warning (Figure 34). Most countries have SOPs that address warning dissemination, communication with the NTWC and communication with other stakeholders (90%), evacuation call procedures, communication with local government and media arrangements (85%). Community level evacuation SOPs were only available in 65% of countries.

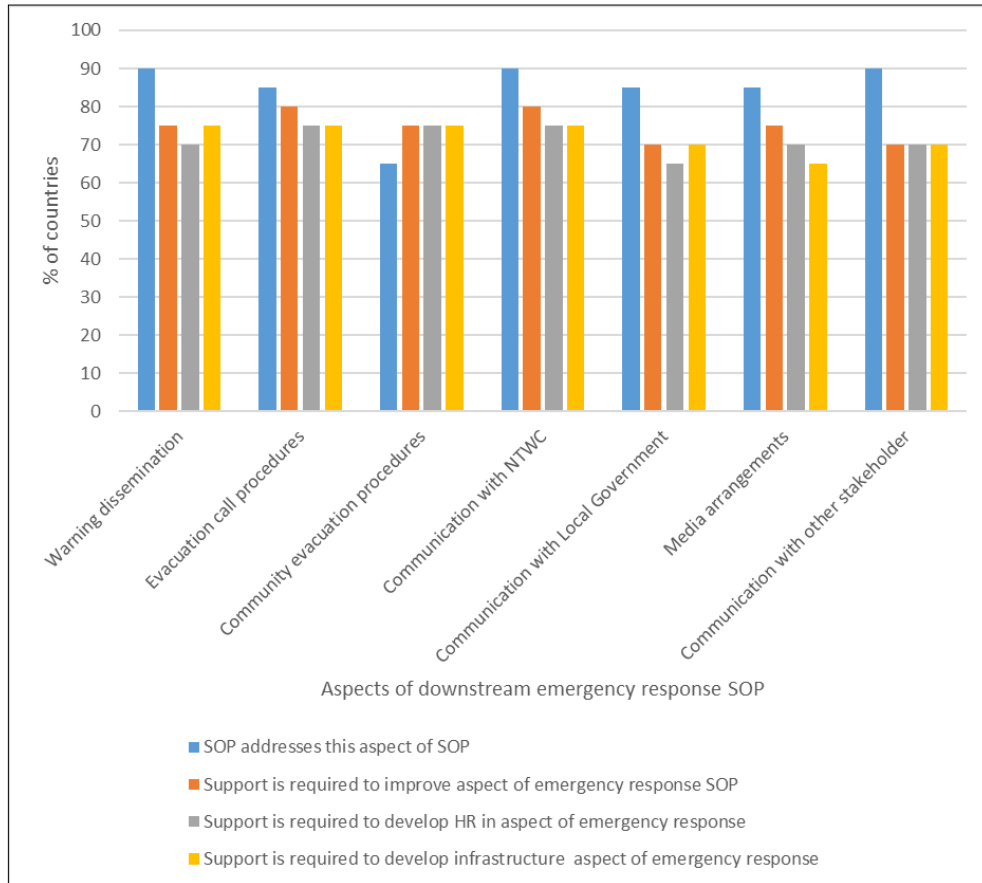


Figure 34. Support required to develop downstream emergency response SOP

However, despite widespread availability, many countries require support to develop SOPs in all seven aspects (70–80%). Many countries also require support to develop human resources and infrastructure across all seven aspects (65–75%).

Ninety-five percent (95%) of the countries surveyed have indicated their willing to share SOPs with IOTIC and other countries.

Countries were asked to confirm the communication methods used for communicating with emergency response organisations (Figure 35). For National Disaster Management Organisations (DMOs), telephones, fax, email and SMS are all widely used in many countries (75% or more). The situation is similar for Local DMOs (65% or more).

For communicating with the media, the telephone, fax and email are the main methods (75% or more).

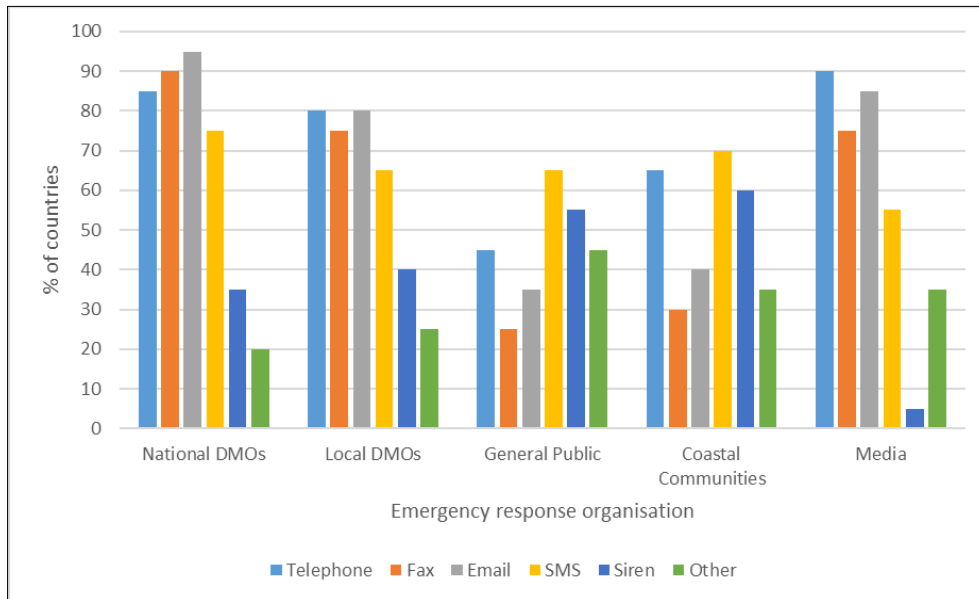


Figure 35. Communication methods for emergency response

Unsurprisingly, the pattern of responses for the general public and coastal communities is similar, with SMS and sirens used widely (55% or more). Telephones are widely used for communicating with coastal communities (65%), but less so for the general public (45%).

Other communication methods mentioned by countries include websites, social media, radio, dedicated applications, broadcast alert systems and television.

### 3.4.2 Evacuation Infrastructure

Countries were asked to indicate the availability of four different types of evacuation infrastructure in their country (Figure 36). Natural or artificial hills for vertical evacuation are the most widely available evacuation infrastructure, identified by 65% of the countries. Evacuation shelters are available in 55% of countries, whereas less common are evacuation signage (45%) and vertical evacuation structures (35%).

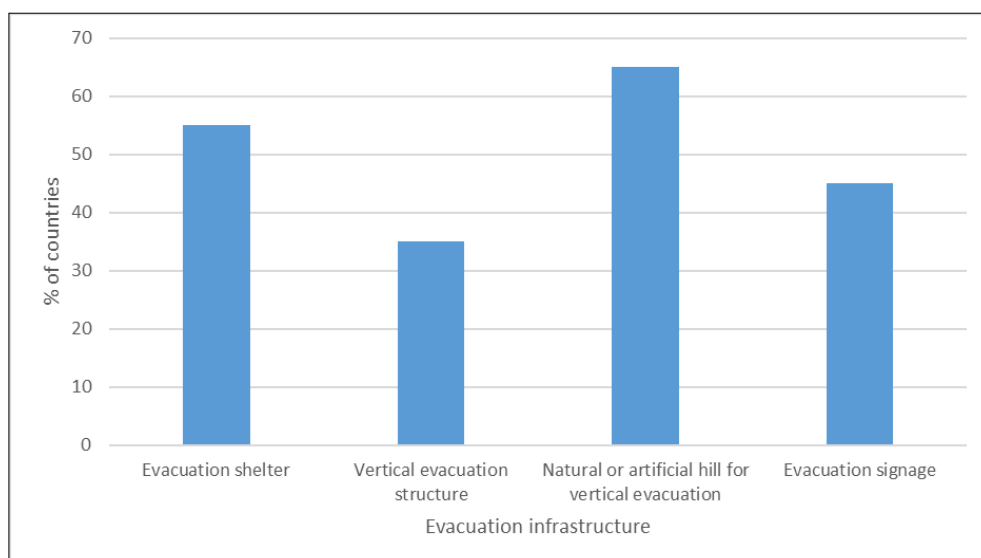


Figure 36. Evacuation infrastructure

Seventy-five percent (75%) of the 20 respondent countries reported that their evacuation infrastructure has been integrated within their evacuation plan (Figure 37).

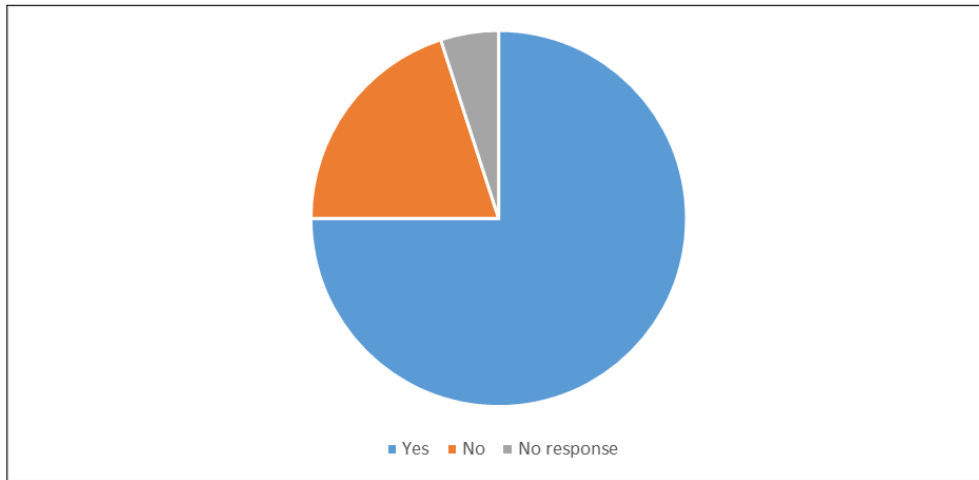


Figure 37. Integration of evacuation infrastructure into evacuation plan

### 3.4.3 Tsunami Exercises

Sixty-five percent (65%) of respondent countries reported that they have tsunami exercises incorporated within their national policies and 80% have tsunami exercises incorporated within national guidelines.

All 20 respondent countries reported conducting tsunami exercises at one or more levels during the inter-session period (Figure 38). Exercises have been conducted at the national level within 70% of countries and at the regional level in 55% of countries. Village and community level exercises have been conducted in 50% of countries. Other levels are less common, including the city (35%) and school (30%).

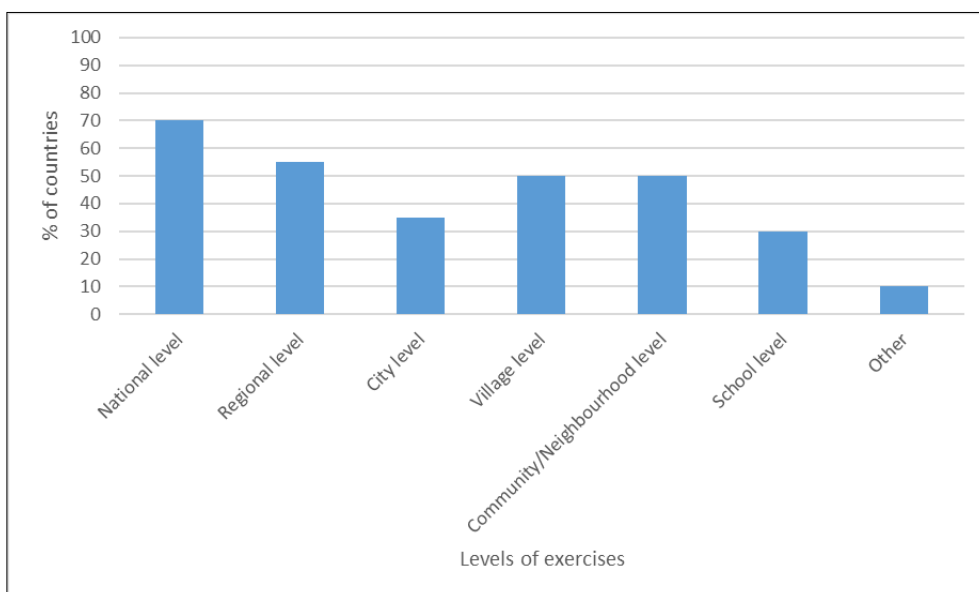


Figure 38. Levels of tsunami exercise conducted

Countries were asked to report on the type of tsunami exercise activities that have been undertaken in their countries during the ICG/IOTWMS inter-sessional period (Figure 39).

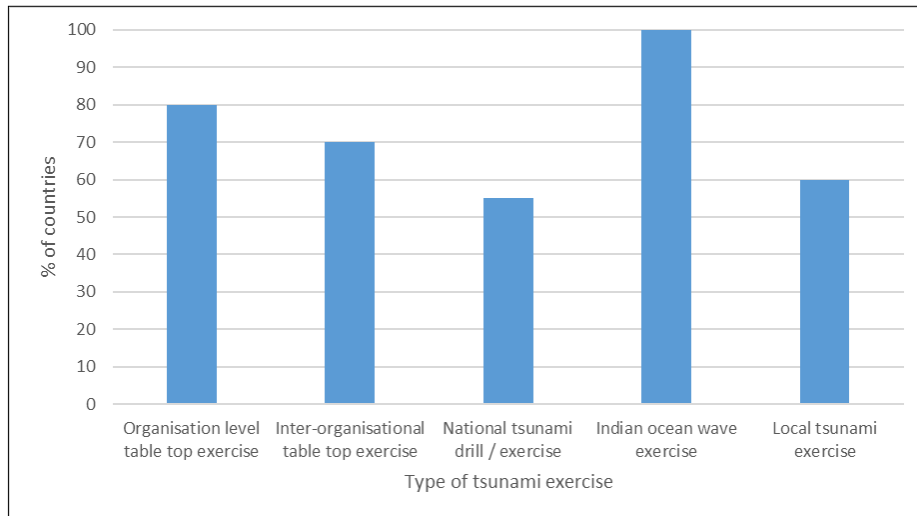


Figure 39. Types of tsunami exercise conducted

All of 20 respondent countries (100%) reported that they took part in the Indian Ocean Wave exercise. Tabletop exercises have also been widely undertaken, both within organisations (80%) and as inter-organisational exercises (70%).

Local tsunami exercises have been undertaken by 60% of respondent countries, marginally more than at the national level (55%).

### 3.4.4 Public Awareness

Countries were asked to identify the organisation responsible for tsunami public awareness programmes in their countries (Figure 40). In the majority of the respondent countries, the National Disaster Management Office takes responsibility (65%), but the National Tsunami Warning Centre (25%) and Local Disaster Management Office (5%) were also identified as the responsible organisation in some countries. One country reported that this is the responsibility of multiple organisations, including the National Disaster Management Organisation (NDMO), Local Disaster Management Organisation (LDMO), NTWC and international organisations.

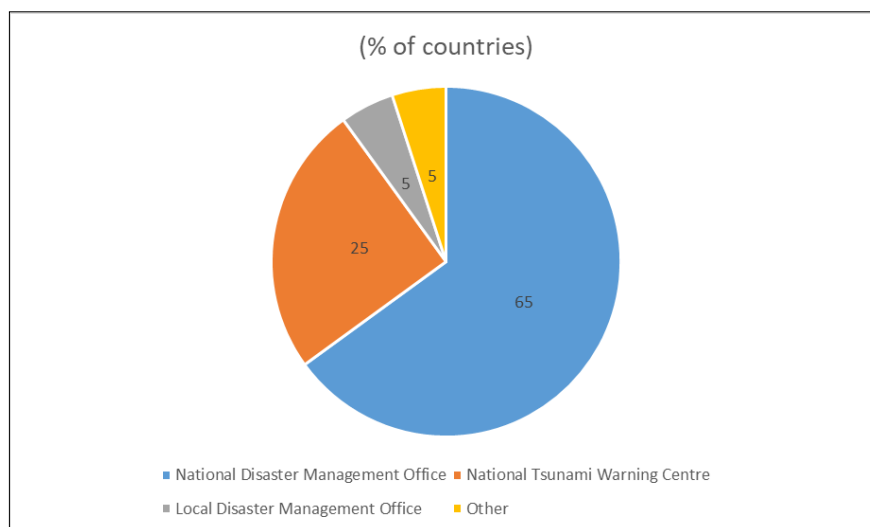


Figure 40. Organisation responsible for tsunami public awareness programmes

**Countries were asked to identify what tsunami-related education and awareness materials they have developed and used (Figure 41).** Posters (75%), leaflets and flyers, booklets and video/oral media (65%) have been identified by the majority of the respondent countries. Education materials such as teaching kits (50%) and school curricular (45%) were also used in many countries. Information boards, indigenous knowledge, signage and public evacuation maps have been less commonly used materials. Australia and Singapore have developed dedicated websites with educational material (as noted in the survey comments).

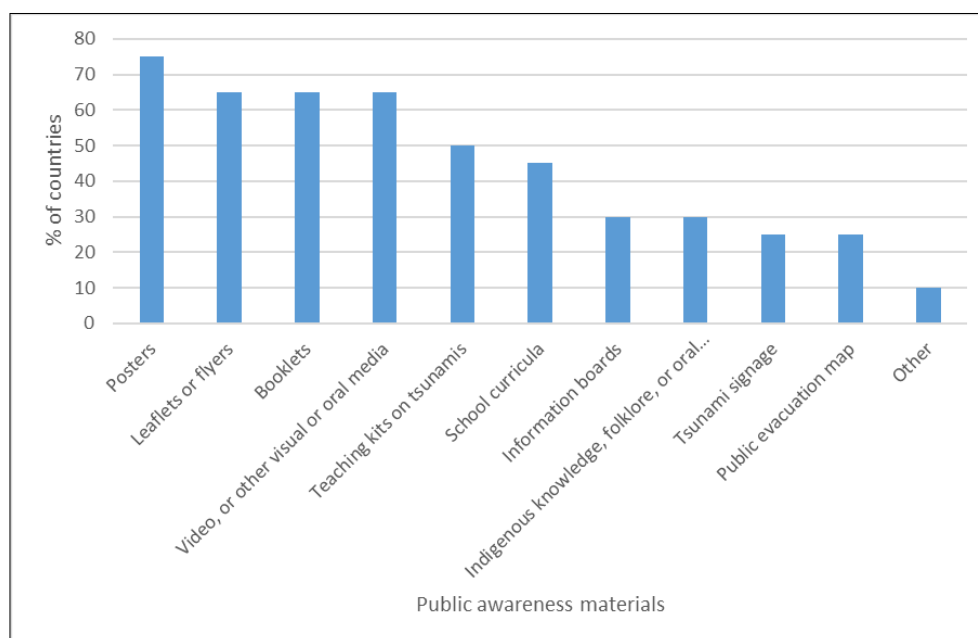


Figure 41. Types of public awareness materials

Ninety-five percent (95%) of the respondent countries confirmed that they are willing to share education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries.

**Countries were asked to confirm whether or not they carry out a range of public awareness activities (Figure 42).** The responses varied greatly across countries. School and child-related awareness activities (80%) and tsunami exercises (75%) have been carried out most widely. A majority of the respondent countries also have carried out preparedness outreach activities and exhibitions (55%), whereas less than half of the countries have participated in Global Disaster Risk Reduction Day (45%) or have carried out competitions or similar to highlight tsunami safety (20%).

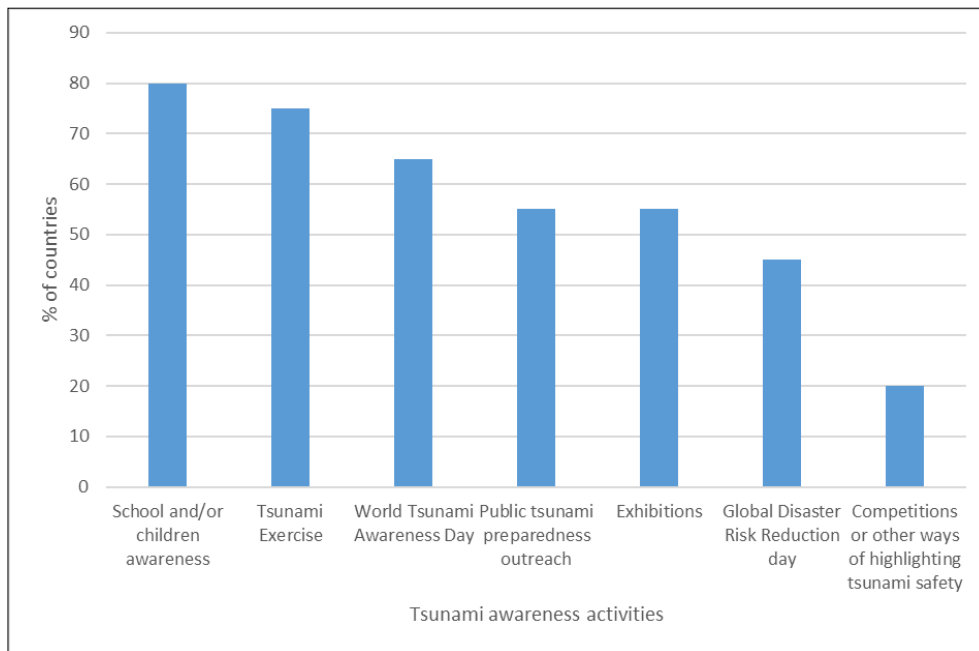


Figure 42. Types of public awareness activity

Countries were asked to indicate any areas in which they required support from the IOTIC to develop or enhance public awareness in their country (Figure 43). Support was requested by the majority of countries for all four areas of public awareness provision. Support in the development of tsunami awareness programmes, activities or campaigns, and participation by international agencies or experts were the most widely requested by 85% of the respondent countries.

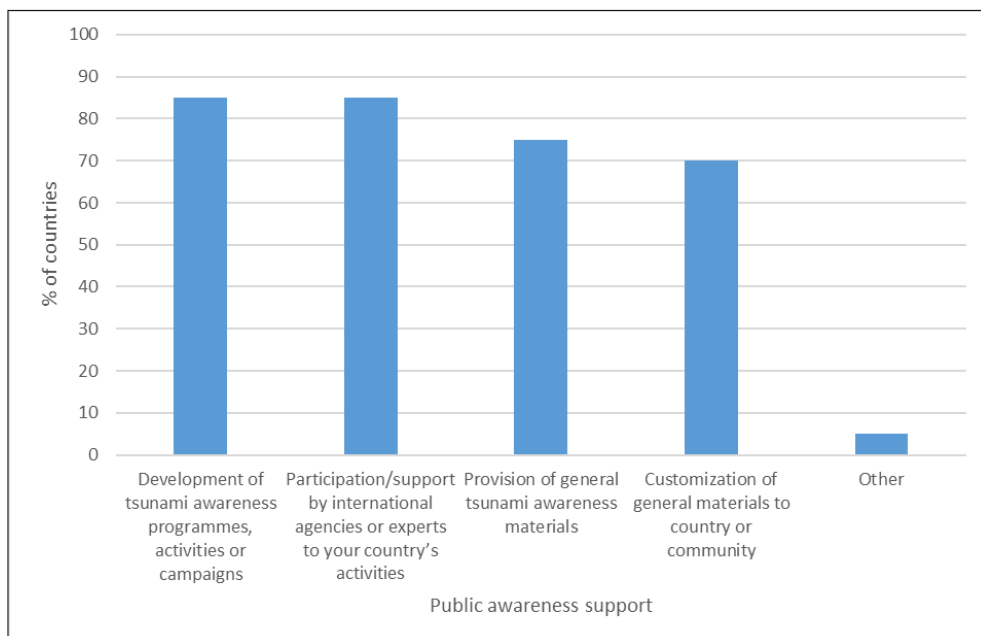


Figure 43. Support required for public awareness activity

Fifty percent (50%) of the respondents have offered to support other Member States to develop or enhance public awareness. The type of support on offer included to provide experts or share their materials and to conduct or support training activities.

Thirty-five percent (35%) of respondents confirmed that their countries are piloting the Indian Ocean Tsunami Ready (IOTR) initiative.

**Countries with communities that participated in the Indian Ocean Tsunami Ready (IOTR) initiative were asked to provide a general ranking of their performance against the IOTR indicators**, using the scale 1 (very poor) to 5 (very good) (Figure 44). It is important to note that some countries who responded that they are not piloting IOTR still chose to rank their performance against the IOTR indicators.

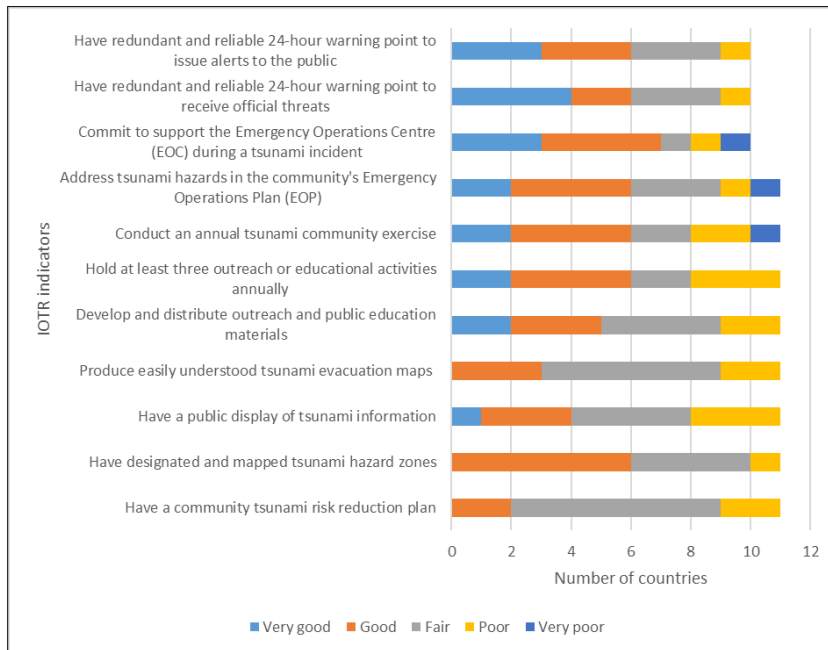


Figure 44. Performance against IOTR indicators

Performance varied greatly among the respondent countries (10), and between the 11 indicators. Performance in having redundant and reliable 24-hour warning points to receive information and alert the public were rated very good or good by 6 of the 10 responding countries, with no country rating as very poor. Commitment to support the Emergency Operation Centre (EOC) during a tsunami, address tsunami in a community's Emergency Operation Plan (EOP) and conduct an annual tsunami exercise were also rated very good or good by 6 or more of the responding countries. However, for each of these aspects one country rated themselves as very poor.

The weakest areas of performance included designated and mapped tsunami hazard zones (no countries were very good, 4 countries rated as fair, 1 as poor), and community risk reduction plans (no countries rated as very good, 7 countries rated as fair, 2 as poor).

#### 4 REGIONAL OVERVIEW OF IOTWMS STATUS AND CAPACITY SUPPORT REQUIREMENTS

This section provides a regional overview of the current status of the IOTWMS and identifies gaps and priorities for further capacity development based on the responses of the 20 countries that completed the online survey. A general comparison to the status of the IOTWMS in 2005 is also provided where relevant. However, the 2005 and 2018 assessments are not directly comparable as the 2005 assessment was a baseline survey that focused mainly on capacity building requirements in the countries affected by the 26 December 2004 whereas the 2018 survey is a wider assessment of the current capacity that has been developed since 2005 in terms of policies, systems, and technological and human



capacity. Furthermore, 16 countries participated in the 2005 assessment compared to 20 countries in the current survey with only 14 countries in common. Although the 2005 survey questions do not map directly on to the 2018 questionnaire, it is possible to group similar questions according to the broad categories of policies, plans and guidelines, and the three pillars: (i) risk assessment and reduction; (ii) detection, warning and dissemination; and (iii) tsunami awareness, preparedness and response. On this basis, [Table 3](#) provides a comparison of the status of the IOTWMS in 2005 and 2018 in which the percentage columns refer to the percentage of countries participating in each survey answering “yes” to the related question, with a “partial yes” in the 2005 assessment counted as a “half yes”. Given the differences between the two assessments, [Table 3](#) is intended to provide a broad comparison only to indicate the scale of capacity improvement in the IOTWMS since 2005.

For each of the following four strategic elements of the end-to-end tsunami warning and mitigation system a set of recommendations (R) is provided under [section 5](#).

#### 4.1 POLICIES, PLANS AND GUIDELINES

In 2005, most countries had national platforms or other mechanisms in place for guiding disaster risk reduction in general and many had national tsunami warning and mitigation coordination committees or similar in place, and 12 of the 16 countries assessed had established disaster coordination mechanisms at community level. However, relatively few countries had tsunami emergency plans, tsunami evacuation plans or tsunami signage in place. In 2018, most countries (19 out of 20) have some form of national tsunami policy, with the majority of countries addressing tsunami as part of a multi-hazard policy. Policies at local level are less prevalent with 15 countries having some form of local tsunami policy. Eighteen (18) countries have some form of tsunami disaster risk reduction plan, again mostly in a multi-hazard framework. Across the four phases of the disaster management cycle, the availability of plans is higher at national level followed by local level with least availability at community level. Notably, all countries reported that their tsunami risk reduction plans are based on hazard and/or risk assessments.

Fewer countries (13 out of 20) have some form of national tsunami guidelines and not all phases of the disaster management cycle are covered by guidelines. However, there is more availability at the local level with 16 countries having some form of local tsunami guidelines, with the majority of these countries addressing tsunami as part of multi-hazard guidelines.

Across policies, plans and guidelines, from national to local level, there is a recurring trend of greater focus on tsunami within the emergency phase of disaster management. While the rehabilitation and reconstruction phase may share many similarities with other hazards, the lack of tsunami specific focus for preparedness and the prevention and mitigation phases is more difficult to explain and further support should be provided to countries requiring assistance to develop policies, plans and guidelines for these phases. Support may also be required to increase the availability of policies, plans and guidelines at the local level for countries that express a need for such assistance. ([Recommendations 1-2](#))

#### 4.2 RISK ASSESSMENT AND REDUCTION

##### 4.2.1 Hazard Assessment

Less than half of the countries assessed in 2005 had conducted tsunami hazard evaluations and numerical modelling of tsunami inundation had been conducted by less than a quarter of countries. All countries participating in the 2018 survey have conducted tsunami hazard assessments and a majority have these as part of multi-hazard assessments. A wide range of organisations have undertaken these assessments including national agencies, national or local universities, national or local consultants, international agencies or a combination of

multiple agencies. In many countries, there is reliance on a sole national agency to carry out hazard assessments. There is therefore an opportunity to increase engagement of other national, regional or international actors, such as research institutes and universities. Their expertise in areas such as hazard assessment would help to address some of the capacity shortcomings revealed at the national level, particularly the areas of hazard, inundation and evacuation mapping.

The level at which these assessments have been carried out also differs among countries, although this may partly be explained by the wide variations in geographic area, population size and hazard threats among them. Thirteen (13) countries have carried out the tsunami hazard assessment at a national level, 8 at the regional level, 9 at the city level and 6 at the village level. Half of the participating countries have carried out hazard assessments at multiple levels.

Countries draw upon a range of data types to support their tsunami hazard assessment, mainly bathymetry, topography and land cover. The availability of this data has considerably improved since 2005 but in many cases, the data is not publicly available. Although the reasons for not making data publicly available were not examined in the survey, it may be due to the cost of making it available, a lack of understanding on how this data could be used for the benefit of others, security, data protection or similar. Whatever the reasons, countries should be encouraged to increase the availability of publicly accessible data for tsunami hazard and risk assessment.

The number and type of tsunami hazard assessment products produced by the participating countries varied greatly but mostly these were inundation and hazard maps. The reason for the difference in the type of products produced is partly explained by the widely varying capacities to undertake the assessments. The survey results also indicate the requirement for capacity improvement tsunami hazard assessment in some countries, with evacuation mapping ranked as the highest priority, followed by hazard mapping and inundation mapping. The survey results show that the capacity to offer training in these areas is already available across the Member States of the IOTWMS and that this could be used to develop those countries with poor capacity. ([Recommendations 3-8](#))

#### **4.2.2 Risk Assessment**

In the 2005 assessment, less than a quarter of the participating countries had conducted tsunami vulnerability assessments, which are components or risk assessments. In the 2018 assessment, 16 out of 20 countries have conducted tsunami risk assessments of which 15 included tsunami as part of a multi-hazard assessment, with flooding, cyclone and earthquake hazards included in addition to tsunamis by 50% or more of countries. Less common hazards included were epidemics and volcanic eruptions.

As with hazard assessments, it would appear that in many countries there is sole reliance on a national agency to carry out risk assessments and there may be opportunity to increase engagement of other national, regional or international actors, such as research institutes and universities. Their expertise in areas such as risk assessment would help to address some of the capacity shortcomings revealed at the national level. It would also help to strengthen the link between science, policy and action.

The survey results indicate that most of the countries that have carried out tsunami risk assessment did so at national level, some did so at regional and city level but only 4 out of 20 countries conducted risk assessments at village and/or community level. These differences may in part be explained by the variations in geographic area, population size and hazard threat, but may also be due to inadequate capacity. The survey indicates wide-ranging capacity to undertake tsunami risk assessment across the 20 participating countries.

Seven (7) countries rate their capacity as very good or good, 5 countries rate themselves as having fair capacity, and 7 countries rate themselves as poor or very poor. There is therefore a need to increase the capacity of these countries to undertake tsunami risk assessments, particularly at city, village and community level.

The wide-ranging capacities among countries may also explain the variations in the number and type of products developed from the tsunami risk assessment. A risk map has been produced by 11 of the 16 countries in order to conduct tsunami risk assessments. Evacuation maps, guidelines and action plans have also been produced, but each of them by less than half of the countries that do tsunami risk assessments. The survey results also indicate that countries have limited capacity to provide training to other countries in tsunami risk assessment. In particular, only 3 countries rated themselves as having the capacity to deliver training at village or community level. ([Recommendations 3-8](#))

#### 4.3 DETECTION, WARNING AND DISSEMINATION

##### 4.3.1 Detection and Warning

In 2005, nearly all of assessed countries (15 out of 16) had an agency for receiving international tsunami warnings from Pacific Tsunami Warning Center (PTWC) and/or Japan Meteorological Agency (JMA) and staffed 24x7, but few (3 countries and 3 partially) had a national agency for monitoring and warning their citizens of regionally or locally generated tsunamis. In the 2018 survey, all countries reported that they have the capability to assess and/or receive potential tsunami threat information and provide advisories or warnings to their coastal communities. Most countries (18 out of 20) reported that the organisation responsible for assessing and/or receiving potential tsunami threat information operated on a 24x7 basis and 16 countries reported that this organisation also has responsibility for issuing national tsunami watches, advisories, alerts and/or warnings.

In 2005, less than half of the countries assessed were receiving real-time seismic and sea-level data. In 2018, 18 out of 20 countries reported that they have access to national or a variety of international seismic networks such as the California Integrated Seismic Network (CISN), Seedlink and IRIS. Seventeen (17) countries are able to access national or international sea level networks via the GTS, [IOC sea level monitoring](#) website or Tide Tool. The 3 countries that do not have access to sea level data (Madagascar, Mozambique and Pakistan) should be encouraged to access the international networks via the readily and freely available monitoring tools. Thirteen (13 out of 20) countries have the capability to analyse real-time seismic and sea-level data using a wide variety of software tools. However, further support is required to improve the capacity of the 7 countries that do not have capability to analyse real-time seismic and sea level data.

Twelve (12 out of 20) countries reported having the capability to use tsunami models to support the generation of threat forecasts using software tools including ComMIT, TUNAMI, TOAST, COMCOT, MOST and other in-house developed applications. The wide variety of tools could hinder the ability of the region to provide training and support for those countries that have inadequate modelling capacity. However, the IOTWMS has focused much effort since 2006 on conducting tsunami modelling training using the ComMIT tool which also forms the basis to the Indian Ocean Tsunami Ready training programme coordinated by IOTIC and the IOTWMS Secretariat. The IOTWMS should also consider providing further support to those countries that wish to build their capacity in tsunami modelling to support the generation of national tsunami threat forecasts.

Four (4 out of 20) countries reported that they had been impacted by a tsunami since 26th December 2004, although only Indonesia had suffered damage/losses from these events. The lack of recent experience of tsunami events in many countries poses a number of

threats to effective early warning, including loss of commitment, a reduction in priority level, difficulty in obtaining resources, lack of practical experience within agencies and their staff, and lack of experience or engagement among the public. Tsunami drills and exercises are therefore important to test communications links, maintain a state of readiness in the warning and response agencies and maintain public awareness. In this context, all countries except Timor-Leste reported that their NTWC and/or TWFP had participated in the 6 monthly IOTWMS communications tests and all countries had participated in the biannual IOWave exercises. The IOTWMS should review and consider increasing the frequency of tabletop or similar tsunami warning exercises to test SOPs and reduce the potential for complacency among countries that have not experienced a recent tsunami event. ([Recommendations 9-12](#))

#### **4.3.2 Dissemination**

Countries use a wide range of media to disseminate tsunami information (warnings, public safety action, etc.) to their citizens. Email messaging is used by all countries and most countries (19 out of 20) also use SMS and television broadcasts. Other media widely used include, telephone, fax, websites and radio. Social media, sirens, and public alert systems are used by about half of the countries.

### **4.4 AWARENESS, PREPAREDNESS AND RESPONSE**

#### **4.4.1 Standard Operating Procedures**

In the 2005 capacity assessment, the existence of Standard Operating Procedures was not explicitly addressed. However, closely related awareness and response procedures were assessed. For example, local government disaster preparedness and emergency response had been assessed or partially assessed by 10 of 16 countries. On the other hand, response procedures for regionally or locally generated tsunamis were in place in only 3 countries. The 2018 survey results indicate that 18 out of 20 countries have developed SOPs for their upstream operations. For downstream operations, most countries have developed SOPs for warning dissemination, communications with the NTWC and other stakeholders, evacuation call procedures and media arrangements. However, fewer countries (13) have developed SOPs for community level evacuation.

Overall, despite SOPs being widely available for most aspects of upstream and downstream early warning operation, many countries have requested further support to develop them, along with the associated human resources and infrastructure. The lack of community level evacuation SOPs in 35% of countries (7) is also notable and significantly worse than other aspects that were examined in this survey and it is apparent that many countries will require further support to develop these. Encouragingly, 19 of the 20 countries surveyed indicated their willingness to share SOPs with IOTIC and other countries, which would provide a good basis for capacity building across the Member States. The IOTIC should capitalise on this willingness by coordinating the sharing of SOPs among the Member States. ([Recommendations 13-21](#))

#### **4.4.2 Evacuation Infrastructure**

Evacuation infrastructure is in place in at least 17 (out of 20) countries of which 13 countries rely on natural or artificial hills for vertical evacuation. Evacuation shelters are available in 11 countries and vertical evacuation structures are available in 7 countries. These countries either suffered high fatalities during the Indian Ocean Tsunami of 26 December 2004 (India, Indonesia, Sri Lanka and Thailand) or have multi-hazard vertical evacuation structures in place for other hazards such as cyclones (Bangladesh and Mozambique). A majority of countries (15 (out of 20) reported that their evacuation infrastructure is integrated within their

evacuation plan. The IOTWMS and IOTIC should consider organizing a training workshop to share Member States' experience of different types of evacuation structure to assist countries to develop infrastructure that is appropriate for their needs and circumstances. ([Recommendations 13-21](#))

#### 4.4.3 Tsunami Exercises

In the 2005 assessment, only 1 country (Thailand) had tested or exercised its response procedures and another 4 countries reported partial testing. Six (6 out of 16) countries reported that their publics were aware or partially aware of what a tsunami is and knew of how to respond to one. In the 2018 assessment, all 20 countries reported that they had conducted tsunami exercises at one or more levels (national, regional, city, village, community, and school) during the period between ICG/IOTWMS sessions and all countries participated in at least one Indian Ocean Wave (IOWave) exercise. National level exercises included organisational and inter-organisational tabletop exercises. Local (village to school level) tsunami exercises were undertaken in 12 countries and further support may be required to incorporate tsunami exercises at these levels. Thirteen (13) countries have incorporated tsunami exercises into their national policies and 16 countries into their national guidelines. ([Recommendations 13-21](#))

#### 4.4.4 Public Awareness

In 2005, community level education and preparedness programmes for national hazards or tsunami existed in nearly half of the countries assessed. However, tsunami education and public outreach programmes were partially in place in only 2 out of 16 countries affected by the 2004 tsunami. Earthquake and tsunami hazards and preparedness were incorporated or partially incorporated into educational curricula for school children in 5 out of 16 countries. In 2018, public awareness programmes were the responsibility of the NDMOs in 13 countries, the NTWC in 5 countries and the LDMO in 5 countries. In one country (Thailand), many organisations at national and local level have responsibility for promoting public awareness programmes, which perhaps is also the reality in many other countries. The survey asked the countries to indicate the tsunami-related education and awareness material that they have developed from a broad list of 10 categories as listed in [Table 3](#). Posters, leaflets and flyers, video or other visual/oral media and booklets are the most commonly used and tsunami signage and public evacuation maps were the least commonly used. This implies that relatively few countries have developed evacuation maps and consequently have not introduced evacuation signage. Nearly all countries indicated their willingness to share their educational and awareness material with IOTIC and other countries. IOTIC should consider assisting countries to develop educational material to encourage the incorporation of tsunami awareness into school curricula. All countries except Singapore also requested assistance from IOTIC to develop or enhance public awareness with support in the development of tsunami awareness programmes, activities or campaigns the most widely requested.

Each country will develop educational and awareness material that is appropriate to its own risk profile, including its exposure to hazard, demography and vulnerability of its population, and it is natural that there will be a variety of different material developed across the Indian Ocean region. It is notable that Sri Lanka has developed material across all 10 categories and 5 other countries have material in 8–9 of the categories. On the other hand, Singapore has not developed any educational and awareness material which reflects its low tsunami risk.

The range of tsunami awareness activities undertaken varies greatly across the countries (see [Table 3](#)). Sixteen (16 out of 20) countries have undertaken school and child-related awareness activities and 15 countries have conducted tsunami exercises. However, only 9 countries have participated in International Disaster Risk Reduction Day (held annually on 13

October) or have conducted competitions or similar activities to highlight tsunami safety (4 countries). The IOTWMS should raise awareness of global events such as World Tsunami Awareness Day (held annually on 5 November since 2016) and International Disaster Risk Reduction Day as a means of maintaining tsunami awareness in the Member States.

The Indian Ocean Tsunami Ready (IOTR) initiative is being piloted in 7 of the 20 respondent countries although an additional 4 countries chose to rank their performance against the IOTR indicators listed in the survey. Of the 7 countries that are piloting IOTR, self-assessed performance varies greatly across the indicators, with upstream indicators being generally rated higher than downstream indicators. This suggests that further attention needs to be paid to areas such as outreach and public education and community tsunami risk reduction plans. For the additional 4 countries that ranked their IOTR performance, their self-assessed performance is generally lower across all indicators and these countries may therefore be candidates for future IOTR interventions. ([Recommendations 13-21](#))

	IOTWMS Status 2005		IOTWMS Status 2018	
Policies, Plans and Guidelines	<ul style="list-style-type: none"> <li>• Legal framework in place for disaster warning formulation, dissemination and response</li> <li>• National platform or other mechanism in place for guiding disaster risk reduction in general</li> <li>• National Tsunami Warning and Mitigation and Coordination Committee or some other coordination mechanism in place</li> <li>• Disaster coordination mechanisms at community level established</li> <li>• Tsunami emergency plans, tsunami evacuation plans and/or signage exist indicating routes to safety or higher ground</li> </ul>	59% 94% 59% 75% 19%	<ul style="list-style-type: none"> <li>• National tsunami policy in place</li> <li>• Local tsunami policy in place</li> <li>• National tsunami disaster risk reduction plan in place</li> <li>• Local tsunami disaster risk reduction plan in place</li> <li>• Community tsunami disaster risk reduction in place</li> <li>• National tsunami guidelines established</li> <li>• Local tsunami guidelines established</li> </ul>	90% 60% 75% 55% 40% 70% 60%
Risk Assessment and Reduction	<ul style="list-style-type: none"> <li>• Tsunami hazard evaluation conducted prior to 26 December 2004</li> <li>• Historical record of past earthquakes and tsunamis documented</li> <li>• Tsunami vulnerability assessment conducted</li> <li>• Numerical modelling studies conducted to calculate inundation from tsunamis</li> <li>• Accurate bathymetry and topography data exist for the coastlines</li> </ul>	44% 37% 22% 22% 25%	<ul style="list-style-type: none"> <li>• Tsunami hazard assessment conducted</li> <li>• Tsunami risk assessment conducted</li> <li>• Numerical modelling conducted for hazard assessment (PTHA and/or DTHA)</li> <li>• Bathymetry used for tsunami hazard assessment</li> <li>• Topography used for hazard assessment</li> </ul>	100% 75% 35% 85% 80%
Detection, Warning and Dissemination	<ul style="list-style-type: none"> <li>• International tsunami warnings received for teletsunamis from PTWC and/or JMA</li> <li>• Agency receiving warnings staffed 24x7</li> <li>• National or regional tsunami warning centre to monitor and warn of regionally or locally generated tsunami in operation</li> <li>• Warning centre staffed 24x7</li> <li>• Real-time seismic data received</li> </ul>	94% 94% 28% 31% 41%	<ul style="list-style-type: none"> <li>• National capability to assess and/or receive potential tsunami threat information and advise and/or warn coastal communities</li> <li>• Warning centre staffed 24x7</li> <li>• Access to national or international seismic networks</li> </ul>	100% 90% 90%

	<ul style="list-style-type: none"> <li>Sea level data available real-time to the central monitoring site, or available in near real-time</li> </ul>	41%	<ul style="list-style-type: none"> <li>Access to national or international sea level networks</li> </ul>	85%
Standard Operating Procedures	<ul style="list-style-type: none"> <li>Local government disaster preparedness and emergency response assessed</li> <li>Community and ordinary citizen disaster preparedness and emergency response assessed</li> <li>Response procedures for regional or locally generated tsunami in place</li> </ul>	59% 25% 19%	<ul style="list-style-type: none"> <li>Warning dissemination SOPs in place</li> <li>Evacuation call SOPs in place</li> <li>Community evacuation SOPs in place</li> </ul>	90% 80% 60%
Tsunami Exercises	<ul style="list-style-type: none"> <li>Response procedures have been tested or exercised</li> <li>Public is aware of what a tsunami is and how to respond to both locally generated and distant tsunamis</li> </ul>	19% 37%	<ul style="list-style-type: none"> <li>Tsunami exercises conducted at national level</li> <li>Tsunami exercises conducted at regional level</li> <li>Tsunami exercises conducted at city level</li> <li>Tsunami exercises conducted at village level</li> <li>Tsunami exercises conducted at community level</li> <li>Tsunami exercises conducted at school level</li> </ul>	70% 55% 35% 50% 50% 30%
Awareness, Preparedness and Response	<ul style="list-style-type: none"> <li>Community level education and preparedness programmes for national hazards or tsunami exist</li> <li>Tsunami education and public outreach programme in place</li> <li>Earthquake and tsunami hazards and preparedness is incorporated into educational curricula for school children</li> </ul>	47% 6% 12%	<ul style="list-style-type: none"> <li>Tsunami related education and awareness material                             <ul style="list-style-type: none"> <li>Leaflets or flyers</li> <li>Posters</li> <li>Booklets</li> <li>Information Boards</li> <li>Tsunami signage</li> <li>Video or other visual/oral media</li> <li>Indigenous knowledge</li> <li>Teaching kits</li> <li>School curricula</li> <li>Public evacuation maps</li> </ul> </li> </ul>	65% 70% 60% 30% 25% 65% 35% 50% 45% 25%
	<ul style="list-style-type: none"> <li>Training programmes for the media on tsunami hazards, mitigation, warning and preparedness exist</li> </ul>	22%	<ul style="list-style-type: none"> <li>Media arrangement SOPs in place</li> </ul>	80%

**Table 3.** Comparison of status of IOTWMS in 2005 and 2018. The percentage columns refer to the percentage of countries participating in each survey answering “yes” to the related question, with a “partial yes” in the 2005 assessment counted as a “half yes”. The 2005 percentages are based on responses from 16 countries and the 2018 percentages are based on responses from 20 countries, with 14 countries in common. Given the differences between the two assessments, the table is intended to provide a broad comparison only to indicate the scale of capacity improvement in the IOTWMS since 2005.



## **5 RECOMMENDATIONS TO ADDRESS CAPACITY GAPS AND SUPPORT REQUIREMENTS**

The following is a summary of the capacity gaps and support requirements that have emerged from the 2018 Indian Ocean capacity assessment of tsunami preparedness. They are intended to provide recommendations for future capacity development activities in the Indian Ocean region.

### Policies, Plans and Guidelines

- R1. Provide support to increase availability of tsunami policies, plans and guidelines at the prevention and mitigation, preparedness, and recovery and reconstruction phases of disaster management; and
- R2. Provide support to increase availability of tsunami policies, plans and guidelines at the local level, either as standalone or as part of a multi-hazard approach.

### Risk Assessment and Reduction

- R3. Increase engagement of other national, regional or international actors in the carrying out of tsunami hazard and risk assessments;
- R4. Increase the availability of publicly accessible data for tsunami hazard and risk assessments;
- R5. Increase the capacity for tsunami hazard assessment, especially in the areas of evacuation mapping, hazard mapping and inundation mapping;
- R6. Capitalise on the existing capacity in Member States for delivering training on hazard mapping and inundation mapping;
- R7. Increase the capacity for city, village and community level tsunami risk assessments; and
- R8. Increase the capacity for developing products from tsunami risk assessments, such as risk maps, evacuation maps, guidelines and action plans.

### Detection, Warning and Dissemination

- R9. Provide support to increase the capacity for analysing real-time seismic and sea-level data for tsunami threat;
- R10. Provide support to increase the capacity for tsunami modelling to support generation of threat forecasts;
- R11. Undertake a further study to examine whether there is a need for so many different software tools to be used to analyse data for tsunami threat or tsunami modelling; and
- R12. Increase the frequency of tabletop or similar tsunami warning exercises to review and test SOPs, and reduce the potential for complacency among countries that have not experienced a recent tsunami event.

### Awareness, Preparedness and Response

- R13. Provide support for countries to improve their SOPs at the interface between upstream and downstream, including the operation of a 24/7 emergency operation centre, receiving information from the NTWC, and response criteria and decision-making, as well as the associated human resources and infrastructure;
- R14. Provide support for countries to improve their SOPs to address warning dissemination, communication with the NTWC, communication with other

- stakeholders, evacuation call procedures, communication with local government and media arrangements, as well as the associated human resources and infrastructure;
- R15. Provide support for the development of community level evacuation SOPs;
- R16. Capitalise on the willingness of countries to share their SOPs to share good practices across Member States;
- R17. Provide training and share Member States' experience of different types of evacuation infrastructure;
- R18. Provide support to incorporate tsunami exercises into cities, villages, communities and schools;
- R19. Provide training and share Member States' experience of different public engagement materials;
- R20. Develop educational materials such as teaching kits, and encourage the incorporation of tsunami awareness into the school curricula; and
- R21. Raise awareness of the Global Disaster Risk Reduction Day (13 October) and World Tsunami Awareness Day (5 November).

## 6 CONCLUSIONS

The overarching vision of the IOTWMS is to save lives and protect property and infrastructure. To achieve this the IOTWMS has been designed and developed as an interoperable system based on best practices and operational technology providing timely and effective advice to the NTCs. The *IOTWMS Medium Term Strategy 2019–2024* (IOC/2019/TS/144) provides a framework and forward direction in which the IOTWMS will develop in the five-year period 2019–2024. The 2018 capacity assessment of tsunami preparedness in the Indian Ocean complements the Medium Term Strategy by providing a baseline of the status of the IOTWMS at the beginning of the five-year cycle. These two documents combined with the *IOTWMS 2019 Factsheet* (IOC/BRO/2019/7) provide an overview of the current status of the IOTWMS, and an outline of its strategic objectives, plans and activities in the medium term.

The 2018 capacity assessment has shown that there has been considerable improvement across all components of the IOTWMS since the baseline assessment conducted in 2005 in the immediate aftermath of the December 2004 Indian Ocean tsunami. Nevertheless, the IOTWMS is not a static system and must improve, evolve and adapt to serve the needs of its Member States. In particular, the 2018 Palu and Sunda Strait tsunami events have highlighted the need to strengthen warning capabilities and enhance community preparedness to deal with events generated by near-field, atypical sources such as coastal landslides and volcanic flank collapse.

In terms of policies, plans and guidelines, the survey reveals that there is greater focus on tsunami within the emergency phase of disaster management. Although the rehabilitation and reconstruction phase shares similarities with other hazards, the lack of tsunami specific focus for the preparedness, prevention and mitigation phases is difficult to explain and further support should be provided to countries requiring assistance to develop policies, plans and guidelines for these phases. The need for support to increase availability of policies, plans and guidelines has previously been identified at the conference to commemorate the 10th anniversary of the Indian Ocean Tsunami in November 2014 (IOC/BRO/2015/2), which recommended that national tsunami programmes should be codified in law and that key functions should be institutionalised. The 2018 capacity assessment survey shows that most countries are working towards including tsunami risk management in multi-hazard legislative and policy frameworks.

The need to improve capacity in tsunami hazard and risk assessment has been identified in several fora since 2014 and is a key activity of IOTWMS Working Group 1 on Tsunami Risk, Community Awareness and Preparedness. Inundation modelling has been identified as a priority to better inform evacuation planning and community responses and Probabilistic Tsunami Hazard Assessment will help provide estimates of uncertainties to assist decision makers. The 2018 tsunamis in Palu and Sunda Strait demonstrated that tsunami hazard assessments are generally too broad to facilitate detailed local planning or to address all potential sources and the hazard assessments will need to be revised for at-risk countries based on more recent data and scientific understanding.

Although capacity for analysing real-time seismic and sea-level data and tsunami modelling has improved considerably in many countries of the Indian Ocean region, there are still some countries that require support to develop this capacity and develop their self-sufficiency to generate threat forecasts. To some extent, this is being achieved through regional cooperation, for example in the North West Indian Ocean. However, more rapid and accurate assessments of earthquake source characteristics for near-field events are required to enable timely community responses, and real-time modelling incorporating earthquake focal mechanism and sea level observations should be explored to provide more accurate tsunami forecasts.

The IOTWMS Secretariat and IOTIC have worked with the IOTWMS Member States since 2008 to assist them to develop their tsunami warning and emergency response SOPs. However, the 2018 survey responses clearly indicate that further support is required, particularly for downstream activities such as community evacuation and at the interface between the upstream tsunami warning and downstream emergency management operations. Furthermore, the Palu and Sunda Strait tsunamis have highlighted the need to develop SOPs that are appropriate for such near-field, rapid onset events. This will be a challenge for the IOTWMS and specific SOP training will need to be developed for countries that are vulnerable to such hazards.

The issue of complacency among countries that have not experienced a tsunami event since 2004 is a potential risk to the long-term sustainability of the IOTWMS and is difficult to manage when many countries experience other more frequently occurring hazards such as cyclones and flooding. It is important to conduct tsunami exercises and drills to test SOPs and maintain public awareness. However, a balance needs to be struck between maintaining awareness and preparedness, and over-sensitising communities to infrequent events, which could in itself lead to loss of interest and/or an increase in complacency. The incorporation of tsunami exercises at city, village, community and school levels will require countries to develop capacity in accordance with the Tsunami Ready indicators, which will require strong commitment at national government level. IOTIC can provide support through the Indian Ocean Tsunami Ready initiative but the countries themselves will need to provide the resources and have the commitment to achieve Tsunami Ready recognition.

Due to the infrequency of tsunami events, it is important that efforts are focused on enhancing the inter-generational awareness of communities to strengthen their long-term resilience. In this regard, tsunami awareness, education and preparedness should be embedded in school curricula from an early age. IOTIC has a vital role to play in the development and sharing of tsunami related knowledge and the development and implementation of educational programmes, as well as organizing workshops and training programmes together with the IOTWMS Secretariat to develop the capacity of IOTWMS Member States.

It is important to sustain operations of the IOTWMS Secretariat and the IOTIC over the long term to ensure efficient functioning of the end-to-end Indian Ocean Tsunami Warning and Mitigation System.

ANNEX I

**CONTRIBUTORS TO THE 2018 STATUS REPORT**

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(2017–2019)**

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ANNEX III

**COMPARATIVE LISTS OF COUNTRIES SURVEYED  
IN THE 2005 AND 2018 ASSESSMENTS**  
(by alphabetical order)

<b>2005</b> Assessment of Capacity Building Requirements for an Effective and Durable Tsunami Warning and Mitigation System in the Indian Ocean (IOC/INF-1219) – Consolidated Report for Countries Affected by the 26 December 2004 Tsunami	<b>2018</b> Capacity Assessment of Tsunami Preparedness in the Indian Ocean –Status Report (IOC Technical Series, 143)
	Australia
Bangladesh	Bangladesh
Comoros	Comoros
	Overseas France (Indian Ocean)
	India
Indonesia	Indonesia
	Iran (Islamic Republic of)
Kenya	Kenya
Madagascar	Madagascar
Malaysia	Malaysia
Mauritius	Mauritius
Mozambique	Mozambique
Myanmar	Myanmar
Oman	Oman
Pakistan	Pakistan
Seychelles	
	Singapore
Somalia	
	<i>South Africa</i> <sup>16</sup>
Sri Lanka	Sri Lanka
Tanzania	Tanzania
Thailand	Thailand
	Timor-Leste

<sup>16</sup> The report from South Africa was submitted after the regional analysis had already been completed and therefore it was not possible to include their responses in the analysis. However, their national report is included in the supplement to this report.

ANNEX III

SUMMARY TABLES OF SURVEY RESPONSES

		AUS	BAN	COM	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	MM	OM	PK	SIN	SA	SLK	TAN	THA	TL	
HAZARD ASSESSMENT	4a) Has your country undertaken a hazard assessment?	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	4b) What type of hazard assessment has been carried out?	MH+T	MH+T	T; MH+T	MH+T	MH+T	MH+T	MH+T	MH+T	MH+T	MH+T	MH+T	MH+T	T	MH+T	T	T, MH+T	MH+T	MH+T	MH+T	MH+T	MH+T	MH+T
	4c) What type of multi-hazard assessment has been carried out? (select all that apply)																						
	Tsunami	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Cyclone	•	•	•	•	•	○	•	•	•	•	○	•	•	○	•	○	○	○	•	•	•	•
	Drought	○	•	○	○	○	○	•	•	•	•	•	•	○	○	○	○	○	•	•	•	•	•
	Earthquakes	•	•	○	•	○	•	•	•	•	•	○	•	○	•	○	•	○	•	○	•	•	•
	Epidemics	○	○	○	○	○	•	•	•	•	•	○	•	○	○	○	○	○	○	•	○	○	○
	Flooding	•	•	•	•	•	•	•	•	•	•	•	•	○	○	○	○	•	•	•	•	•	•
	Landslide	○	•	○	•	○	•	•	•	•	•	•	○	○	○	○	○	○	○	•	○	•	•
	Volcanic eruptions	○	○	•	•	○	•	○	•	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Other	○	○	○	○	○	•	○	•	○	○	○	○	•	○	•	○	○	○	•	○	○	•
	4d) Who did the tsunami hazard assessment in your country? (select all that apply)																						
	National Agency	•	•	○	○	•	•	•	•	•	•	•	•	•	•	○	•	•	•	•	○	•	○
	International Agency	○	○	○	○	○	○	○	○	○	○	○	○	•	•	○	○	○	○	○	○	•	•
	National / Local University	•	○	○	•	○	•	•	○	○	○	○	•	•	○	○	○	•	○	○	•	•	○
	National / International Consultant	•	•	•	○	○	•	○	○	○	○	○	•	○	○	•	○	○	○	•	○	•	○
	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)																						
	National Level	•	•	•	○	•	•	○	•	•	•	•	○	○	•	○	•	○	•	○	•	○	○
	Regional Level	•	○	○	•	•	•	•	○	•	○	○	○	○	○	○	○	○	•	○	•	○	•
	City Level	•	○	○	○	○	•	○	○	•	○	•	•	○	•	•	○	○	○	○	○	•	•
	Village Level	○	○	○	○	○	•	•	○	○	○	○	○	○	○	○	○	○	○	•	○	•	○
4g) Data used for hazard assessment and whether it is publicly available?																							
Bathymetry - Used for hazard assessment	•	•	?	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	?	•	•	
Bathymetry - Publicly available	•	•	?	•	○	○	•	•	○	○	○		?	○	•	○	•	?	○	○	•	•	
Seismo-tectonic model - Used for hazard assessment	•	?	?	?	•	•	•	•	○	•	?		•	•	•	•	○		•	•	○	○	
Seismo-tectonic model - Publicly available	•	?	?	○	○	○	•	•	○	•	?		?	•	•	○	?		•	○	○	○	
Topography - Used for hazard assessment	•	•	?	•	•	•	•	•	•	•	•	•		•	•	○	•	•	•	?	•	•	
Topography - Publicly available	•	•	?	•	○	○	•	•	○	○	○		?	?	○	•	•	?	○	○	•	•	
Land Cover -Used for hazard assessment	•	•	?	•	•	•	○	○	•	•	○		•	•	•	•	○		•	•	○	○	
Land Cover - Publicly available	•	•	?	○	•	•		○	○	○	?		?	?	○	•	•		•	•	○	○	
Infrastructure details - Used for hazard assessment	•	?	?	•	•	•	○	○	•	•	○		•	•	○	○	•	•	•	•	•	○	
Infrastructure details - Publicly available	○	?	?	○	○	○		○	○	○	?		?	•	○	○	•	?	•	•	○	○	

		AUS	BAN	COM	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	MM	OM	PK	SIN	SA	SLK	TAN	THA	TL	
HAZARD ASSESSMENT	4h)	What products do you have from the tsunami hazard assessment? (select all that apply)																					
	Probabilistic tsunami hazard assessment	•	•	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Deterministic tsunami hazard analysis	○	○	○	○	•	•	•	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Field studies on tsunami impacts	○	○	○	○	•	•	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Hazard map	•	•	•	○	•	•	•	○	○	•	•	•	○	•	•	○	•	•	•	•	•	○
	Inundation map	•	•	•	•	•	•	•	○	•	○	•	•	•	•	•	•	•	•	•	○	•	○
	Evacuation map	○	○	•	○	○	•	•	○	•	○	•	•	•	○	○	○	○	○	•	○	•	○
	Guidelines	•	○	•	○	○	•	•	•	•	○	○	○	○	○	○	○	○	○	○	○	○	○
	4i)	On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment																					
	Rating	4	2	3	3	5	3	4	3	2	4	4	3	2	4	5	4	4	2	4	3	3	
	4j)	On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?																					
	Probabilistic tsunami hazard assessment	3	5	2	3	4	4	3	5	4	3	3	3	3	2	3	2	3	5	3	4	3	
	Deterministic tsunami hazard analysis	3	5	3	4	5	4	3	5	4	3	5	3	4	2	2	4	4	4	3	4	3	
	Field studies on tsunami impacts	1	5	2	3	4	4	3	5	5	4	3	4	4	3	3	2	3	4	4	4	3	
	Hazard map	2	5	4	5	5	5	4	5	4	4	5	4	4	2	4	2	4	5	4	4	4	
	Inundation map	2	5	4	3	5	5	4	5	4	4	5	4	5	2	4	2	4	5	4	5	4	
	Evacuation map	3	5	4	5	4	5	4	5	4	5	5	4	5	5	4	2	4	5	5	5	4	
	4k)	On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?																					
	Probabilistic tsunami hazard assessment	4	2	2	2	4	3	3	1	2	3	3	2	3	3	5	1	2	2	3	3	2	
	Deterministic tsunami hazard analysis	4	2	2	2	5	3	5	1	2	3	3	2	3	3		3	2	2	3	3	2	
Field studies on tsunami impacts	3	2	2	2	4	3	3	1	2	4	1	2	2	2		1	2	2	4	3	2		
Hazard map	4	2	2	3	5	4	5	1	2	4	4	3	3	2	5	3	3	3	4	3	2		
Inundation map	4	2	2	3	5	4	5	1	2	4	4	3	3	3	5	3	3	3	4	3	2		
Evacuation map	4	2	2	3	4	4	5	1	2	4	4	3	2	2		1	3	2	5	3	2		
RISK ASSESSMENT	5a)	Has your country undertaken a tsunami risk assessment?																					
	5b)	What type of risk assessment?																					
		MA+T	MA+T	T, MA+T	MA+T	MA+T	MA+T		MA+T	MA+T		MA+T	MA+T	T	MA+T		T, MA+T			MA+T	T, MA+T	MA+T	
	5c)	What hazards have been considered in your multi-hazard risk assessment? (select all that apply)																					
	Tsunami	•	•	•	•	•	•		•	•		•	•	•	•		•			•	•	•	
	Cyclone	•	•	•	•	•	○		•	•		•	•	○	•		○			○	•	•	
	Drought	○	•	○	○	○	•		•	•		•	•	○	○		○			•	•	•	
Earthquakes	•	•	•	○	○	•		•	•		○	•	○	•		○			○	•	•		
Epidemics	•	○	•	○	○	○		•	•		○	•	○	○		○			○	•	○		
Flooding	•	•	•	•	•	•		•	•		•	•	○	○		•			•	•	•		
Landslide	•	•	○	•	○	•		•	•		•	○	○	○		○			○	•	•		
Volcanic eruptions	○	○	○	•	○	•		•	○		○	○	○	○		○			○	○	○		
Other	○	○	○	○	○	•		•	○		○	•	○	•		○			○	○	•		

		AUS	BAN	COM	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	MM	OM	PK	SIN	SA	SLK	TAN	THA	TL
RISK ASSESSMENT	<b>5d)</b>	<b>Who did the tsunami risk assessment in your country? (select all that apply)</b>																				
	National Agency	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>		<input checked="" type="radio"/>	<input checked="" type="radio"/>		<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>		<input checked="" type="radio"/>			<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	International Agency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>		<input type="radio"/>			<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	National/local University	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		<input type="radio"/>	<input type="radio"/>		<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	National/International Consultant	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		<input type="radio"/>			<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	Other	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<b>5e)</b>	<b>At what level was the tsunami risk assessment carried out? (select all that apply)</b>																				
	National	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>		<input checked="" type="radio"/>	<input checked="" type="radio"/>		<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		<input checked="" type="radio"/>			<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	Regional	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>		<input type="radio"/>	<input checked="" type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	City	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>		<input type="radio"/>	<input checked="" type="radio"/>		<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>		<input type="radio"/>			<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	Village	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>		<input type="radio"/>			<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	Community / Neighbourhood	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>			<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	<b>5h)</b>	<b>What products do you have from the tsunami risk assessment? (select all that apply)</b>																				
	Risk map	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>			<input type="radio"/>		<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		<input checked="" type="radio"/>			<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	Evacuation map	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>			<input checked="" type="radio"/>		<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>		<input type="radio"/>			<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	Guidelines	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>			<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		<input type="radio"/>			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	Action Plan	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>			<input type="radio"/>		<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		<input checked="" type="radio"/>			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>			<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<b>5i)</b>	<b>On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment</b>																				
	Rating	4	2	3	4	5	4		1	2	3	2	3	2	4	1	4	4	2	2	4	3
	<b>5j)</b>	<b>On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?</b>																				
	National Level	2	5	2	1	4	3		5	5	3	5	3	2	2	4	2	5	4	4	5	3
	Regional Level	3	5	1	3	4	4		5	5	3	5	3	3	2	3	0	4	3	4	3	3
	City Level	3	5	4	4	4	4		5	5	4	5	4	4	4	5	0	4	5	4	5	3
	Village Level	2	5	4	4	4	4		5	5	4	5	4	5	3	5	0	4	5	4	5	3
	Community / Neighbourhood Level	2	5	4	4	4	4		5	4	5	5	4	5	3	5	0	4	5	4	5	3
	<b>5k)</b>	<b>On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?</b>																				
National Level	4	2	2	3	4	4		2	2	3	4	3	2	3	1	4	2	2	4	3	2	
Regional Level	4	2	2	3	4	3		2	2	3	4	3	2	2	1	1	2	2	4	3	2	
City Level	4	2	2	2	4	3		2	2	3	1	4	2	3	1	1	2	2	4	3	2	
Village Level	3	2	2	2	4	3		2	2	4	1	4	2	3	1	1	2	2	3	3	2	
Community / Neighbourhood Level	3	2	2	2	4	3		2	2	4	1	4	2	3	1	1	2	2	3	3	2	



		AUS	BAN	COM	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	MM	OM	PK	SIN	SA	SLK	TAN	THA	TL		
POLICIES	6a)	Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available.																						
		Prevention and mitigation	MH+T	MH+T	MH+T	MH+T	T	MH+T		MH+T	MH+T	N/A	N/A		MH+T	MH+T	MH+T	T	N/A	MH+T	MH+T	T	MH+T	
		Preparedness	MH+T	MH+T	MH+T	MH+T	T	MH+T		MH+T	MH+T	N/A	N/A		MH+T	MH+T	MH+T	T	N/A	MH+T	MH+T	T	MH+T	
		Emergency response	MH+T	MH+T	MH+T	MH+T	T	MH+T		MH+T	MH+T	MH+T	MH+T		MH+T	MH+T	MH+T	T	N/A	MH+T	MH+T	T	MH+T	
		Rehabilitation and reconstruction	MH+T	MH+T	MH+T	MH+T	T	MH+T		MH+T	MH+T	N/A	N/A		MH+T	MH+T	MH+T	MH+T	N/A	MH+T	MH+T	MH+T	MH+T	
	6b)	Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available.																						
		Prevention and mitigation	N/A	MH+T	N/A	N/A	MH+T	MH+T		MH+T	MH+T	N/A	N/A		MH+T	MH+T	T	N/A	N/A	MH+T	MH+T	T		
		Preparedness	N/A	MH+T	N/A	N/A	MH+T	MH+T		MH+T	MH+T	N/A	N/A		MH+T	MH+T	T	N/A	N/A	MH+T	MH+T	T		
		Emergency response	N/A	MH+T	N/A	N/A	MH+T	MH+T		MH+T	MH+T	MH+T	N/A		MH+T	MH+T	MH+T	N/A	N/A	MH+T	MH+T	MH+T		
		Rehabilitation and reconstruction	N/A	MH+T	N/A	N/A	MH+T	MH+T		MH+T	MH+T	N/A	N/A		MH+T	MH+T	MH+T	N/A	N/A	MH+T	MH+T	MH+T		
	PLANS	7a)	Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard																					
			National - Prevention and mitigation	MH+T	MH+T		MH+T	T	T		MH+T	MH+T	N/A	MH+T			MH+T	MH+T	T	MH+T	N/A	N/A	T	T
		Local - Prevention and mitigation	T	MH+T		N/A	MH+T	T		N/A	MH+T	N/A	N/A			MH+T	N/A	N/A	MH+T	N/A	N/A	T	MH+T	
		Community / Neighbourhood Level - Prevention and mitigation	MH+T	MH+T		N/A	MH+T	T		N/A	MH+T	N/A	N/A			N/A	N/A	MH+T	N/A	N/A	T	MH+T		
		National - Preparedness	MH+T	MH+T		MH+T	T	T		MH+T	MH+T	N/A	MH+T			MH+T	MH+T	T	MH+T	MH+T	N/A	T	T	
		Local - Preparedness	T	MH+T		N/A	MH+T	T		N/A	MH+T	N/A	N/A		MH+T	MH+T	N/A	N/A	MH+T	MH+T	N/A	MH+T	MH+T	
		Community / Neighbourhood Level - Preparedness	MH+T	MH+T		N/A	MH+T	T		N/A	MH+T	N/A	N/A			N/A	N/A	MH+T	MH+T	N/A	MH+T	MH+T		
		National - Emergency response	MH+T	MH+T		MH+T	T	MH+T		MH+T	MH+T	MH+T	MH+T			MH+T	MH+T	T	MH+T	MH+T	N/A	MH+T	MH+T	
		Local - Emergency response	T	MH+T		MH+T	MH+T	MH+T		N/A	MH+T	MH+T	N/A			MH+T	N/A	N/A	MH+T	MH+T	N/A	MH+T	MH+T	
		Community / Neighbourhood Level - Emergency response	MH+T	MH+T		N/A	MH+T	MH+T		N/A	MH+T	MH+T	N/A				N/A	N/A	MH+T	MH+T	N/A	MH+T	N/A	
		National - Rehabilitation and reconstruction	N/A	MH+T		MH+T	T	MH+T		MH+T	MH+T	N/A	N/A			MH+T	MH+T	MH+T	MH+T	N/A	N/A	MH+T	T	
		Local - Rehabilitation and reconstruction	MH+T	MH+T		N/A	MH+T	MH+T		N/A	MH+T	N/A	N/A			MH+T	N/A	N/A	MH+T	N/A	N/A	MH+T	N/A	
	Community / Neighbourhood Level - Rehabilitation	MH+T	MH+T		N/A	MH+T	MH+T		N/A	MH+T	N/A	N/A				N/A	N/A	MH+T	N/A	N/A	MH+T	N/A		
7b)	Are your country's tsunami disaster risk reduction plans based on hazards and risk																							
		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
GUIDELINES	8a)	Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available.																						
		Prevention and mitigation	T	MH+T	N/A		T	T		MH+T	MH+T	N/A	N/A			MH+T	N/A	T	N/A	N/A	MH+T	T	N/A	
		Preparedness	T	MH+T	N/A		T	T		MH+T	MH+T	N/A	N/A		T	MH+T	N/A	T	N/A	MH+T	MH+T	T	MH+T	
		Emergency response	T	MH+T	N/A		T	MH+T		MH+T	MH+T	N/A	MH+T			MH+T	N/A	T	N/A	MH+T	MH+T	MH+T	MH+T	
		Rehabilitation and reconstruction	N/A	MH+T	N/A		T	MH+T		MH+T	MH+T	N/A	N/A			MH+T	N/A	MH+T	N/A	N/A	MH+T	MH+T	MH+T	
	8b)	Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available.																						
		Prevention and mitigation	T	MH+T	N/A		MH+T	N/A		MH+T	MH+T	N/A	N/A			MH+T	N/A	N/A	N/A	N/A	MH+T	T	N/A	
		Preparedness	T	MH+T	N/A		MH+T	N/A		MH+T	MH+T	N/A	N/A			MH+T	N/A	N/A	N/A	N/A	MH+T	MH+T	T	N/A
		Emergency response	T	MH+T	N/A		MH+T	N/A		MH+T	MH+T	MH+T	T			MH+T	N/A	N/A	N/A	N/A	MH+T	MH+T	MH+T	N/A
		Rehabilitation and reconstruction	N/A	MH+T	N/A		MH+T	N/A		MH+T	MH+T	N/A	N/A			MH+T	N/A	N/A	N/A	N/A	MH+T	MH+T	N/A	



		AUS	BAN	COM	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	MM	OM	PK	SIN	SA	SLK	TAN	THA	TL	
DETECTION AND WARNING	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	•	•	○	○	•	•	○	•	•	•	○	○	•	•	•	•	○	•	○	○	•	
	9o) Does the organisation have capability for tsunami modelling to support generation of	•	○	○	○	•	•	•	•	•	•	○	○	○	•	•	•	○	•	•	•	•	
	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	•	•	○		•	○	•	•	•	•	•	•	•	•	○	•	•	•	•	•	•	•
	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	○
	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (eg. IOWave) conducted in the inter-sessional period?	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	○	•	•	•	•	•	•
	9u) After the December 26 2004 tsunami and until now, was your country impacted by any	•	○	○	○	•	•	○	○	○	○	○	○	○	○	○	○	○	○	○	•	○	○
DISSEMINATION	10a) How is the tsunami information (warning, public safety action, etc) disseminated within country? (select all that apply)																						
	Email	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	SMS	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	○	•	•
	Telephone	•	•	•	○	•	○	•	•	•	•	•	○	•	•	•	•	•	•	•	•	•	•
	Fax	•	•	•	○	•	•	•	•	○	•	•	•	•	•	•	•	•	○	•	•	•	○
	Webpage	•	•	•	○	•	•	•	•	•	•	•	○	•	•	•	•	•	•	•	•	•	○
	Radio	•	•	•	•	•	•	○	•	•	•	•	○	•	•	•	•	•	•	•	•	•	○
	WhatsApp / Facebook / Other social media	•	•	•	○	•	•	•	•	○	•	○	○	•	•	○	○	○	○	•	○	•	•
	Door-to-door	•	○	○	○	•	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Sirens	•	•	○	○	•	•	•	•	•	•	•	○	○	○	○	•	○	○	•	○	•	•
	Television	•	•	•	•	•	•	○	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Warning towers	•	○	○	○	•	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Megaphone	•	○	•	•	•	○	○	•	•	○	○	○	○	○	○	○	○	○	○	○	○	•
	Police/military	•	○	○	○	•	•	○	•	•	○	•	○	○	○	○	○	○	○	○	•	•	○
	Public alert system	•	○	○	○	•	○	○	•	•	○	○	•	○	•	○	○	•	○	•	•	•	•
	VHF radio	•	•	○	○	•	○	○	•	•	○	•	○	○	○	○	○	○	○	•	○	•	○
VPN	•	○	○	○	•	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Other	•	○	○	○	○	•	○	○	○	○	•	○	•	○	○	○	○	•	○	○	•	•	

		AUS	BAN	COM	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	MM	OM	PK	SIN	SA	SLK	TAN	THA	TL	
STANDARD OPERATING PROCEDURES	<b>11a)</b>	<b>For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.</b>																					
		24/7 EOC - Does your SOP address this aspect of tsunami emergency response?	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	○	•	•	•	•
		24/7 EOC - Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	○	•	•	○	○	•	•	•	•	○	•	•	•	•	○	•	•	•	•	•	•
		24/7 EOC - Is support required to develop Human Resources in this aspect of tsunami emergency response?	○	•	○	○	•	•	•	•	•	•	•	•	•	•	•	○	•	•	•	•	•
		24/7 EOC - Is support required to develop infrastructure for this aspect of tsunami emergency response?	○	•	•	•	•	•	•	•	•	•	•	•	•	○	•	○	•	•	•	•	•
		Receiving information from the NTWC - Does your SOP address this aspect of tsunami emergency response?	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
		Receiving information from the NTWC - Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	○	•	•	○	○	•	•	•	•	○	•	○	•	○	○	○	•	•	•	•	•
		Receiving information from the NTWC - Is support required to develop Human Resources in this aspect	○	•	○	○	○	•	•	•	•	○	•	○	•	○	○	○	•	•	•	•	•
		Receiving information from the NTWC - Is support required to develop infrastructure for this aspect of	○	•	•	•	○	•	•	•	•	•	•	•	•	○	•	○	○	•	•	•	•
		Does your SOP address this aspect of tsunami emergency response?	•	•	○	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
		Response Criteria / decision making - Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	•	•	•	•	○	•	•	•	•	•	•	•	○	•	○	○	•	•	•	•	•
		Response Criteria / decision making - Is support required to develop Human Resources in this aspect	○	•	•	•	○	•	•	•	•	•	•	•	•	•	○	○	•	•	•	•	•
		Response Criteria / decision making - Is support required to develop infrastructure for this aspect of	○	•	○	•	○	•	•	•	•	•	•	•	•	○	•	○	•	•	•	•	•
	<b>11b)</b>	<b>For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.</b>																					
	Warning dissemination - Does your SOP address this aspect of tsunami emergency response?	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Warning dissemination - Is support required to develop/improve this aspect of tsunami emergency	•	•	•	•	○	•	•	•	•	○	•	•	•	•	•	○	○	•	•	•	•	
	Warning dissemination - Is support required to develop Human Resources in this aspect of tsunami	•	•	•	○	○	•	•	•	•	•	•	•	•	•	○	○	○	•	•	•	•	
	Warning dissemination - Is support required to develop infrastructure for this aspect of tsunami	○	•	•	•	○	•	•	•	•	•	•	•	•	•	•	○	○	•	•	•	•	
	Evacuation call procedures - Does your SOP address this aspect of tsunami emergency	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	○	○	•	•	•	•	
	Evacuation call procedures - Is support required to develop/improve this aspect of tsunami emergency	•	•	•	•	○	•	•	•	•	•	•	•	•	•	•	○	•	•	•	•	•	
	Evacuation call procedures - Is support required to develop Human Resources in this aspect of tsunami	•	•	•	○	•	•	•	•	•	•	•	•	•	•	○	○	•	•	•	•	•	



		AUS	BAN	COM	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	MM	OM	PK	SIN	SA	SLK	TAN	THA	TL		
STANDARD OPERATING PROCEDURES	<b>11b)</b>	<b>For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.</b>																						
		Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc. - Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	•	•	•	○	○	•		•	•	•			•	•	○	○	•	•	•	•	•	
		Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc. - Is support required to develop Human Resources in this aspect of tsunami emergency response?	•	•	•	○	○	•		•	•	•			•	•	○	○	•	•	•	•	•	•
		Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc. - Is support required to develop infrastructure for this aspect of tsunami emergency response?	○	•	•	○	○	•		•	•	•			•	•	•	○	○	•	•	•	•	•
	<b>11c)</b>	<b>Would your country be willing to share your SOPs with the IOTIC and other countries?</b>	•	•	•	•	•	•		•	•	•	•	•	•	•	•	○	•	•	•	•	•	•
	<b>11d)</b>	<b>For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)</b>																						
		National DMOs - Telephone	•	○	•	•	•	○		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
		National DMOs - Fax	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	○
		National DMOs - Email	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
		National DMOs - SMS	•	○	•	•	•	•		•	•	•	•	○	•	•	•	•	•	•	○	○	•	•
		National DMOs - Siren	○	○	○	•	•	○		•	○	○	○	○	○	○	○	•	•	○	○	○	•	•
		National DMOs - Other	•	○	○	○	•	○		○	○	•	○	○	○	○	○	○	○	○	○	○	•	○
		Local DMOs - Telephone	•	○	•	•	•	○		•	•	•	○	•	•	•	•	•	•	•	•	•	•	•
		Local DMOs - Fax	•	•	•	•	•	•		○	○	•	○	•	•	•	•	•	•	•	•	•	•	○
		Local DMOs - Email	•	•	•	•	•	•		•	○	•	○	•	•	•	○	•	•	•	•	•	•	•
		Local DMOs - SMS	•	○	•	•	•	•		•	•	•	○	○	•	○	•	•	•	○	○	•	•	•
		Local DMOs - Siren	•	○	○	○	•	•		•	•	○	○	○	○	○	•	•	○	○	○	○	•	○
	Local DMOs - Other	•	○	○	○	•	•		○	○	•	○	○	○	○	○	○	○	○	○	○	•	○	
	General public - Telephone	•	○	○	○	•	○		•	○	•	○	○	•	○	•	•	○	○	•	○	•	•	
	General public - Fax	•	○	○	○	○	○		○	○	•	○	○	•	○	○	•	○	○	•	○	○	○	
	General public - Email	•	○	○	○	•	○		○	○	•	○	○	•	○	○	•	○	○	•	○	•	•	
	General public - SMS	•	•	•	○	•	○		•	•	○	•	○	•	•	•	•	•	•	○	○	•	•	
	General public - Siren	•	•	○	○	○	○		•	•	•	•	○	○	•	•	•	○	•	○	•	○	○	
	General public - Other	•	○	•	•	•	•		○	○	•	○	○	○	•	○	○	○	•	○	•	•	○	

		AUS	BAN	COM	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	MM	OM	PK	SIN	SA	SLK	TAN	THA	TL		
STANDARD OPERATING PROCEDURES	<b>11b)</b>	<b>For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.</b>																						
		Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc. - Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	•	•	•	○	○	•		•	•	•			•	•	○	○	•	•	•	•	•	
		Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc. - Is support required to develop Human Resources in this aspect of tsunami emergency response?	•	•	•	○	○	•		•	•	•			•	•	○	○	•	•	•	•	•	•
		Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc. - Is support required to develop infrastructure for this aspect of tsunami emergency response?	○	•	•	○	○	•		•	•	•			•	•	•	○	○	•	•	•	•	•
	<b>11c)</b>	<b>Would your country be willing to share your SOPs with the IOTIC and other countries?</b>	•	•	•	•	•	•		•	•	•	•	•	•	•	•	○	•	•	•	•	•	•
	<b>11d)</b>	<b>For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)</b>																						
		National DMOs - Telephone	•	○	•	•	•	○		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
		National DMOs - Fax	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	○
		National DMOs - Email	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
		National DMOs - SMS	•	○	•	•	•	•		•	•	•	•	○	•	•	•	•	•	•	○	○	•	•
		National DMOs - Siren	○	○	○	•	•	○		•	○	○	○	○	○	○	○	•	•	○	○	○	•	•
		National DMOs - Other	•	○	○	○	•	○		○	○	•	○	○	○	○	○	○	○	○	○	○	•	○
		Local DMOs - Telephone	•	○	•	•	•	○		•	•	•	○	•	•	•	•	•	•	•	•	•	•	•
		Local DMOs - Fax	•	•	•	•	•	•		○	○	•	○	•	•	•	•	•	•	•	•	•	•	○
		Local DMOs - Email	•	•	•	•	•	•		•	○	•	○	•	•	•	○	•	•	•	•	•	•	•
		Local DMOs - SMS	•	○	•	•	•	•		•	•	•	○	○	•	○	•	•	•	○	○	•	•	•
		Local DMOs - Siren	•	○	○	○	•	•		•	•	○	○	○	○	○	•	•	○	○	○	○	•	○
		Local DMOs - Other	•	○	○	○	•	•		○	○	•	○	○	○	○	○	○	○	○	○	○	•	○
		General public - Telephone	•	○	○	○	•	○		•	○	•	○	○	•	○	•	•	○	○	•	○	•	•
		General public - Fax	•	○	○	○	○	○		○	○	•	○	○	•	○	○	•	○	○	•	○	•	○
		General public - Email	•	○	○	○	•	○		○	○	•	○	○	•	○	○	•	○	○	•	○	•	•
		General public - SMS	•	•	•	○	•	○		•	•	○	•	○	•	•	•	•	•	•	○	○	•	•
		General public - Siren	•	•	○	○	○	○		•	•	•	•	○	○	•	•	•	○	•	○	•	•	○
		General public - Other	•	○	•	•	•	•		○	○	•	○	○	○	○	○	○	○	○	○	○	•	○
		Coastal communities - Telephone	•	○	•	•	•	○		•	•	•	○	•	•	○	•	•	•	○	•	•	○	•
		Coastal communities - Fax	•	○	○	•	○	○		○	○	•	○	•	•	○	○	•	○	○	○	○	○	○
		Coastal communities - Email	•	○	○	•	•	○		○	○	•	○	•	•	○	○	•	•	○	○	○	○	•
	Coastal communities - SMS	•	•	•	•	•	○		•	•	○	•	○	•	•	•	•	•	•	○	○	•	•	
	Coastal communities - Siren	•	•	○	○	○	○		•	•	•	•	○	○	•	•	•	○	•	•	•	•	○	
	Coastal communities - Other	○	○	•	○	•	•		○	○	•	○	○	○	•	○	○	○	•	○	•	•	○	

		AUS	BAN	COM	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	MM	OM	PK	SIN	SA	SLK	TAN	THA	TL	
STANDARD OPERATING PROCEDURES	<b>11d)</b>	<b>For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)</b>																					
		Coastal communities - Other	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
		Media - Telephone	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
		Media - Fax	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
		Media - Email	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
		Media - SMS	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
		Media - Siren	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Media - Other	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
TSUNAMI EXERCISES	<b>12a)</b>	<b>Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas).</b>																					
		Evacuation shelter	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
		Vertical evacuation structure	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
		Natural or artificial hill for vertical evacuation	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
		Evacuation signage	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
		Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<b>12b)</b>	<b>Is your evacuation infrastructure integrated in the evacuation plan?</b>																					
			<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	<b>12a)</b>	<b>Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)</b>																					
		National policy	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
		National guidelines	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	<b>12b)</b>	<b>At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)</b>																					
		National level	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
		Regional level	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
		City level	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
		Village level	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		Community/Neighbourhood level	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	School level	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	
<b>12c)</b>	<b>What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?</b>																						
	Organisation table top exercises	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	
	Inter-organisation table top exercises	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	
	National tsunami drill/exercise	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	
	Indian Ocean Wave exercise	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	
	Local tsunami exercise	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	
	Other	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
PUBLIC AWARENESS	<b>13a)</b>	<b>Who is responsible for tsunami public awareness programmes in your country?</b>																					
			LDMO	NDMO	NDMO	NDMO	NDMO	NTWC	NTWC	NDMO	NDMO	NDMO	NTWC	NDMO	NTWC	NDMO	NDMO	NTWC	NDMO	NDMO	NDMO	MO	NDMO
	<b>13b)</b>	<b>What tsunami related education and awareness materials do you have? (select all that apply)</b>																					
		Leaflets or flyers	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
		Posters	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
		Booklets	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
		Information boards	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	Tsunami Signage	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	Video, or other visual or oral media	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	





		AUS	BAN	COM	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	MM	OM	PK	SIN	SA	SLK	TAN	THA	TL	
PUBLIC AWARENESS	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)																						
	Have a community tsunami risk reduction plan	3	4			4	3		3	2			3	3	3					2	3		
	Have designated and mapped tsunami hazard zones	3	4			4	4		4	2			4	3	4					3	3		
	Have a public display of tsunami information	2	4			4	5		3	2			2	3	4					3	3		
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	3	4			4	3		3	2			2	3	4					3	3		
	Develop and distribute outreach and public education	3	4			5	4		3	2			2	3	5					3	4		
	Hold at least three outreach or educational activities annually	2	4			5	5		3	2			2	3	4					4	4		
	Conduct an annual tsunami community exercise	2	4			5	5		3	2			1	3	4					4	4		
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	3	5			5	4		4	2			1	3	4					3	4		
	Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	5	5			5	4		4	2			4	3	4					1			
	Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	3	5			5	5		3	2			4	3	5					4			
	Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	3	5			4	5		3	2			4	3	5					4			

ANNEX IV

COUNTRY SUMMARY REPORTS

AUSTRALIA					
	Status			Notes/Requirements	
<b>Policies</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> National Strategy for Disaster Resilience (Feb 2011); National Disaster Risk Reduction Framework (draft); Australian Emergency Management Arrangements Handbook
	Prevention & Mitigation	Multi-hazard inc.Tsunami	Not available		
	Preparedness	Multi-hazard inc.Tsunami	Not available		
	Emergency Response	Multi-hazard inc.Tsunami	Not available		
	Rehabilitation & Reconstruction	Multi-hazard inc.Tsunami	Not available		
<b>Plans</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	<b>Community</b>	<b>Notes:</b> Australian Government Disaster Response Plan stipulates when and how to seek Federal Government assistance in a major disaster; Tsunami subplan in each State/Territory Emergency Service; Multi-hazard plan in each State/Territory and local government area
	Prevention & Mitigation	Multi-hazard inc.Tsunami	Standalone tsunami	Multi-hazard inc.Tsunami	
	Preparedness	Multi-hazard inc.Tsunami	Standalone tsunami	Multi-hazard inc.Tsunami	
	Emergency Response	Multi-hazard inc.Tsunami	Standalone tsunami	Multi-hazard inc.Tsunami	
	Rehabilitation & Reconstruction	Not available	Multi-hazard inc.Tsunami	Multi-hazard inc.Tsunami	
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>				
<b>Guidelines</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> Tsunami Emergency Planning in Australia Handbook.
	Prevention & Mitigation	Standalone tsunami	Standalone tsunami		
	Preparedness	Standalone tsunami	Standalone tsunami		
	Emergency Response	Standalone tsunami	Standalone tsunami		
	Rehabilitation & Reconstruction	Not available	Not available		
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard assessment including <b>tsunami, cyclone, earthquakes and flooding</b>.</li> <li>• Tsunami hazard assessment at <b>national, regional and city levels</b></li> <li>• Products available: <b>PTHA, field studies on tsunami impact, hazard maps and inundation maps, guidelines on tsunami hazard modelling</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Good</b></li> <li>• Capacity to train other countries: <b>Good</b> (PTHA, DTHA, hazard, inundation and evacuation maps) to <b>Moderate</b> (field studies)</li> </ul>				<b>Notes:</b> Tsunami Hazard Modelling Guidelines available. Most mapping used the 2008 PTHA since updated with the 2018 PTHA. State governments to assess need to update mapping given the significant changes to the PTHA product.

AUSTRALIA						
	Status	Notes/Requirements				
<b>Risk Assessment</b>	<ul style="list-style-type: none"> <li>• Single risk assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard risk assessment including <b>tsunami, cyclone, earthquakes, epidemics, flooding and landslides</b></li> <li>• Tsunami risk assessment at <b>regional level</b></li> <li>• Products available: <b>National Emergency Risk Assessment Guidelines (NERAG)</b></li> <li>• Capacity to undertake tsunami risk assessment: <b>Very Good</b></li> <li>• Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Good</b></li> </ul>	<p><b>Notes:</b>                      PTHA shows that offshore hazard varies around the country. However, there is not necessarily a direct relationship between high offshore hazard and high onshore hazard due to the nature of the nearshore environment and the source of the event itself.</p>				
<b>Detection and Warning</b>	<ul style="list-style-type: none"> <li>• National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>• Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>Joint Australian Tsunami Warning Centre (JATWC)</b></li> <li>• Use IOTWMS TSP data to determine national threats? <b>Use own threat assessments</b></li> <li>• 24x7 operations? <b>Yes</b> (see notes)</li> <li>• Level of tsunami threat forecast information produced: <b>Ocean-wide, national and local</b></li> <li>• Access to national or international seismic networks: <b>Yes</b> (see notes)</li> <li>• Access to national or international sea level networks: <b>Yes</b> (see notes)</li> <li>• Other national observing networks used for tsunami early warning: <b>GNSS/GPS</b></li> <li>• Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>Yes</b></li> <li>• Capability for tsunami modelling to support threat forecasts: <b>Yes</b></li> <li>• Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>• Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>	<p><b>Notes:</b>                      24x7 staffed earthquake monitoring at Geoscience Australia, Canberra and sea-level monitoring at Bureau of Meteorology's National Operations Centre, Melbourne; redundant infrastructure and communications services; direct GA-BOM video conferencing facility.</p> <p>Real-time seismic data available from GA's seismic monitoring network, the International Monitoring System (IMS) of the Comprehensive Nuclear- Test-Ban Treaty (CTBT) and from other international seismic monitoring networks via IRIS and other public SEEDlink server.</p> <p>Real-time data from Australian operated 43 coastal sea level stations and Australian network of 6 tsunameters.</p>				
<b>Dissemination</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; padding: 5px;">How is tsunami information disseminated within country?</td> <td style="padding: 5px;">Email SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media Door-to-door, Sirens, Television, Warning towers, Megaphone, Police/military, Public alert system, VHF radio, VPN.</td> </tr> <tr> <td style="padding: 5px;">How is warning terminated?</td> <td style="padding: 5px;">JATWC will issue a warning cancellation when it assesses that either no tsunami has eventuated or the tsunami threat has passed. In the latter case, the observed wave amplitudes must be below the Marine Threat threshold for at least two hours, although abnormal sea level changes and currents may persist for many hours.</td> </tr> </table>	How is tsunami information disseminated within country?	Email SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media Door-to-door, Sirens, Television, Warning towers, Megaphone, Police/military, Public alert system, VHF radio, VPN.	How is warning terminated?	JATWC will issue a warning cancellation when it assesses that either no tsunami has eventuated or the tsunami threat has passed. In the latter case, the observed wave amplitudes must be below the Marine Threat threshold for at least two hours, although abnormal sea level changes and currents may persist for many hours.	<p><b>Notes:</b>                      Other: Emergency Alert; Phone trees; 1300 TSUNAMI telephone services</p> <p><b>Notes:</b>                      All Clear advice s not issued by the JATWC, but by the State/Territory emergency management authorities who have jurisdictional responsibility for public safety and response to any tsunami impacts.</p>
How is tsunami information disseminated within country?	Email SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media Door-to-door, Sirens, Television, Warning towers, Megaphone, Police/military, Public alert system, VHF radio, VPN.					
How is warning terminated?	JATWC will issue a warning cancellation when it assesses that either no tsunami has eventuated or the tsunami threat has passed. In the latter case, the observed wave amplitudes must be below the Marine Threat threshold for at least two hours, although abnormal sea level changes and currents may persist for many hours.					

AUSTRALIA																							
	Status		Notes/ Requirements																				
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<b>Standard Operating Procedures</b>	SOPs for <b>upstream</b> emergency response: <ul style="list-style-type: none"> <li>• 24/7 Emergency Response Centre: <b>Yes</b></li> <li>• Receiving information from NTWC: <b>Yes</b></li> <li>• Response criteria/decision making: <b>Yes</b></li> </ul>																						
	SOPs for <b>downstream</b> emergency response: <ul style="list-style-type: none"> <li>• Warning dissemination: <b>Yes</b></li> <li>• Evacuation call procedures: <b>Yes</b></li> <li>• Community evacuation procedures: <b>No</b></li> <li>• Communication with NTWC: <b>Yes</b></li> <li>• Communication with local government: <b>Yes</b></li> <li>• Media arrangements: <b>Yes</b></li> <li>• Communication with other stakeholders: <b>Yes</b></li> </ul>		<table border="1"> <tbody> <tr> <td>✓</td> <td>✓</td> <td>X</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>X</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>X</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>X</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>X</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>X</td> </tr> </tbody> </table>	✓	✓	X	✓	✓	X	✓	✓	X	✓	✓	✓	✓	✓	X	✓	✓	X	✓	✓
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<b>Evacuation Infrastructure</b>	<ul style="list-style-type: none"> <li>• Evacuation shelters: <b>No</b></li> <li>• Vertical evacuation shelter: <b>No</b></li> <li>• Natural or artificial hill for vertical evacuation: <b>Yes</b> (No definitive percentage)</li> <li>• Evacuation signage: <b>Yes</b></li> <li>• Evacuation infrastructure integrated in evacuation plan: <b>No</b></li> </ul>		<b>Notes:</b> Shelters available but not specifically for tsunami. Evacuation signage is limited to some coastal cities such as Manly Beach																				
<b>Tsunami Exercises</b>	<ul style="list-style-type: none"> <li>• Tsunami exercises incorporated in national policy <b>No</b></li> <li>• Tsunami exercises incorporated in national guidelines <b>Yes</b></li> </ul>																						
	Level at which exercises are conducted: <ul style="list-style-type: none"> <li>• National: <b>Yes</b></li> <li>• Regional: <b>Yes</b></li> <li>• City: <b>Yes</b></li> <li>• Village: <b>Yes</b></li> <li>• Community/neighbourhood: <b>No</b></li> <li>• School: <b>No</b></li> </ul>		<b>Notes:</b> <ul style="list-style-type: none"> <li>• Organisation table top (5-10)</li> <li>• Inter-organisation table top (5-10)</li> <li>• National tsunami drill/exercise (2, leveraging IOWave18 and PacWave18)</li> <li>• Indian Ocean Wave Exercise (1?)</li> </ul>																				
<b>Public Awareness</b>	<ul style="list-style-type: none"> <li>• Responsibility for tsunami public awareness programmes: <b>LDMO</b></li> </ul>																						
	Tsunami related education and awareness material available: <ul style="list-style-type: none"> <li>• Leaflets or flyers: <b>Yes</b></li> </ul>	Tsunami awareness activities undertaken: <ul style="list-style-type: none"> <li>• World Tsunami Awareness Day: <b>Yes</b></li> </ul>	<b>Notes:</b> A tailored-to-Australia online tsunami education resource called "Tsunami: The Ultimate Guide" at																				

<b>AUSTRALIA</b>			
	<b>Status</b>	<b>Notes/ Requirements</b>	
	<ul style="list-style-type: none"> <li>• Posters: <b>Yes</b></li> <li>• Booklets: <b>Yes</b></li> <li>• Information boards: <b>Yes</b></li> <li>• Tsunami signage: <b>Yes</b></li> <li>• Video or other visual or oral media: <b>Yes</b></li> <li>• Indigenous knowledge, folklore etc: <b>No</b></li> <li>• Teaching kits: <b>Yes</b></li> <li>• Schools curricula: <b>Yes</b></li> <li>• Public evacuation maps: <b>Yes</b></li> </ul>	<ul style="list-style-type: none"> <li>• Global Disaster Risk Reduction Day: <b>Yes</b></li> <li>• Public tsunami preparedness outreach: <b>Yes</b></li> <li>• School and/or children’s awareness: <b>No</b></li> <li>• Exhibitions: <b>No</b></li> <li>• Competitions/other ways of highlighting tsunami safety: <b>No</b></li> </ul>	<p><a href="https://knowledge.aidr.org.au/resources/the-ultimate-guide- tsunami/#">https://knowledge.aidr.org.au/resources/the-ultimate-guide- tsunami/#</a> Keen to work with IOTIC to enhance tsunami preparedness</p>
	<p>Support from IOTIC required to develop or enhance public awareness:</p>	<ul style="list-style-type: none"> <li>• Provision of general tsunami awareness materials <b>X</b></li> <li>• Customization of general materials to country or community <b>X</b></li> <li>• Development of tsunami awareness programmes, activities or campaigns <b>✓</b></li> <li>• Participation/support by international agencies or experts to your country’s activities <b>✓</b></li> </ul>	
	<ul style="list-style-type: none"> <li>• Willing to support other countries to develop or enhance public awareness: <b>Yes</b></li> <li>• Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>Yes</b></li> </ul>		<p><b>Notes:</b> IOTR pilot communities: Christmas Island and Cocos (Keeling) Islands</p>
<b>General Comments and Future Plans</b>	<p><b>General Comments:</b></p> <ul style="list-style-type: none"> <li>• Australian Tsunami Advisory Group (ATAG) has updated the national Tsunami Emergency Planning Handbook and developed national Tsunami Hazard Modelling Guidelines. Both documents were released on World Tsunami Awareness Day on 5 Nov 2018.</li> <li>• Geoscience Australia (GA) upgraded the National Earthquake Alert Centre in June 2018 which is a key component of the JATWC</li> <li>• GA released a new version of the PTHA on World Tsunami Awareness Day. Reviewed at EGU and journal publications are progressing)</li> <li>• GA have provided options to the IOTWMS to leverage the PTHA for Indian Ocean nations</li> <li>• GA has trained scientists in the Pacific to develop tsunami inundation maps and to integrate into disaster management plans using the open-source PacSAFE software tool.</li> <li>• Bureau of Meteorology performed a major upgrade to its tsunami Decision Support Tool.</li> <li>• Bureau of Meteorology published a real-time tsunami warning status page for the Indian Ocean which was successfully tested during the IOWave18 exercise</li> <li>• University of Newcastle completed a study into the potential for submarine landslide inundation off the NSW coast</li> </ul>		

<b>AUSTRALIA</b>		
	<b>Status</b>	<b>Notes/ Requirements</b>
	<p><b><u>Future Plans</u></b></p> <ul style="list-style-type: none"> <li>• Develop local tsunami hazard information using the 2018 PTHA and the Tsunami Hazard Modelling Guidelines</li> <li>• Collect elevation data in priority areas and support national initiatives in this regard</li> <li>• Develop nationally consistent storm surge services</li> <li>• Continue to collaborate on science improvements to the warning system (e.g. upgrade the JATWC T2 scenario database based on new data in the PTHA18)</li> <li>• Develop and/or refine tsunami evacuation maps</li> <li>• More inundation modelling and mapping</li> <li>• Increase tsunami awareness for coastal communities and marine users</li> </ul>	

BANGLADESH				
	Status			Notes/Requirements
<b>Policies</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	
	Prevention & Mitigation	Multi-hazard +Tsunami	Multi-hazard +Tsunami	
	Preparedness	Multi-hazard +Tsunami	Multi-hazard +Tsunami	
	Emergency Response	Multi-hazard +Tsunami	Multi-hazard +Tsunami	
	Rehabilitation & Reconstruction	Multi-hazard +Tsunami	Multi-hazard +Tsunami	
<b>Plans</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	<b>Community</b>
	Prevention & Mitigation	Multi-hazard +Tsunami	Multi-hazard +Tsunami	Multi-hazard +Tsunami
	Preparedness	Multi-hazard +Tsunami	Multi-hazard +Tsunami	Multi-hazard +Tsunami
	Emergency Response	Multi-hazard +Tsunami	Multi-hazard +Tsunami	Multi-hazard +Tsunami
	Rehabilitation & Reconstruction	Multi-hazard +Tsunami	Multi-hazard +Tsunami	Multi-hazard +Tsunami
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>			
<b>Guidelines</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	
	Prevention & Mitigation	Multi-hazard +Tsunami	Multi-hazard +Tsunami	
	Preparedness	Multi-hazard +Tsunami	Multi-hazard +Tsunami	
	Emergency Response	Multi-hazard +Tsunami	Multi-hazard +Tsunami	
	Rehabilitation & Reconstruction	Multi-hazard +Tsunami	Multi-hazard +Tsunami	
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard assessment undertaken including <b>tsunami, cyclone, droughts, earthquakes, flooding, landslides</b></li> <li>• Tsunami hazard assessment undertaken at <b>national level</b></li> <li>• Products available: <b>PTHA, DTHA, hazard maps and inundation maps.</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Poor</b></li> <li>• Capacity to train other countries: <b>Poor</b> (all categories)</li> </ul>			<p><b>Notes:</b> 0.5% coastal areas of total Khulna, Barishal, Chattogram division have been mapped for tsunami hazard.</p> <p><b>Requirements:</b> Priority to improve capacity in all areas of tsunami hazard assessment is rated as <b>Essential</b>.</p>



BANGLADESH					
	Status		Notes/Requirements		
<b>Risk Assessment</b>	<ul style="list-style-type: none"> <li>Single risk assessment on tsunami undertaken: <b>No</b></li> <li>Multi-hazard risk assessment undertaken including <b>tsunami, cyclone, drought, earthquakes, flooding and landslides</b></li> <li>Tsunami risk assessment undertaken at <b>national level</b></li> <li>Products available: <b>risk map</b></li> <li>Capacity to undertake tsunami risk assessment: <b>Poor</b></li> <li>Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Poor</b> (all categories)</li> </ul>		<p><b>Notes:</b> 0.5% coastal areas of total Khulna, Barishal, Chattogram division have been mapped for tsunami risk. More than 5 important cities are at risk from tsunami.</p> <p><b>Requirements:</b> Priority to improve capacity in all areas of tsunami risk assessment is rated as <b>Essential</b>.</p>		
<b>Detection and Warning</b>	<ul style="list-style-type: none"> <li>National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>Bangladesh Meteorological Department</b></li> <li>Use IOTWMS TSP data to determine national threats? <b>Use TSP data</b></li> <li>24x7 operations? <b>Yes</b></li> <li>Level of tsunami threat forecast information produced: <b>national</b></li> <li>Access to national or international seismic networks: <b>Yes</b> (see notes)</li> <li>Access to national or international sea level networks: <b>Yes</b></li> <li>Other national observing networks used for tsunami early warning: <b>None</b></li> <li>Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>Yes</b></li> <li>Capability for tsunami modelling to support threat forecasts: <b>No</b></li> <li>Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>		<p><b>Notes:</b> National seismic data through national communication infrastructure, mobile telecommunications etc)</p>		
<b>Dissemination</b>	How is tsunami information disseminated within country?	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social, media, Sirens, Television, VHF radio			
	How is warning terminated?	Based on the updated information on tsunami warning from IOTWMS TSPs the warning situation in terminated			
<b>Standard Operating Procedures</b>	SOPs for <b>upstream</b> emergency response:		<b>Support Required to Develop</b>		
	<ul style="list-style-type: none"> <li>24/7 Emergency Response Centre: <b>Yes</b></li> <li>Receiving information from NTWC: <b>Yes</b></li> <li>Response criteria/decision making: <b>Yes</b></li> </ul>		<b>SOPs</b>	<b>Human Resources</b>	<b>Infrastructure</b>
			✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓

BANGLADESH					
	Status		Notes/Requirements		
	SOPs for <b>downstream</b> emergency response: <ul style="list-style-type: none"> <li>Warning dissemination: <b>Yes</b></li> <li>Evacuation call procedures: <b>Yes</b></li> <li>Community evacuation procedures: <b>No</b></li> <li>Communication with NTWC: <b>Yes</b></li> <li>Communication with local government: <b>Yes</b></li> <li>Media arrangements: <b>Yes</b></li> <li>Communication with other stakeholders: <b>Yes</b></li> </ul>		<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>
<b>Evacuation Infrastructure</b>	<ul style="list-style-type: none"> <li>Evacuation shelters: <b>Yes</b></li> <li>Vertical evacuation shelter: <b>Yes</b></li> <li>Natural or artificial hill for vertical evacuation: <b>Yes</b> (2% or risk prone areas)</li> <li>Evacuation signage: <b>Yes</b></li> <li>Evacuation infrastructure integrated in evacuation plan: <b>Yes</b></li> </ul>		<b>Notes:</b> Evacuation infrastructure and signage is considered insufficient		
<b>Tsunami Exercises</b>	<ul style="list-style-type: none"> <li>Tsunami exercises incorporated in national policy <b>No</b></li> <li>Tsunami exercises incorporated in national guidelines <b>Yes</b></li> </ul>				
	Level at which exercises are conducted: <ul style="list-style-type: none"> <li>National: <b>Yes</b></li> <li>Regional: <b>No</b></li> <li>City: <b>No</b></li> <li>Village: <b>No</b></li> <li>Community/neighbourhood: <b>No</b></li> <li>School: <b>No</b></li> </ul>		<b>Notes:</b> <ul style="list-style-type: none"> <li>Organisation tabletop (10 times)</li> <li>Inter-organisation tabletop (10 times)</li> <li>National tsunami drill/exercise (once)</li> <li>Indian Ocean Wave Exercise (3 times)</li> <li>Local tsunami exercise (3-4 times)</li> <li>DREE by Armed Forces Division (for earthquakes)</li> </ul>		
<b>Public Awareness</b>	<ul style="list-style-type: none"> <li>Responsibility for tsunami public awareness programmes: <b>NDMO</b></li> </ul>		<b>Notes:</b> Department of Disaster Management		
	Tsunami related education and awareness material available: <ul style="list-style-type: none"> <li>Leaflets or flyers: <b>No</b></li> <li>Posters: <b>No</b></li> <li>Booklets: <b>No</b></li> <li>Information boards: <b>Yes</b></li> <li>Tsunami signage: <b>No</b></li> <li>Video or other visual or oral media: <b>No</b></li> <li>Indigenous knowledge, folklore etc: <b>No</b></li> <li>Teaching kits: <b>No</b></li> <li>Schools curricula: <b>No</b></li> </ul>	Tsunami awareness activities undertaken: <ul style="list-style-type: none"> <li>World Tsunami Awareness Day: <b>Yes</b> (annually)</li> <li>Global Disaster Risk Reduction Day: <b>Yes</b> (annually)</li> <li>Public tsunami preparedness outreach: <b>Yes</b> (1 day per year)</li> <li>School and/or children's awareness: <b>Yes</b> (1 day per year)</li> <li>Exhibitions: <b>Yes</b> (3 days per year)</li> <li>Competitions/other ways of highlighting tsunami safety: <b>Yes</b> (1 day per year)</li> </ul>			

BANGLADESH		
	Status	Notes/Requirements
	<ul style="list-style-type: none"> <li>Public evacuation maps: <b>No</b></li> </ul>	
	Support from IOTIC required to develop or enhance public awareness <ul style="list-style-type: none"> <li>Provision of general tsunami awareness materials ✓</li> <li>Customization of general materials to country or community ✓</li> <li>Development of tsunami awareness programmes, activities or campaigns ✓</li> <li>Participation/support by international agencies or experts to your country's activities ✓</li> </ul>	
	<ul style="list-style-type: none"> <li>Willing to support other countries to develop or enhance public awareness: <b>Yes</b></li> <li>Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>Yes</b></li> </ul>	
	<p><b>General Comments:</b> Bangladesh Meteorological Department, Dhaka is involved with tsunami exercise. But we have lack of knowledge of tsunami modelling and tsunami risk assessment documentation.</p> <p><b>Future Plans</b> Bangladesh Meteorological Department has an interest on developing the computed tsunami modeling system as well as tsunami inundation map with evacuation route, training the emergency personnel, supporting to build sufficient evacuation centers, coastal wall of particular height as a part for future tsunami warning and mitigation system improvements.</p>	

COMOROS				
	Status			Notes/Requirements
<b>Policies</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Not available	
	Preparedness	Multi-hazard inc. Tsunami	Not available	
	Emergency Response	Standalone Tsunami only	Not available	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Not available	
<b>Plans</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	<b>Community</b>
	Prevention & Mitigation	-	-	-
	Preparedness	-	-	-
	Emergency Response	-	-	-
	Rehabilitation & Reconstruction	-	-	-
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>			
<b>Guidelines</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	
	Prevention & Mitigation	Not available	Not available	
	Preparedness	Not available	Not available	
	Emergency Response	Not available	Not available	
	Rehabilitation & Reconstruction	Not available	Not available	
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>Yes</b></li> <li>• Multi-hazard assessment undertaken including <b>tsunami, cyclone, flooding, volcanic eruptions</b></li> <li>• Tsunami hazard assessment undertaken at <b>national level</b></li> <li>• Products available: <b>Hazard map, inundation map, evacuation map, guidelines (SOP) for national level stakeholders.</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Fair</b></li> <li>• Capacity to train other countries: <b>Poor</b></li> </ul>			

COMOROS					
	Status		Notes/Requirements		
<b>Risk Assessment</b>	<ul style="list-style-type: none"> <li>• Single risk assessment on tsunami undertaken: <b>Yes</b></li> <li>• Multi-hazard risk assessment undertaken including <b>tsunami, cyclone, earthquakes, epidemics and flooding</b></li> <li>• Tsunami risk assessment undertaken at <b>national level</b></li> <li>• Products available: <b>risk map, evacuation map, guidelines</b></li> <li>• Capacity to undertake tsunami risk assessment: <b>Fair</b></li> <li>• Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Poor</b></li> </ul>				
<b>Detection and Warning</b>	<ul style="list-style-type: none"> <li>• National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>• Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>Agence National de l'Aviation Civile et de la Météorologie Direction Technique de la Météorologie</b></li> <li>• Use IOTWMS TSP data to determine national threats? <b>Use TSP data</b></li> <li>• 24x7 operations? <b>No</b></li> <li>• Level of tsunami threat forecast information produced: <b>National, local</b></li> <li>• Access to national or international seismic networks: <b>No</b></li> <li>• Access to national or international sea level networks: <b>Yes</b></li> <li>• Other national observing networks used for tsunami early warning: <b>Buoy</b></li> <li>• Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>No</b></li> <li>• Capability for tsunami modelling to support threat forecasts: <b>No</b></li> <li>• Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>No</b></li> <li>• Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>		<p><b>Note:</b> Not completely 24x7. Operations are 15 or 12x7 depending on weekend days</p> <p>loc-sealevelmonitoring.org</p> <p>IOTWMS TSPs provide tsunami products</p>		
<b>Dissemination</b>	How is tsunami information disseminated within country?	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media, Television, Megaphone			
	How is warning terminated?	By a message confirm the no threat in our coastal area			
<b>Standard Operating Procedures</b>	SOPs for <b>upstream</b> emergency response:		<b>Support Required to Develop</b>		
	<ul style="list-style-type: none"> <li>• 24/7 Emergency Response Centre: <b>Yes</b></li> <li>• Receiving information from NTWC: <b>Yes</b></li> <li>• Response criteria/decision making: <b>No</b></li> </ul>		<b>SOPs</b>	<b>Human Resources</b>	<b>Infrastructure</b>
			✓	X	✓
			✓	X	✓
		✓	✓	X	

COMOROS				
	Status	Notes/Requirements		
	<p>SOPs for <b>downstream</b> emergency response:</p> <ul style="list-style-type: none"> <li>Warning dissemination: <b>Yes</b></li> <li>Evacuation call procedures: <b>Yes</b></li> <li>Community evacuation procedures: <b>No</b></li> <li>Communication with NTWC: <b>Yes</b></li> <li>Communication with local government: <b>Yes</b></li> <li>Media arrangements: <b>No</b></li> <li>Communication with other stakeholders: <b>Yes</b></li> </ul>	✓	✓	✓
		✓	✓	X
		✓	✓	X
		✓	✓	✓
		X	X	✓
		✓	✓	X
		✓	✓	✓
<b>Evacuation Infrastructure</b>	<ul style="list-style-type: none"> <li>Evacuation shelters: <b>No</b></li> <li>Vertical evacuation shelter: <b>No</b></li> <li>Natural or artificial hill for vertical evacuation: <b>Yes</b></li> <li>Evacuation signage: <b>No</b></li> <li>Evacuation infrastructure integrated in evacuation plan: <b>No</b></li> </ul>			
<b>Tsunami Exercises</b>	<ul style="list-style-type: none"> <li>Tsunami exercises incorporated in national policies: <b>No</b></li> <li>Tsunami exercises incorporated in national guidelines: <b>Yes</b></li> </ul>			
	<p>Level at which exercises are conducted:</p> <ul style="list-style-type: none"> <li>National: <b>Yes</b></li> <li>Regional: <b>Yes</b></li> <li>City: <b>No</b></li> <li>Village: <b>Yes</b></li> <li>Community/neighbourhood: <b>Yes</b></li> <li>School: <b>No</b></li> </ul>			
<b>Public Awareness</b>	<ul style="list-style-type: none"> <li>Responsibility for tsunami public awareness programmes: <b>NDMO</b></li> </ul>			
	<p>Tsunami related education and awareness material available:</p> <ul style="list-style-type: none"> <li>Leaflets or flyers: <b>Yes</b></li> <li>Posters: <b>No</b></li> <li>Booklets: <b>Yes</b></li> <li>Information boards: <b>No</b></li> <li>Tsunami signage: <b>No</b></li> <li>Video or other visual or oral media: <b>No</b></li> <li>Indigenous knowledge, folklore etc: <b>No</b></li> <li>Teaching kits: <b>Yes</b></li> <li>Schools curricula: <b>Yes</b></li> <li>Public evacuation maps: <b>No</b></li> </ul>	<p>Tsunami awareness activities undertaken:</p> <ul style="list-style-type: none"> <li>World Tsunami Awareness Day: <b>Yes (once)</b></li> <li>Global Disaster Risk Reduction Day: <b>Yes (more than 3 times)</b></li> <li>Public tsunami preparedness outreach: <b>No</b></li> <li>School and/or children's awareness: <b>Yes (occasionally)</b></li> <li>Exhibitions: <b>Yes</b></li> <li>Competitions/other ways of highlighting tsunami safety: <b>No</b></li> </ul>		

<b>COMOROS</b>		
	<b>Status</b>	<b>Notes/Requirements</b>
	<ul style="list-style-type: none"> <li>• Provision of general tsunami awareness materials <span style="float: right;">X</span></li> <li>• Customization of general materials to country or community <span style="float: right;">X</span></li> <li>• Development of tsunami awareness programmes, activities or campaigns <span style="float: right;">✓</span></li> <li>• Participation/support by international agencies or experts to your country's activities <span style="float: right;">✓</span></li> </ul>	
	<ul style="list-style-type: none"> <li>• Willing to support other countries to develop or enhance public awareness: <b>No</b></li> <li>• Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>No</b></li> </ul>	
<b>General Comments and Future Plans</b>	<b>General Comments:</b> None provided	
	<b>Future Plans:</b> None provided	

FRANCE INDIAN OCEAN TERRITORIES				
	Status			Notes/Requirements
<b>Policies</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Not available	
	Preparedness	Multi-hazard inc. Tsunami	Not available	
	Emergency Response	Multi-hazard inc. Tsunami	Not available	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Not available	
<b>Plans</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	<b>Community</b>
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Not available	Not available
	Preparedness	Multi-hazard inc. Tsunami	Not available	Not available
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Not available
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Not available	Not available
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>			
<b>Guidelines</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	
	Prevention & Mitigation	<i>No response</i>	<i>No response</i>	
	Preparedness	<i>No response</i>	<i>No response</i>	
	Emergency Response	<i>No response</i>	<i>No response</i>	
	Rehabilitation & Reconstruction	<i>No response</i>	<i>No response</i>	
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard assessment undertaken including: <b>Tsunami, cyclone, earthquakes, flooding, landslide, volcanic eruptions</b></li> <li>• Tsunami hazard assessment undertaken at <b>regional level</b></li> <li>• Products available: <b>inundation map</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Fair</b></li> <li>• Capacity to train other countries: <b>Poor</b> (PTHA, DTHA, field studies) to <b>Moderate</b> (hazard, inundation, evacuation maps)</li> </ul>			<p><b>Notes:</b> Eastern and northern coasts (Saint Benoit - Saint André - Sainte Suzanne - Sainte Marie - Saint Denis - Saint Paul) mapped for tsunami hazard</p>



FRANCE INDIAN OCEAN TERRITORIES			
	Status	Notes/Requirements	
Risk Assessment	<ul style="list-style-type: none"> <li>• Single risk assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard risk assessment undertaken including <b>tsunami, cyclone, flooding, landslides and volcanic eruptions</b></li> <li>• Tsunami risk assessment undertaken at <b>regional level</b></li> <li>• Products available: <b>risk map</b></li> <li>• Capacity to undertake tsunami risk assessment: <b>Good</b></li> <li>• Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Poor</b> (city, village, community level) <b>to moderate</b> (national to regional level)</li> </ul>		
Detection and Warning	<ul style="list-style-type: none"> <li>• National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>• Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>Météo-France</b></li> <li>• Use IOTWMS TSP data or own assessments to determine national threats: <b>Use TSP data</b></li> <li>• 24x7 operations? <b>Yes</b></li> <li>• Level of tsunami threat forecast information produced: <b>Ocean-wide</b></li> <li>• Access to national or international seismic networks: <b>No</b></li> <li>• Access to national or international sea level networks: <b>Yes</b></li> <li>• Other national observing networks used for tsunami early warning: <b>None</b></li> <li>• Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>No</b></li> <li>• Capability for tsunami modelling to support threat forecasts: <b>No</b></li> <li>• Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <i>(No response)</i></li> <li>• Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>		
Dissemination	How is tsunami information disseminated within country?	Email, SMS, Radio, Television, Megaphone	
	How is warning terminated?	Media info and official communication (email - sms)	

FRANCE INDIAN OCEAN TERRITORIES				
	Status	Notes/Requirements		
		Support Required to Develop		
		SOPs	Human Resources	Infrastructure
Standard Operating Procedures	SOPs for <b>upstream</b> emergency response: <ul style="list-style-type: none"> <li>24/7 Emergency Response Centre: <b>Yes</b></li> <li>Receiving information from NTWC: <b>Yes</b></li> <li>Response criteria/decision making: <b>Yes</b></li> </ul>	X X ✓	X X ✓	✓ ✓ ✓
	SOPs for <b>downstream</b> emergency response: <ul style="list-style-type: none"> <li>Warning dissemination: <b>Yes</b></li> <li>Evacuation call procedures: <b>Yes</b></li> <li>Community evacuation procedures: <b>No</b></li> <li>Communication with NTWC: <b>Yes</b></li> <li>Communication with local government: <b>Yes</b></li> <li>Media arrangements: <b>Yes</b></li> <li>Communication with other stakeholders: <b>Yes</b></li> </ul>	✓ ✓ X ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ X X X X	✓ ✓ ✓ X X X X
Evacuation Infrastructure	<ul style="list-style-type: none"> <li>Evacuation shelters: <b>No</b></li> <li>Vertical evacuation shelter: <b>No</b></li> <li>Natural or artificial hill for vertical evacuation: <b>Yes</b></li> <li>Evacuation signage: <b>No</b></li> <li>Evacuation infrastructure integrated in evacuation plan: <b>No</b></li> </ul>			
Tsunami Exercises	<ul style="list-style-type: none"> <li>Tsunami exercises incorporated in national policies: <b>No</b></li> <li>Tsunami exercises incorporated in national guidelines: <b>Yes</b></li> </ul>			
	Level at which exercises are conducted: <ul style="list-style-type: none"> <li>National: <b>No</b></li> <li>Regional: <b>Yes</b></li> <li>City: <b>No</b></li> <li>Village: <b>No</b></li> <li>Community/neighbourhood: <b>No</b></li> <li>School: <b>No</b></li> </ul>			
Public Awareness	Responsibility for tsunami public awareness programmes: <b>NMO</b>			
	Tsunami related education and awareness material available: <ul style="list-style-type: none"> <li>Leaflets or flyers: <b>No</b></li> <li>Posters: <b>No</b></li> </ul>	Tsunami awareness activities undertaken: <ul style="list-style-type: none"> <li>World Tsunami Awareness Day: <b>No</b></li> <li>Global Disaster Risk Reduction Day:</li> </ul>		

FRANCE INDIAN OCEAN TERRITORIES				
	Status		Notes/Requirements	
	<ul style="list-style-type: none"> <li>• Booklets: <b>No</b></li> <li>• Information boards: <b>Yes</b></li> <li>• Tsunami signage: <b>No</b></li> <li>• Video or other visual or oral media: <b>No</b></li> <li>• Indigenous knowledge, folklore etc: <b>No</b></li> <li>• Teaching kits: <b>No</b></li> <li>• Schools curricula: <b>No</b></li> <li>• Public evacuation maps: <b>No</b></li> </ul>		<ul style="list-style-type: none"> <li>• Public tsunami preparedness outreach: <b>No</b></li> <li>• School and/or children's awareness: <b>No</b></li> <li>• Exhibitions: <b>No</b></li> <li>• Competitions/other ways of highlighting tsunami safety: <b>No</b></li> </ul>	
	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>• Provision of general tsunami awareness materials</li> <li>• Customization of general materials to country or community</li> <li>• Development of tsunami awareness programmes, activities or campaigns</li> <li>• Participation/support by international agencies or experts to your country's activities</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>X</li> <li>X</li> <li>X</li> </ul>	
	<ul style="list-style-type: none"> <li>• Willing to support other countries to develop or enhance public awareness: <b>No</b></li> <li>• Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>No</b></li> </ul>			
	<p><b>General Comments and Future Plans</b></p> <p><b>General Comments:</b> None provided</p> <p><b>Future Plans:</b> None provided</p>			

INDIA					
	Status			Notes/Requirements	
Policies	Phase	National	Local		
	Prevention & Mitigation	Standalone tsunami	Multi-hazard inc. Tsunami		<b>Notes:</b> National Disaster Management Guidelines- Management of Tsunamis by National Disaster Management Authority (NDMA)  Multi Hazard Policies are available at Provinces level
	Preparedness	Standalone tsunami	Multi-hazard inc. Tsunami		
	Emergency Response	Standalone tsunami	Multi-hazard inc. Tsunami		
	Rehabilitation & Reconstruction	Standalone tsunami	Multi-hazard inc. Tsunami		
Plans	Phase	National	Local	Community	
	Prevention & Mitigation	Standalone tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Preparedness	Standalone tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Emergency Response	Standalone tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Rehabilitation & Reconstruction	Standalone tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>				
Guidelines	Phase	National	Local		<b>Notes:</b> National Disaster Management Guidelines- Management of Tsunamis by National Disaster Management Authority (NDMA)  Multi Hazard Policies are available at Provinces level
	Prevention & Mitigation	Standalone tsunami	Multi-hazard inc. Tsunami		
	Preparedness	Standalone tsunami	Multi-hazard inc. Tsunami		
	Emergency Response	Standalone tsunami	Multi-hazard inc. Tsunami		
	Rehabilitation & Reconstruction	Standalone tsunami	Multi-hazard inc. Tsunami		
Hazard Assessment	<ul style="list-style-type: none"> <li>Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>Multi-hazard assessment undertaken including: <b>Tsunami, cyclone, flooding</b></li> <li>Tsunami hazard assessment undertaken at <b>national and regional level</b></li> <li>Products available: <b>DTHA, field studies, hazard and inundation map</b></li> <li>Capacity to undertake tsunami hazard assessment: <b>Very good</b></li> <li>Capacity to train other countries: <b>Good</b> (PTHA, field studies, evacuation maps) to <b>very good</b> (DTHA, hazard and inundation maps)</li> </ul>				<b>Notes:</b> Ministry of Environment and Forest (MoEF), Government of India is the nodal agency to implement coastal zone management plan and policy. As part of national policy MoEF is generating the coastal hazard zones. National Centre for Coastal Research (NCCR) and INCOIS are also involved in generation of coastal hazard maps.

INDIA		
	Status	Notes/Requirements
Risk Assessment	<ul style="list-style-type: none"> <li>Single risk assessment on tsunami undertaken: <b>No</b></li> <li>Multi-hazard risk assessment undertaken including <b>tsunami, cyclone, flooding</b></li> <li>Tsunami risk assessment undertaken at <b>national, regional and city levels</b></li> <li>Products available: <b>risk map, guidelines</b></li> <li>Capacity to undertake tsunami risk assessment: <b>Very good</b></li> <li>Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Good</b> (at all levels)</li> </ul>	<p><b>Notes:</b> Entire coastline of India except Andaman and Nicobar Islands Province has been mapped. Coastal cities of 9 provinces are at risk from tsunami. Indian National Centre for Ocean Information Services (INCOIS); National Centre for Coastal Research (NCCR) can provide training/consultancy</p>
Detection and Warning	<ul style="list-style-type: none"> <li>National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>Indian Tsunami Early Warning Centre (ITEWC) at INCOIS</b></li> <li>Use IOTWMS TSP data or own assessment to determine national threats? <b>Use TSP data and own threat assessment</b></li> <li>24x7 operations? <b>Yes</b></li> <li>Level of tsunami threat forecast information produced: <b>Ocean-wide, national and local</b></li> <li>Access to national or international seismic networks: <b>Yes</b> (see notes)</li> <li>Access to national or international sea level networks: <b>Yes</b> (see notes)</li> <li>Other national observing networks used for tsunami early warning: <b>GNSS/GPS, Coastal radars</b> (see notes)</li> <li>Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>Yes</b></li> <li>Capability for tsunami modelling to support threat forecasts: <b>Yes</b> (see notes)</li> <li>Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>	<p><b>Notes:</b></p> <p>National Seismic Network (RTSMN &amp; ISGN) through VSAT connectivity 2. International seismic data from GSN &amp; IRIS servers through Internet (seedlink)</p> <p>National sea level data through INSAT, GPRS &amp; Iridium connectivity. International sea level data from NOAA- NDBC &amp; IOC sea level station monitoring facility servers through internet.</p> <p>35 Nos of GNSS stations &amp; 10 Nos of HF Radars operated by INCOIS</p> <p>In-house developed application which uses TUNAMI-N2 and ADCIRC models</p>
Dissemination	How is tsunami information disseminated within country?	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media, Door-to-door, Sirens, Television, Warning towers, Megaphone, Police/military, VHF radio, VPN
	How is warning terminated?	After receiving the final bulletin from INCOIS, local DMOs are taking decision on termination of warning situation.
Standard		<b>Support Required to: Develop</b>

INDIA							
	Status		Notes/Requirements				
Operating Procedures	SOPs for <b>upstream</b> emergency response:		<b>SOPs</b>	<b>Human Resources</b>	<b>Infrastructure</b>		
	<ul style="list-style-type: none"> <li>24/7 Emergency Response Centre: <b>Yes</b></li> <li>Receiving information from NTWC: <b>Yes</b></li> <li>Response criteria/decision making: <b>Yes</b></li> </ul>		✓ ✓ ✓	✓ X X	✓ X X		
Operating Procedures	SOPs for <b>downstream</b> emergency response:						
	<ul style="list-style-type: none"> <li>Warning dissemination: <b>Yes</b></li> <li>Evacuation call procedures: <b>Yes</b></li> <li>Community evacuation procedures: <b>No</b></li> <li>Communication with NTWC: <b>Yes</b></li> <li>Communication with local government: <b>Yes</b></li> <li>Media arrangements: <b>Yes</b></li> <li>Communication with other stakeholders: <b>Yes</b></li> </ul>		X X X X X X X	X ✓ ✓ X X X X	X ✓ ✓ X X X X		
	Evacuation Infrastructure	<ul style="list-style-type: none"> <li>Evacuation shelters: <b>Yes</b></li> <li>Vertical evacuation shelter: <b>Yes</b></li> <li>Natural or artificial hill for vertical evacuation: <b>Yes</b></li> <li>Evacuation signage: <b>Yes</b></li> <li>Evacuation infrastructure integrated in evacuation plan: <b>Yes</b></li> </ul>		<b>Notes:</b> Evacuation shelters are available at Province Level. Around 60% of risk prone areas covered Natural hills are available in few coastal provinces Evacuation signage is available in few places			
		Tsunami Exercises	<ul style="list-style-type: none"> <li>Tsunami exercises incorporated in national policies: <b>Yes</b></li> <li>Tsunami exercises incorporated in national guidelines: <b>Yes</b></li> </ul>				
			Level at which exercises are conducted: <ul style="list-style-type: none"> <li>National: <b>Yes</b></li> <li>Regional: <b>Yes</b></li> <li>City: <b>Yes</b></li> <li>Village: <b>Yes</b></li> <li>Community/neighbourhood: <b>Yes</b></li> <li>School: <b>Yes</b></li> </ul>				
		Public Awareness	<ul style="list-style-type: none"> <li>Responsibility for tsunami public awareness programmes: <b>NDMO</b></li> </ul>				
			Tsunami related education and awareness material available: <ul style="list-style-type: none"> <li>Leaflets or flyers: <b>Yes</b></li> <li>Posters: <b>Yes</b></li> <li>Booklets: <b>Yes</b></li> </ul>	Tsunami awareness activities undertaken: <ul style="list-style-type: none"> <li>World Tsunami Awareness Day: <b>Yes</b> (2 times)</li> <li>Global Disaster Risk Reduction Day:</li> </ul>			

INDIA			
	Status	Notes/Requirements	
	<ul style="list-style-type: none"> <li>Information boards: <b>No</b></li> <li>Tsunami signage: <b>Yes</b></li> <li>Video or other visual or oral media: <b>Yes</b></li> <li>Indigenous knowledge, folklore etc: <b>Yes</b></li> <li>Teaching kits: <b>Yes</b></li> <li>Schools curricula: <b>No</b></li> <li>Public evacuation maps: <b>Yes</b></li> </ul>	<p style="text-align: center;"><b>No</b></p> <ul style="list-style-type: none"> <li>Public tsunami preparedness outreach: <b>Yes</b> (4 times)</li> <li>School and/or children's awareness: <b>Yes</b> (&gt;50 times))</li> <li>Exhibitions: <b>Yes</b> (4 times)</li> <li>Competitions/other ways of highlighting tsunami safety: <b>Yes</b> (1 time)</li> <li>Tsunami exercise: <b>Yes</b> (3 times)</li> </ul>	
	Support from IOTIC required to develop or enhance public awareness:	<ul style="list-style-type: none"> <li>Provision of general tsunami awareness materials ✓</li> <li>Customization of general materials to country or community ✓</li> <li>Development of tsunami awareness programmes, activities or campaigns ✓</li> <li>Participation/support by international agencies or experts to your country's activities ✓</li> </ul>	
	<ul style="list-style-type: none"> <li>Willing to support other countries to develop or enhance public awareness: <b>Yes</b></li> <li>Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>Yes</b></li> </ul>	<p><b>Notes:</b> Training on preparing SOPs, GIS maps, tsunami modelling, Seismic &amp; Sea level analysis, preparation of education material etc</p> <p>In Odisha Province, 6 communities are piloting the IOTR programme. Community Names: 1) Jayadevkasaba Pahi 2) Podhuan 3) Tantiapal Sasan 4) Noliasahi 5) Keutajanga 6) Venkatraipur</p>	
<b>General Comments and Future Plans</b>	<p><b>General Comments:</b> INCOIS has initiated preliminary work on cutting edge research areas such as:</p> <ul style="list-style-type: none"> <li>Multi-hazard Vulnerability Mapping has been done for most vulnerable areas</li> <li>Real-time tsunami inundation modelling using ADCIRC has been evaluated and ready for operational usage</li> <li>3D GIS Mapping has been completed for around 5000 sq.km area</li> <li>Conducted National SOP workshops, Mock exercise, WTAD, Open days, Exhibitions, etc.</li> </ul>		
	<p><b>Future Plans:</b></p> <ul style="list-style-type: none"> <li>Enhance observational network by deployment of additional stations</li> <li>Enhancements in Tsunami Modelling and Sea-level Inversion</li> <li>Utilization of real-time GNSS &amp; SMA data for rupture characterization of the tsunamigenic earthquakes</li> <li>Implementation of Service Level 3 inundation modelling for Indian Ocean coastal zones</li> <li>Development of webpage to calculate performance indicators of all TSPs automatically</li> </ul>		

INDIA		
	Status	Notes/Requirements
	<ul style="list-style-type: none"><li>• Continuing technical enhancements as part of the new IOTWMS Service Definition from time to time</li><li>• Contribute to training and capacity building activities as per the requirements of the ICG/IOTWMS</li><li>• Contribute to the planning and conduct of ongoing 6-monthly IOTWMS COMMs Tests</li></ul>	



INDONESIA					
	Status			Notes/Requirements	
Policies	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> UU No. 24 tahun 2007 (for general policy)
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
Plans	<b>Phase</b>	<b>National</b>	<b>Local</b>	<b>Community</b>	<b>Notes:</b> NDMO (BNPB) and UNDP
	Prevention & Mitigation	Standalone Tsunami only	Standalone Tsunami	Standalone Tsunami	
	Preparedness	Standalone Tsunami only	Standalone Tsunami	Standalone Tsunami	
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>				
Guidelines	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> SNI rambu evakuasi Tsunami (sign evacuation), SNI Jalur Evakuasi Tsunami (Evacuation route), SNI Sirine Peringatan Dini Tsunami (Siren of Early Warning System), SNI Manajemen Pelatihan menghadapi bencana tsunami (Manajemen Training for Tsunami Disaster)
	Prevention & Mitigation	Standalone Tsunami	Not available		
	Preparedness	Standalone Tsunami	Not available		
	Emergency Response	Multi-hazard inc. Tsunami	Not available		
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Not available		
Hazard Assessment	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard assessment undertaken including: <b>Tsunami, flooding, earthquakes, epidemics, landslide, volcanic eruptions, forest and land fires</b></li> <li>• Tsunami hazard assessment undertaken at <b>national, regional, city and village levels</b></li> <li>• Products available: <b>PTHA, field studies, hazard, inundation map and evacuation maps, guidelines</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Fair</b></li> <li>• Capacity to train other countries: <i>No response</i></li> </ul>			<b>Notes:</b> Guidelines on tsunami evacuation and tsunami warning signs.  Nearly 100% Indonesia has a basic map in Inarisk, which can be used as a calculation for tsunami hazards with a modified scenario.	

INDONESIA		
	Status	Notes/Requirements
Risk Assessment	<ul style="list-style-type: none"> <li>• Single risk assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard risk assessment undertaken including <b>tsunami, drought, earthquake, flooding, landslides, volcanic eruptions</b></li> <li>• Tsunami risk assessment undertaken at <b>national, regional, city and village levels</b></li> <li>• Products available: <b>risk map and evacuation maps, action plan, evacuation signs, information boards</b></li> <li>• Capacity to undertake tsunami risk assessment: <b>Good</b></li> <li>• Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Good</b> (national level) to <b>Moderate</b> (regional, city, village, community levels)</li> </ul>	<p><b>Notes:</b> 26 provinces are included in the tsunami risk areas</p>
Detection and Warning	<ul style="list-style-type: none"> <li>• National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>• Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>BMKG, BNPB, BPBD, BASARNAS</b></li> <li>• Use IOTWMS TSP data or own assessment to determine national threats? <b>Use TSP data and own threat assessment</b></li> <li>• 24x7 operations? <b>Yes</b></li> <li>• Level of tsunami threat forecast information produced: <b>Ocean-wide, national and local</b></li> <li>• Access to national or international seismic networks: <b>Yes</b> (see notes)</li> <li>• Access to national or international sea level networks: <b>Yes</b> (see notes)</li> <li>• Other national observing networks used for tsunami early warning: <b>None</b></li> <li>• Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>Yes</b></li> <li>• Capability for tsunami modelling to support threat forecasts: <b>Yes</b> (see notes)</li> <li>• Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>No</b></li> <li>• Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>	<p><b>Notes:</b> BMKG = NTWC BNPB = NDMO BPBD = LDMO BASARNAS = National Search and Rescue Agency</p> <p>The list of seismic and sea level stations operated by Indonesia collated by IOTWMS Secretariat as many seismic stations have been added and some sea level stations have been decommissioned.</p> <p>BMKG is the agency responsible for providing tsunami products</p>
Dissemination	How is tsunami information disseminated within country?	Email, SMS, Fax, Webpage, Radio, WhatsApp / Facebook / Other social, media, Sirens, Television, Police/military, DVB-WRS
	How is warning terminated?	Based on: sea level observation and monitoring; Modelling Tsunami on the last ETA +2 hours

INDONESIA																								
	Status		Notes/Requirements																					
Standard Operating Procedures	SOPs for <b>upstream</b> emergency response: <ul style="list-style-type: none"> <li>• 24/7 Emergency Response Centre: <b>Yes</b></li> <li>• Receiving information from NTWC: <b>Yes</b></li> <li>• Response <b>criteria</b>/decision making: <b>Yes</b></li> </ul>		<b>Support Required to Develop</b> <table border="1"> <thead> <tr> <th>SOPs</th> <th>Human Resources</th> <th>Infrastructure</th> </tr> </thead> <tbody> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> </tbody> </table>	SOPs	Human Resources	Infrastructure	✓	✓	✓	✓	✓	✓	✓	✓	✓									
	SOPs	Human Resources	Infrastructure																					
✓	✓	✓																						
✓	✓	✓																						
✓	✓	✓																						
	SOPs for <b>downstream</b> emergency response: <ul style="list-style-type: none"> <li>• Warning dissemination: <b>Yes</b></li> <li>• Evacuation call procedures: <b>Yes</b></li> <li>• Community evacuation procedures: <b>No</b></li> <li>• Communication with NTWC: <b>Yes</b></li> <li>• Communication with local government: <b>Yes</b></li> <li>• Media arrangements: <b>Yes</b></li> <li>• <b>Communication</b> with other stakeholders: <b>Yes</b></li> </ul>		<table border="1"> <tbody> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> </tbody> </table>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
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Evacuation Infrastructure	<ul style="list-style-type: none"> <li>• Evacuation shelters: <b>Yes</b></li> <li>• Vertical evacuation shelter: <b>Yes</b></li> <li>• Natural or artificial hill for vertical evacuation: <b>Yes</b></li> <li>• Evacuation signage: <b>Yes</b></li> <li>• Evacuation infrastructure integrated in evacuation plan: <b>Yes</b></li> </ul>		<b>Notes:</b> <ul style="list-style-type: none"> <li>• Many areas such as at Padang, Pacitan, Bali</li> <li>• Many areas</li> <li>• Due to limit area, we had explored for Pandeglang</li> <li>• All evacuation areas given the signage</li> </ul>																					
Tsunami Exercises	<ul style="list-style-type: none"> <li>• Tsunami exercises incorporated in national policies: <b>Yes</b></li> <li>• Tsunami exercises incorporated in national guidelines: <b>Yes</b></li> </ul>																							
	Level at which exercises are conducted: <ul style="list-style-type: none"> <li>• National: <b>Yes</b></li> <li>• Regional: <b>Yes</b></li> <li>• City: <b>No</b></li> <li>• Village: <b>No</b></li> <li>• Community/neighbourhood: <b>No</b></li> <li>• School: <b>No</b></li> </ul>																							
Public Awareness	<ul style="list-style-type: none"> <li>• Responsibility for tsunami public awareness programmes: <b>NTWC</b></li> </ul>																							
	Tsunami related education and awareness material available: <ul style="list-style-type: none"> <li>• Leaflets or flyers: <b>Yes</b></li> <li>• Posters: <b>Yes</b></li> </ul>	Tsunami awareness activities undertaken: <ul style="list-style-type: none"> <li>• World Tsunami Awareness Day: <b>No</b></li> <li>• Global Disaster Risk Reduction Day:</li> </ul>																						

INDONESIA					
	Status	Notes/Requirements			
	<ul style="list-style-type: none"> <li>• Booklets: <b>Yes</b></li> <li>• Information boards: <b>Yes</b></li> <li>• Tsunami signage: <b>Yes</b></li> <li>• Video or other visual or oral media: <b>Yes</b></li> <li>• Indigenous knowledge, folklore etc: <b>Yes</b></li> <li>• Teaching kits: <b>Yes</b></li> <li>• Schools curricula: <b>No</b></li> <li>• Public evacuation maps: <b>Yes</b></li> </ul>	<p style="text-align: center;"><b>No</b></p> <ul style="list-style-type: none"> <li>• Public tsunami preparedness outreach: <b>Yes</b> (1 time)</li> <li>• School and/or children’s awareness: <b>Yes</b> (&gt;5 times))</li> <li>• Exhibitions: <b>Yes</b> (&gt;3 times/year)</li> <li>• Competitions/other ways of highlighting tsunami safety: <b>No</b></li> <li>• Tsunami exercise: <b>Yes</b> (2 times/year)</li> </ul>			
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; vertical-align: top;">                     Support from IOTIC required to develop or enhance public awareness                 </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> <li>• Provision of general tsunami awareness materials <span style="float: right;">✓</span></li> <li>• Customization of general materials to country or community <span style="float: right;">X</span></li> <li>• Development of tsunami awareness programmes, activities or campaigns <span style="float: right;">X</span></li> <li>• Participation/support by international agencies or experts to your country’s activities <span style="float: right;">✓</span></li> </ul> </td> </tr> </table>	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>• Provision of general tsunami awareness materials <span style="float: right;">✓</span></li> <li>• Customization of general materials to country or community <span style="float: right;">X</span></li> <li>• Development of tsunami awareness programmes, activities or campaigns <span style="float: right;">X</span></li> <li>• Participation/support by international agencies or experts to your country’s activities <span style="float: right;">✓</span></li> </ul>		
	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>• Provision of general tsunami awareness materials <span style="float: right;">✓</span></li> <li>• Customization of general materials to country or community <span style="float: right;">X</span></li> <li>• Development of tsunami awareness programmes, activities or campaigns <span style="float: right;">X</span></li> <li>• Participation/support by international agencies or experts to your country’s activities <span style="float: right;">✓</span></li> </ul>			
	<ul style="list-style-type: none"> <li>• Willing to support other countries to develop or enhance public awareness: <b>Yes</b></li> <li>• Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>Yes</b></li> </ul>		<p><b>Notes:</b> BMKG has cooperated with IOTIC for 5 (five) consecutive years since 2017 until 2021</p> <p>NDMO (BNPB) has developed Destana (Disaster Resilience Village ) at several villages spreading in Indonesia</p>		
<b>General Comments and Future Plans</b>	<p><b>General Comments:</b>                      BMKG as NTWC currently focusing on Tsunami Early Warning caused by the volcano eruption, we realized that we need to establish our system, capacity building and public awareness to deal with Tsunami in Indonesia. This establishing might implicate the NDMO, Media and many stakeholders to educate the society about awareness of vulnerability hazard of the tsunami and its cause not only from earthquake.</p> <p><b>Future Plans:</b>                      BMKG and many stakeholders make some cooperation for preparing the Standard Operating Procedure for each institute in order to make synergy tsunami evacuation, then the output will be the regulation for tsunami evacuation</p>				

IRAN					
	Status			Notes/Requirements	
<b>Policies</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> National and local tsunami policies are undergoing preparation
	Prevention & Mitigation	<i>No response</i>	<i>No response</i>		
	Preparedness	<i>No response</i>	<i>No response</i>		
	Emergency Response	<i>No response</i>	<i>No response</i>		
	Rehabilitation & Reconstruction	<i>No response</i>	<i>No response</i>		
<b>Plans</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	<b>Community</b>	<b>Notes:</b> Plans are under development
	Prevention & Mitigation	<i>No response</i>	<i>No response</i>	<i>No response</i>	
	Preparedness	<i>No response</i>	<i>No response</i>	<i>No response</i>	
	Emergency Response	<i>No response</i>	<i>No response</i>	<i>No response</i>	
	Rehabilitation & Reconstruction	<i>No response</i>	<i>No response</i>	<i>No response</i>	
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>				
<b>Guidelines</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		
	Prevention & Mitigation	<i>No response</i>	<i>No response</i>		
	Preparedness	<i>No response</i>	<i>No response</i>		
	Emergency Response	<i>No response</i>	<i>No response</i>		
	Rehabilitation & Reconstruction	<i>No response</i>	<i>No response</i>		
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard assessment undertaken including: <b>Tsunami, cyclone, drought, earthquakes, epidemics, flooding, landslides</b></li> <li>• Tsunami hazard assessment undertaken at <b>regional and village levels</b></li> <li>• Products available: <b>DTHA, tsunami hazard analysis, hazard map, inundation map, evacuation map, guidelines</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Good</b></li> <li>• Capacity to train other countries: <b>Moderate</b> (IPTHA and field studies) to <b>Very Good</b> (hazard, inundation and evacuation mapping)</li> </ul>				<b>Notes:</b> 100% of Chabahar and 20% of Jask region have been mapped for tsunami hazard.  Guidelines provided in Educational Brochure

IRAN								
	Status		Notes/Requirements					
<b>Risk Assessment</b>	<ul style="list-style-type: none"> <li>Single risk assessment on tsunami undertaken: <b>No</b></li> <li>Multi-hazard risk assessment undertaken including <i>No response</i></li> <li>Tsunami risk assessment undertaken at [level]: <i>No response</i></li> <li>Products available: <i>No response</i></li> <li>Capacity to undertake tsunami risk assessment: <i>No response</i></li> <li>Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <i>No response</i></li> </ul>							
<b>Detection and Warning</b>	<ul style="list-style-type: none"> <li>National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>Iranian National Institute for Oceanography and Atmospheric Science</b></li> <li>Use IOTWMS TSP data or own assessment to determine national threats? <b>Use TSP data and own threat assessment</b></li> <li>24x7 operations? <b>No</b></li> <li>Level of tsunami threat forecast information produced: <b>National and local level</b></li> <li>Access to national or international seismic networks: <b>Yes</b> (see notes)</li> <li>Access to national or international sea level networks: <b>Yes</b> (see notes)</li> <li>Other national observing networks used for tsunami early warning: <b>None</b></li> <li>Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>No</b></li> <li>Capability for tsunami modelling to support threat forecasts: <b>Yes</b> (see notes)</li> <li>Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>		<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>Institute of Geophysics University of Tehran (IGUT)</li> <li>loc-sealevelmonitoring.org</li> <li>Use ComMIT</li> </ul>					
<b>Dissemination</b>	How is tsunami information disseminated within country?	Email, SMS, Telephone, Fax, Webpage, WhatsApp / Facebook / Other social media, Sirens						
	How is warning terminated?	When sea level would be less than 0.5 meters according to observation and model results						
<b>Standard Operating Procedures</b>	SOPs for <b>upstream</b> emergency response:		<b>Support Required to Develop</b>					
	<ul style="list-style-type: none"> <li>24/7 Emergency Response Centre: <i>No response</i></li> <li>Receiving information from NTWC: <i>No response</i></li> <li>Response criteria/decision making: <i>No response</i></li> </ul>		<table border="1"> <thead> <tr> <th>SOPs</th> <th>Human Resources</th> <th>Infrastructure</th> </tr> </thead> <tbody> <tr> <td><i>No response</i></td> <td><i>No response</i></td> <td><i>No response</i></td> </tr> </tbody> </table>	SOPs	Human Resources	Infrastructure	<i>No response</i>	<i>No response</i>
SOPs	Human Resources	Infrastructure						
<i>No response</i>	<i>No response</i>	<i>No response</i>						

IRAN				
	Status	Notes/Requirements		
	<p>SOPs for <b>downstream</b> emergency response:</p> <ul style="list-style-type: none"> <li>Warning dissemination: <i>No response</i></li> <li>Evacuation call procedures: <i>No response</i></li> <li>Community evacuation procedures: <i>No response</i></li> <li>Communication with NTWC: <i>No response</i></li> <li>Communication with local government: <i>No response</i></li> <li>Media arrangements: <i>No response</i></li> <li>Communication with other stakeholders: <i>No response</i></li> </ul>	<i>No response</i>	<i>No response</i>	<i>No response</i>
<b>Evacuation Infrastructure</b>	<ul style="list-style-type: none"> <li>Evacuation shelters: <b>No</b></li> <li>Vertical evacuation shelter: <b>No</b></li> <li>Natural or artificial hill for vertical evacuation: <b>Yes</b></li> <li>Evacuation signage: <b>No</b></li> <li>Evacuation infrastructure integrated in evacuation plan: <b>Yes</b></li> </ul>			
<b>Tsunami Exercises</b>	<ul style="list-style-type: none"> <li>Tsunami exercises incorporated in national policies: <i>No response</i></li> <li>Tsunami exercises incorporated in national guidelines: <i>No response</i></li> </ul>			
	<p>Level at which exercises are conducted:</p> <ul style="list-style-type: none"> <li>National: <b>No</b></li> <li>Regional: <b>No</b></li> <li>City: <b>No</b></li> <li>Village: <b>Yes</b></li> <li>Community/neighbourhood: <b>No</b></li> <li>School: <b>No</b></li> </ul>			
<b>Public Awareness</b>	<ul style="list-style-type: none"> <li>Responsibility for tsunami public awareness programmes: <b>NTWC</b></li> </ul>			
	<p>Tsunami related education and awareness material available:</p> <ul style="list-style-type: none"> <li>Leaflets or flyers: <b>No</b></li> <li>Posters: <b>Yes</b></li> <li>Booklets: <b>Yes</b></li> <li>Information boards: <b>No</b></li> <li>Tsunami signage: <b>No</b></li> <li>Video or other visual or oral media: <b>No</b></li> <li>Indigenous knowledge, folklore etc: <b>No</b></li> <li>Teaching kits: <b>No</b></li> <li>Schools curricula: <b>Yes</b></li> <li>Public evacuation maps: <b>No</b></li> </ul>	<p>Tsunami awareness activities undertaken:</p> <ul style="list-style-type: none"> <li>World Tsunami Awareness Day: <b>Yes</b> (1 time – 2018)</li> <li>Global Disaster Risk Reduction Day: <i>No response</i></li> <li>Public tsunami preparedness outreach: <b>Yes</b></li> <li>School and/or children’s awareness: <b>Yes</b></li> <li>Exhibitions: <b>No</b></li> <li>Competitions/other ways of</li> </ul>		

IRAN		
	Status	Notes/Requirements
	<ul style="list-style-type: none"> <li>highlighting tsunami safety: <b>No</b></li> <li>Tsunami exercise: <b>Yes</b></li> </ul>	
	Support from IOTIC required to develop or enhance public awareness <ul style="list-style-type: none"> <li>Provision of general tsunami awareness materials ✓</li> <li>Customization of general materials to country or community ✓</li> <li>Development of tsunami awareness programmes, activities or campaigns ✓</li> <li>Participation/support by international agencies or experts to your country's activities ✓</li> </ul>	
	<ul style="list-style-type: none"> <li>Willing to support other countries to develop or enhance public awareness: <b>No</b></li> <li>Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>No</b></li> </ul>	
	<p><b>General Comments:</b>            Developing inundation and evacuation maps for Chabahar and Jask Building a dedicated website for tsunami warnings and bulletins Setting up SMS and Fax panels for issuing warnings and bulletins.</p> <p><b>Future Plans:</b>            Iranian National Center for Ocean Hazards has planned its future improvements as follows:</p> <ul style="list-style-type: none"> <li>Make the warning dissemination process automated.</li> <li>Develop and integrate NTWC, NDMO, and LDMO tsunami Standard Operating Procedures. Cooperate with more organizations to improve their involvement in tsunami exercises.</li> <li>Continue numerical Modeling for different parts of Iranian coastline. Produce inundation and evacuation maps.</li> <li>Set up inter-organizational tsunami exercises. Improve education and public awareness.</li> </ul>	



KENYA					
	Status			Notes/Requirements	
<b>Policies</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> National Disaster Management Policy
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
<b>Plans</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	<b>Community</b>	<b>Notes:</b> National Disaster Response Plan
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Not Available	Not Available	
	Preparedness	Multi-hazard inc. Tsunami	Not Available	Not Available	
	Emergency Response	Multi-hazard inc. Tsunami	Not Available	Not Available	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Not Available	Not Available	
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>				
<b>Guidelines</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> Standard Operating Procedures
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard assessment undertaken including: <b>Tsunami, cyclone, drought, earthquakes, epidemics, flooding, landslides, volcanic eruptions, lightning</b></li> <li>• Tsunami hazard assessment undertaken at <b>national level</b></li> <li>• Products available: <b>Guidelines, historic data</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Fair</b></li> <li>• Capacity to train other countries: <b>No capacity</b></li> </ul>				

KENYA		
	Status	Notes/Requirements
<b>Risk Assessment</b>	<ul style="list-style-type: none"> <li>• Single risk assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard risk assessment undertaken including <b>tsunami, cyclone, drought, earthquakes, epidemics, flooding, landslides, volcanic eruptions, lightning</b></li> <li>• Tsunami risk assessment undertaken at <b>national level</b></li> <li>• Products available: <b>None</b></li> <li>• Capacity to undertake tsunami risk assessment: <b>Very poor</b></li> <li>• Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Poor</b> (at all levels)</li> </ul>	
<b>Detection and Warning</b>	<ul style="list-style-type: none"> <li>• National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>• Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>Kenya Meteorological Department NTWC</b></li> <li>• Use IOTWMS TSP data or own assessment to determine national threats? <b>Use TSP data</b></li> <li>• 24x7 operations? <b>Yes</b></li> <li>• Level of tsunami threat forecast information produced: <b>Ocean-wide</b></li> <li>• Access to national or international seismic networks: <b>Yes</b></li> <li>• Access to national or international sea level networks: <b>Yes</b> (see notes)</li> <li>• Other national observing networks used for tsunami early warning: <b>None</b></li> <li>• Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>Yes</b> (see notes)</li> <li>• Capability for tsunami modelling to support threat forecasts: <b>Yes</b> (see notes)</li> <li>• Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>• Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>	<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• National sea level networks currently out of service but can be accessed through GTS</li> <li>• Capability to analyse seismic and sea level data and tsunami modelling exists but is not adequate</li> </ul>
<b>Dissemination</b>	How is tsunami information disseminated within country?	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media, Door-to-door, Sirens, Television, Warning towers, Megaphone, Police/military, VHF radio, VPN
	How is warning terminated?	After receiving the final bulletin from INCOIS, local DMOs are taking decision on termination of warning situation.

KENYA																								
	Status		Notes/Requirements																					
Standard Operating Procedures	SOPs for <b>upstream</b> emergency response: <ul style="list-style-type: none"> <li>• 24/7 Emergency Response Centre: <b>Yes</b></li> <li>• Receiving information from NTWC: <b>Yes</b></li> <li>• Response criteria/decision making: <b>Yes</b></li> </ul>		<b>Support Required to Develop</b> <table border="1"> <thead> <tr> <th>SOPs</th> <th>Human Resources</th> <th>Infrastructure</th> </tr> </thead> <tbody> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> </tbody> </table>	SOPs	Human Resources	Infrastructure	✓	✓	✓	✓	✓	✓	✓	✓	✓									
	SOPs	Human Resources	Infrastructure																					
✓	✓	✓																						
✓	✓	✓																						
✓	✓	✓																						
	SOPs for <b>downstream</b> emergency response: <ul style="list-style-type: none"> <li>• Warning dissemination: <b>Yes</b></li> <li>• Evacuation call procedures: <b>Yes</b></li> <li>• Community evacuation procedures: <b>No</b></li> <li>• Communication with NTWC: <b>Yes</b></li> <li>• Communication with local government: <b>Yes</b></li> <li>• Media arrangements: <b>Yes</b></li> <li>• Communication with other stakeholders: <b>Yes</b></li> </ul>		<table border="1"> <tbody> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> </tbody> </table>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
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Evacuation Infrastructure	<ul style="list-style-type: none"> <li>• Evacuation shelters: <b>Yes</b></li> <li>• Vertical evacuation shelter: <b>No</b></li> <li>• Natural or artificial hill for vertical evacuation: <b>No</b></li> <li>• Evacuation signage: <b>Yes</b></li> <li>• Evacuation infrastructure integrated in evacuation plan: <b>Yes</b></li> </ul>		<b>Notes:</b> <ul style="list-style-type: none"> <li>• All coastal towns use tents as evacuation shelters</li> <li>• Signage in limited places where known or common knowledge to the communities</li> </ul>																					
Tsunami Exercises	<ul style="list-style-type: none"> <li>• Tsunami exercises incorporated in national policies: <b>Yes</b></li> <li>• Tsunami exercises incorporated in national guidelines: <b>Yes</b></li> </ul>																							
	Level at which exercises are conducted: <ul style="list-style-type: none"> <li>• National: <b>Yes</b></li> <li>• Regional: <b>Yes</b></li> <li>• City: <b>No</b></li> <li>• Village: <b>No</b></li> <li>• Community/neighbourhood: <b>No</b></li> <li>• School: <b>No</b></li> </ul>																							
Public Awareness	<ul style="list-style-type: none"> <li>• Responsibility for tsunami public awareness programmes: <b>NDMO</b></li> </ul>																							
	Tsunami related education and awareness material available: <ul style="list-style-type: none"> <li>• Leaflets or flyers: <b>Yes</b></li> <li>• Posters: <b>Yes</b></li> </ul>	Tsunami awareness activities undertaken: <ul style="list-style-type: none"> <li>• World Tsunami Awareness Day: <b>Yes</b> (Annual)</li> <li>• Global Disaster Risk Reduction Day: <b>Yes</b></li> </ul>																						

KENYA			
	Status	Notes/Requirements	
	<ul style="list-style-type: none"> <li>• Booklets: <b>Yes</b></li> <li>• Information boards: <b>No</b></li> <li>• Tsunami signage: <b>Yes</b></li> <li>• Video or other visual or oral media: <b>Yes</b></li> <li>• Indigenous knowledge, folklore etc: <b>Yes</b></li> <li>• Teaching kits: <b>Yes</b></li> <li>• Schools curricula: <b>Yes</b></li> <li>• Public evacuation maps: <b>Yes</b></li> </ul>	((Annual) <ul style="list-style-type: none"> <li>• Public tsunami preparedness outreach: <b>Yes</b> (Annual)</li> <li>• School and/or children's awareness: <b>Yes</b> (Annual)</li> <li>• Exhibitions: <b>Yes</b> (Annual)</li> <li>• Competitions/other ways of highlighting tsunami safety: <b>No</b></li> <li>• Tsunami exercise: <b>Yes</b> (biennial IOWave)</li> </ul>	
	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>• Provision of general tsunami awareness materials ✓</li> <li>• Customization of general materials to country or community ✓</li> <li>• Development of tsunami awareness programmes, activities or campaigns ✓</li> <li>• Participation/support by international agencies or experts to your country's activities ✓</li> </ul>	
	<ul style="list-style-type: none"> <li>• Willing to support other countries to develop or enhance public awareness: <b>Yes</b></li> <li>• Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>Yes</b></li> </ul>	<b>Notes:</b> <ul style="list-style-type: none"> <li>• Skills on SOP development, public awareness, advocacy, material development</li> <li>• Kilifi Blue Beach area</li> </ul>	
<b>General Comments and Future Plans</b>	<b>General Comments:</b> The NTWC has been collaborating with many stakeholders in IOWAVE and IOTR activities. In these events, we have raised the capacity of the stakeholders and affected communities. We have carried out Tsunami Drills in different coastal locations all of which has utilised community participation as well as key stakeholders. Majority of the stakeholders are now aware of their roles in tsunami warning operations. We have also upscaled our communication systems to be more alert and responsive. Our staff at the NTWC are 24/7 alert.		
	<b>Future Plans:</b> Other innovations include planned seismic and tidal gauge stations enhancement, buoys and other sea level measurements instruments and equipment		

MADAGASCAR					
	Status			Notes/Requirements	
<b>Policies</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> National Policy of Disaster and Risk Management (Law no.2015-031) taking into account of multi hazard and multi-risk approach. One policy for the four disaster management phases. In addition to the policy, we also have the National Strategy of Disaster and Risk Management
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
<b>Plans</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	<b>Community</b>	<b>Notes:</b> 1) National Contingency Plan with multi-hazard approach 2) Regional Contingency Plans with multi-hazard approach: - Vatovavy Fitovinany Regional Contingency Plan including tsunami - Atsimo Atsinanana Regional Contingency Plan including tsunami 3) Contingency Plan of Sainte Marie Island including tsunami
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>				
<b>Guidelines</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> National Rapid Reaction Matrix on Tsunami  Regional / local Rapid Reaction Matrix on Tsunami
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard assessment undertaken including: <b>Tsunami, cyclone, drought, earthquakes, epidemics, flooding, landslides</b></li> <li>• Tsunami hazard assessment undertaken at <b>national, regional and city levels</b></li> <li>• Products available: <b>Inundation and evacuation maps</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Poor</b></li> <li>• Capacity to train other countries: <b>Poor</b></li> </ul>			<b>Notes:</b> Conducted by Institute and Observatory of Geophysics of Antananarivo (IOGA), Bureau National de Gestion des Risque et des Catastrophes (BNGRC)  Manakara (eastern coast of Madagascar, map still in improvement) The other cities on going	

MADAGASCAR						
	Status	Notes/Requirements				
<b>Risk Assessment</b>	<ul style="list-style-type: none"> <li>• Single risk assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard risk assessment undertaken including <b>tsunami, cyclone, drought, earthquakes, epidemics, flooding, landslides</b></li> <li>• Tsunami risk assessment undertaken at <b>national, regional and city levels</b></li> <li>• Products available: <b>Evacuation map</b></li> <li>• Capacity to undertake tsunami risk assessment: <b>Poor</b></li> <li>• Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Poor</b> (at all levels)</li> </ul>	<p><b>Notes:</b> Conducted by Institute and Observatory of Geophysics of Antananarivo (IOGA) / Bureau National de Gestion des Risques et des Catastrophes (BNGRC)</p> <p>Manakara (eastern coast of Madagascar, map still in improvement) The other cities on going</p>				
<b>Detection and Warning</b>	<ul style="list-style-type: none"> <li>• National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>• Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>Institute and Observatory of Geophysics of Antananarivo (I.O.G.A.)</b></li> <li>• Use IOTWMS TSP data or own assessment to determine national threats? <b>Use TSP data and own assessment</b></li> <li>• 24x7 operations? <b>Yes</b></li> <li>• Level of tsunami threat forecast information produced: <b>Ocean-wide and national</b></li> <li>• Access to national or international seismic networks: <b>Yes</b> (see notes)</li> <li>• Access to national or international sea level networks: <b>No</b></li> <li>• Other national observing networks used for tsunami early warning: <b>None</b></li> <li>• Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>Yes</b> (see notes)</li> <li>• Capability for tsunami modelling to support threat forecasts: <b>Yes</b> (see notes)</li> <li>• Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>• Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>	<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• National seismic network, seedlink, internet</li> <li>• Use SeisComp3</li> <li>• Use ComMIT</li> </ul>				
<b>Dissemination</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">How is tsunami information disseminated within country?</td> <td>Email, SMS, Telephone, Fax, Webpage, Radio, Door-to-door, Sirens, Television, Megaphone, Police/military, Public alert , system, VHF radio</td> </tr> <tr> <td>How is warning terminated?</td> <td>The warning will end few hours after the TSPs "all clear " message</td> </tr> </table>	How is tsunami information disseminated within country?	Email, SMS, Telephone, Fax, Webpage, Radio, Door-to-door, Sirens, Television, Megaphone, Police/military, Public alert , system, VHF radio	How is warning terminated?	The warning will end few hours after the TSPs "all clear " message	
How is tsunami information disseminated within country?	Email, SMS, Telephone, Fax, Webpage, Radio, Door-to-door, Sirens, Television, Megaphone, Police/military, Public alert , system, VHF radio					
How is warning terminated?	The warning will end few hours after the TSPs "all clear " message					

MADAGASCAR				
	Status	Notes/Requirements		
Standard Operating Procedures	SOPs for <b>upstream</b> emergency response: <ul style="list-style-type: none"> <li>24/7 Emergency Response Centre: <b>Yes</b></li> <li>Receiving information from NTWC: <b>Yes</b></li> <li>Response criteria/decision making: <b>Yes</b></li> </ul>	Support Required to Develop		
		SOPs	Human Resources	Infrastructure
	SOPs for <b>downstream</b> emergency response: <ul style="list-style-type: none"> <li>Warning dissemination: <b>Yes</b></li> <li>Evacuation call procedures: <b>Yes</b></li> <li>Community evacuation procedures: <b>No</b></li> <li>Communication with NTWC: <b>Yes</b></li> <li>Communication with local government: <b>Yes</b></li> <li>Media arrangements: <b>Yes</b></li> <li>Communication with other stakeholders: <b>Yes</b></li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> </ul>
Evacuation Infrastructure	<ul style="list-style-type: none"> <li>Evacuation shelters: <b>Yes</b></li> <li>Vertical evacuation shelter: <b>No</b></li> <li>Natural or artificial hill for vertical evacuation: <b>Yes</b></li> <li>Evacuation signage: <b>No</b></li> <li>Evacuation infrastructure integrated in evacuation plan: <b>Yes</b></li> </ul>	<b>Notes:</b> <ul style="list-style-type: none"> <li>Coastal regions, especially in eastern part of country</li> <li>Almost all of the coastal regions</li> </ul>		
Tsunami Exercises	<ul style="list-style-type: none"> <li>Tsunami exercises incorporated in national policies: <b>Yes</b></li> <li>Tsunami exercises incorporated in national guidelines: <b>Yes</b></li> </ul>			
	Level at which exercises are conducted: <ul style="list-style-type: none"> <li>National: <b>Yes</b></li> <li>Regional: <b>Yes</b></li> <li>City: <b>Yes</b></li> <li>Village: <b>No</b></li> <li>Community/neighbourhood: <b>No</b></li> <li>School: <b>No</b></li> </ul>			
Public Awareness	<ul style="list-style-type: none"> <li>Responsibility for tsunami public awareness programmes: <b>NDMO</b></li> </ul>			
	Tsunami related education and awareness material available: <ul style="list-style-type: none"> <li>Leaflets or flyers: <b>No</b></li> <li>Posters: <b>Yes</b></li> </ul>	Tsunami awareness activities undertaken: <ul style="list-style-type: none"> <li>World Tsunami Awareness Day: <b>No</b></li> <li>Global Disaster Risk Reduction Day: <b>No</b></li> </ul>		

<b>MADAGASCAR</b>			
	<b>Status</b>		<b>Notes/Requirements</b>
	<ul style="list-style-type: none"> <li>• Booklets: <b>Yes</b></li> <li>• Information boards: <b>No</b></li> <li>• Tsunami signage: <b>No</b></li> <li>• Video or other visual or oral media: <b>No</b></li> <li>• Indigenous knowledge, folklore etc: <b>No</b></li> <li>• Teaching kits: <b>Yes</b></li> <li>• Schools curricula: <b>No</b></li> <li>• Public evacuation maps: <b>No</b></li> </ul>	<ul style="list-style-type: none"> <li>• Public tsunami preparedness outreach: <b>Yes</b> (1 time/year)</li> <li>• School and/or children's awareness: <b>Yes</b> (1 time/year)</li> <li>• Exhibitions: <b>No</b></li> <li>• Competitions/other ways of highlighting tsunami safety: <b>No</b></li> <li>• Tsunami exercise: <b>Yes</b> (1 time/year)</li> </ul>	
	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>• Provision of general tsunami awareness materials</li> <li>• Customization of general materials to country or community</li> <li>• Development of tsunami awareness programmes, activities or campaigns</li> <li>• Participation/support by international agencies or experts to your country's activities</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>
	<ul style="list-style-type: none"> <li>• Willing to support other countries to develop or enhance public awareness: <b>Yes</b></li> <li>• Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>Yes (?)</b></li> </ul>		<b>Notes:</b> <ul style="list-style-type: none"> <li>• Sensitisation</li> <li>• Response unclear</li> </ul>
<b>General Comments and Future Plans</b>	<b>General Comments:</b> We are starting to make people and authorities to be conscious of the existence of the tsunami. Not all of the communities are aware of this disaster and not all of the people know yet its existence. Most of the coastal part of the country are still vulnerable face to the tsunami. We make a policy to be prepared and reduce its impact for each region but it is not yet finished for all the country		
	<b>Future Plans:</b> Exercises are needed for the regions which are already visited and have a knowledge of tsunami Many regions don't have yet SOP and don't know yet about tsunami		



MALAYSIA					
	Status			Notes/Requirements	
<b>Policies</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> MKN Directive 20
	Prevention & Mitigation	Not available	Not available		
	Preparedness	Not available	Not available		
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Rehabilitation & Reconstruction	Not available	Not available		
<b>Plans</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	<b>Community</b>	<b>Notes:</b> Tsunami Emergency Response Plan
	Prevention & Mitigation	Not available	Not available	Not available	
	Preparedness	Not available	Not available	Not available	
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Rehabilitation & Reconstruction	Not available	Not available	Not available	
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>				
<b>Guidelines</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> Tsunami Emergency Response Plan
	Prevention & Mitigation	Not available	Not available		
	Preparedness	Not available	Not available		
	Emergency Response	Not available	Multi-hazard inc. Tsunami		
	Rehabilitation & Reconstruction	Not available	Not available		
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard assessment undertaken including: <b>Tsunami, drought, earthquakes, epidemics, flooding, landslides</b></li> <li>• Tsunami hazard assessment undertaken at <b>national level</b></li> <li>• Products available: <b>Hazard map, field studies</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Good</b></li> <li>• Capacity to train other countries: <b>Moderate</b> (PTHA, DTHA) to <b>Good</b> (field studies, hazard, inundation and evacuation mapping)</li> </ul>			<b>Notes:</b> Hazard assessment of Malaysian coastline conducted by Malaysian Meteorological Department and Akademik Sains Malaysia	

MALAYSIA			
	Status		Notes/Requirements
<b>Risk Assessment</b>	<ul style="list-style-type: none"> <li>Single risk assessment on tsunami undertaken: <b>No</b></li> <li>Multi-hazard risk assessment undertaken including <i>No response</i></li> <li>Tsunami risk assessment undertaken at <i>No response</i></li> <li>Products available: <i>No response</i></li> <li>Capacity to undertake tsunami risk assessment: <b>Fair</b></li> <li>Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Moderate</b> (national, regional and city levels) to <b>Good</b> (village and community levels)</li> </ul>		
<b>Detection and Warning</b>	<ul style="list-style-type: none"> <li>National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>Malaysian Meteorological Department</b></li> <li>Use IOTWMS TSP data or own assessment to determine national threats? <b>Use TSP data and own assessment</b></li> <li>24x7 operations? <b>Yes</b></li> <li>Level of tsunami threat forecast information produced: <b>National and local level</b></li> <li>Access to national or international seismic networks: <b>Yes</b> (see notes)</li> <li>Access to national or international sea level networks: <b>Yes</b> (see notes)</li> <li>Other national observing networks used for tsunami early warning: <b>None</b></li> <li>Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>Yes</b> (see notes)</li> <li>Capability for tsunami modelling to support threat forecasts: <b>Yes</b> (see notes)</li> <li>Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>		<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>Seedlink, internet</li> <li>National sea level stations: Pulau Perhentian Kudat, Sabah Lahad Datu, Sabah Pulau Perak Kerachut, Penang Porto Malai, Langkawi</li> <li>Use Antelope, SeisComp3, Tide Tool</li> <li>Use Tunami, COMCOT and ComMIT</li> </ul>
<b>Dissemination</b>	How is tsunami information disseminated within country?	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media, Sirens, Television, mobile application (myCuaca)	
	How is warning terminated?	When no significant wave heights is observed from the national tide gauge station	
<b>Standard</b>			<b>Support Required to Develop</b>

MALAYSIA					
	Status		Notes/Requirements		
Operating Procedures	SOPs for <b>upstream</b> emergency response:		<b>SOPs</b>	<b>Human Resources</b>	<b>Infrastructure</b>
	<ul style="list-style-type: none"> <li>• 24/7 Emergency Response Centre: <b>Yes</b></li> <li>• Receiving information from NTWC: <b>Yes</b></li> <li>• Response criteria/decision making: <b>Yes</b></li> </ul>		✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
Operating Procedures	SOPs for <b>downstream</b> emergency response:				
	<ul style="list-style-type: none"> <li>• Warning dissemination: <b>Yes</b></li> <li>• Evacuation call procedures: <b>Yes</b></li> <li>• Community evacuation procedures: <b>No</b></li> <li>• Communication with NTWC: <b>Yes</b></li> <li>• Communication with local government: <b>Yes</b></li> <li>• Media arrangements: <b>Yes</b></li> <li>• Communication with other stakeholders: <b>Yes</b></li> </ul>		✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓
Evacuation Infrastructure	<ul style="list-style-type: none"> <li>• Evacuation shelters: <b>No</b></li> <li>• Vertical evacuation shelter: <b>No</b></li> <li>• Natural or artificial hill for vertical evacuation: <b>Yes</b></li> <li>• Evacuation signage: <b>No</b></li> <li>• Evacuation infrastructure integrated in evacuation plan: <b>Yes</b></li> </ul>		<b>Notes:</b> <ul style="list-style-type: none"> <li>• Along Malaysian coastal waters</li> </ul>		
Tsunami Exercises	<ul style="list-style-type: none"> <li>• Tsunami exercises incorporated in national policies: <b>Yes</b></li> <li>• Tsunami exercises incorporated in national guidelines: <b>Yes</b></li> </ul>				
	Level at which exercises are conducted:				
Public Awareness	<ul style="list-style-type: none"> <li>• National: <b>No</b></li> <li>• Regional: <b>No</b></li> <li>• City: <b>No</b></li> <li>• Village: <b>No</b></li> <li>• Community/neighbourhood: <b>Yes</b></li> <li>• School: <b>Yes</b></li> </ul>				
	<ul style="list-style-type: none"> <li>• Responsibility for tsunami public awareness programmes: <b>NDMO</b></li> </ul>				
Public Awareness	Tsunami related education and awareness material available:		Tsunami awareness activities undertaken:		
	<ul style="list-style-type: none"> <li>• Leaflets or flyers: <b>Yes</b></li> <li>• Posters: <b>Yes</b></li> <li>• Booklets: <b>Yes</b></li> </ul>		<ul style="list-style-type: none"> <li>• World Tsunami Awareness Day: <b>Yes</b> (1 time)</li> <li>• Global Disaster Risk Reduction Day:</li> </ul>		

MALAYSIA			
	Status	Notes/Requirements	
	<ul style="list-style-type: none"> <li>Information boards: <b>No</b></li> <li>Tsunami signage: <b>No</b></li> <li>Video or other visual or oral media: <b>Yes</b></li> <li>Indigenous knowledge, folklore etc: <b>No</b></li> <li>Teaching kits: <b>No</b></li> <li>Schools curricula: <b>No</b></li> <li>Public evacuation maps: <b>No</b></li> </ul>	<p><b>No</b></p> <ul style="list-style-type: none"> <li>Public tsunami preparedness outreach: <b>No</b></li> <li>School and/or children's awareness: <b>Yes</b> (2 times)</li> <li>Exhibitions: <b>Yes</b> (3 times)</li> <li>Competitions/other ways of highlighting tsunami safety: <b>Yes</b> (2 times)</li> <li>Tsunami exercise: <b>Yes</b> (2 times)</li> </ul>	
	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>Provision of general tsunami awareness materials ✓</li> <li>Customization of general materials to country or community ✓</li> <li>Development of tsunami awareness programmes, activities or campaigns ✓</li> <li>Participation/support by international agencies or experts to your country's activities ✓</li> </ul>	
	<ul style="list-style-type: none"> <li>Willing to support other countries to develop or enhance public awareness: <b>No</b></li> <li>Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>No</b></li> </ul>		
<b>General Comments and Future Plans</b>	<p><b>General Comments:</b> In 2019, MMD will be conducting public awareness's campaigns and drills on the extreme weather, earthquake &amp; tsunami for the aiming as follow: -</p> <ul style="list-style-type: none"> <li>Preparing the publics for all hazards through awareness and education programmes;</li> <li>Communicate hazard risk assessment information to the communities, NADMA, local authorities and disaster response team;</li> <li>Educating the public with warnings, alerting system and evacuation arrangements; and</li> <li>Involvement of communities in mitigation activities (drills &amp; evacuation plan).</li> </ul>		
	<p><b>Future Plans:</b> MMD will develop Location-Based SMS alert to warn people in vulnerable areas of impending disasters. Under the system, an SMS would be sent to those living near disaster-prone areas when events like earthquake, tsunami, typhoon and heavy thunderstorm are likely to take place</p>		

MAURITIUS					
	Status			Notes/Requirements	
<b>Policies</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> National: National Disaster Scheme  Local: Tsunami Emergency Scheme
	Prevention & Mitigation	Not available	Not available		
	Preparedness	Not available	Not available		
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Rehabilitation & Reconstruction	Not available	Not available		
<b>Plans</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	<b>Community</b>	<b>Notes:</b> National Disaster Scheme/Tsunami Emergency Scheme
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Not available	Not available	
	Preparedness	Multi-hazard inc. Tsunami	Not available	Not available	
	Emergency Response	Multi-hazard inc. Tsunami	Not available	Not available	
	Rehabilitation & Reconstruction	Not available	Not available	Not available	
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>				
<b>Guidelines</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> National Disaster Scheme/Tsunami Emergency Scheme
	Prevention & Mitigation	Not available	Not available		
	Preparedness	Not available	Not available		
	Emergency Response	Multi-hazard inc. Tsunami	Standalone tsunami guidelines		
	Rehabilitation & Reconstruction	Not available	Not available		
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard assessment undertaken including: <b>Tsunami, cyclone, drought, flooding, landslides</b></li> <li>• Tsunami hazard assessment undertaken at <b>national, city and village level</b></li> <li>• Products available: <b>Hazard, inundation and evacuation maps</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Good</b></li> <li>• Capacity to train other countries: <b>Moderate</b> (PTHA, DTHA) to <b>Good</b> (hazard, inundation and evacuation mapping)</li> </ul>			<b>Notes:</b> Whole island mapped for tsunami hazard.	

MAURITIUS		
	Status	Notes/Requirements
Risk Assessment	<ul style="list-style-type: none"> <li>Single risk assessment on tsunami undertaken: <b>No</b></li> <li>Multi-hazard risk assessment undertaken including: <b>Tsunami, cyclone, drought, flooding, landslide</b></li> <li>Tsunami risk assessment undertaken at: <b>National level</b></li> <li>Products available: <b>Risk map, action plan</b></li> <li>Capacity to undertake tsunami risk assessment: <b>Poor</b></li> <li>Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Good</b> (national and regional levels). <b>No capacity</b> (city, village and community levels)</li> </ul>	<p><b>Notes:</b> A Tsunami Emergency Scheme has been put into place which elaborates the roles, responsibilities and actions of stakeholders concerned under general preparedness, issue of tsunami watch, warning and termination. This scheme is at national level.</p> <p>Six district councils (Pamplemousses, Riviere du Rempart, Flacq, Black River, Savanne, Grand Port) and one City Council (Port-Louis) are at risk from tsunami</p> <p>The tsunami risk mapped areas for Mauritius is kept for restricted use/application pending policy decision as to their access for general public attention.</p>
Detection and Warning	<ul style="list-style-type: none"> <li>National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>Director, Meteorological Services</b></li> <li>Use IOTWMS TSP data or own assessment to determine national threats? <b>Use TSP data</b></li> <li>24x7 operations? <b>Yes</b></li> <li>Level of tsunami threat forecast information produced: <b>National level</b></li> <li>Access to national or international seismic networks: <b>Yes</b> (see notes)</li> <li>Access to national or international sea level networks: <b>Yes</b> (see notes)</li> <li>Other national observing networks used for tsunami early warning: <b>None</b></li> <li>Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>No</b></li> <li>Capability for tsunami modelling to support threat forecasts: <b>No</b></li> <li>Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>	<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>Seismic: Internet</li> <li>Sea level: GTS and internet</li> </ul>
Dissemination	How is tsunami information disseminated within country?	Email, SMS, Telephone, Fax, Webpage, Radio, Sirens, Television, Police/military, VHF radio
	How is warning terminated?	2 hours after the passage of last high wave and also from observation of tide gauge and visual from police

MAURITIUS					
	Status		Notes/Requirements		
Standard Operating Procedures	SOPs for <b>upstream</b> emergency response:		Support Required to Develop		
	<ul style="list-style-type: none"> <li>24/7 Emergency Response Centre: <b>Yes</b></li> <li>Receiving information from NTWC: <b>Yes</b></li> <li>Response criteria/decision making: <b>Yes</b></li> </ul>		SOPs	Human Resources	Infrastructure
			X	✓	✓
	SOPs for <b>downstream</b> emergency response:		X	X	✓
	<ul style="list-style-type: none"> <li>Warning dissemination: <b>Yes</b></li> <li>Evacuation call procedures: <i>N/R</i></li> <li>Community evacuation procedures: <i>N/R</i></li> <li>Communication with NTWC: <i>N/R</i></li> <li>Communication with local government: <i>N/R</i></li> <li>Media arrangements: <i>N/R</i></li> <li>Communication with other stakeholders: <i>N/R</i></li> </ul>		✓	X	✓
			-	-	-
			-	-	-
			-	-	-
			-	-	-
			-	-	-
Evacuation Infrastructure	<ul style="list-style-type: none"> <li>Evacuation shelters: <b>Yes</b></li> <li>Vertical evacuation shelter: <i>N/R</i></li> <li>Natural or artificial hill for vertical evacuation: <b>No</b></li> <li>Evacuation signage: <b>No</b></li> <li>Evacuation infrastructure integrated in evacuation plan: <b>Yes</b></li> </ul>		<b>Notes:</b> <ul style="list-style-type: none"> <li>The existing national system of emergency shelters for cyclones is extended for cases of tsunami as far as applicable</li> </ul>		
Tsunami Exercises	<ul style="list-style-type: none"> <li>Tsunami exercises incorporated in national policies: <b>Yes</b></li> <li>Tsunami exercises incorporated in national guidelines: <b>Yes</b></li> </ul>				
	Level at which exercises are conducted:				
	<ul style="list-style-type: none"> <li>National: <b>Yes</b></li> <li>Regional: <b>No</b></li> <li>City: <b>Yes</b></li> <li>Village: <b>Yes</b></li> <li>Community/neighbourhood: <b>Yes</b></li> <li>School: <b>Yes</b></li> </ul>				
Public Awareness	<ul style="list-style-type: none"> <li>Responsibility for tsunami public awareness programmes: <b>NTWC</b></li> </ul>				
	Tsunami related education and awareness material available:	Tsunami awareness activities undertaken:			
	<ul style="list-style-type: none"> <li>Leaflets or flyers: <b>Yes</b></li> <li>Posters: <b>Yes</b></li> </ul>	<ul style="list-style-type: none"> <li>World Tsunami Awareness Day: <b>Yes</b></li> <li>Global Disaster Risk Reduction Day:</li> </ul>			

<b>MAURITIUS</b>						
	<b>Status</b>	<b>Notes/Requirements</b>				
	<ul style="list-style-type: none"> <li>• Booklets: <b>No</b></li> <li>• Information boards: <b>No</b></li> <li>• Tsunami signage: <b>No</b></li> <li>• Video or other visual or oral media: <b>Yes</b></li> <li>• Indigenous knowledge, folklore etc: <b>No</b></li> <li>• Teaching kits: <b>Yes</b></li> <li>• Schools curricula: <b>Yes</b></li> <li>• Public evacuation maps: <b>No</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Yes</b></li> <li>• Public tsunami preparedness outreach: <b>Yes</b></li> <li>• School and/or children’s awareness: <b>Yes</b></li> <li>• Exhibitions: <b>Yes</b></li> <li>• Competitions/other ways of highlighting tsunami safety: <i>N/R</i></li> <li>• Tsunami exercise: <b>Yes</b></li> </ul>				
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; vertical-align: top;">                     Support from IOTIC required to develop or enhance public awareness                 </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> <li>• Provision of general tsunami awareness materials</li> <li>• Customization of general materials to country or community</li> <li>• Development of tsunami awareness programmes, activities or campaigns</li> <li>• Participation/support by international agencies or experts to your country’s activities</li> </ul> </td> <td style="vertical-align: top; text-align: center;">                     X ✓ ✓ ✓                 </td> </tr> </table>	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>• Provision of general tsunami awareness materials</li> <li>• Customization of general materials to country or community</li> <li>• Development of tsunami awareness programmes, activities or campaigns</li> <li>• Participation/support by international agencies or experts to your country’s activities</li> </ul>	X ✓ ✓ ✓		
	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>• Provision of general tsunami awareness materials</li> <li>• Customization of general materials to country or community</li> <li>• Development of tsunami awareness programmes, activities or campaigns</li> <li>• Participation/support by international agencies or experts to your country’s activities</li> </ul>	X ✓ ✓ ✓			
	<ul style="list-style-type: none"> <li>• Willing to support other countries to develop or enhance public awareness: <b>No</b></li> <li>• Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>No</b></li> </ul>					
<b>General Comments and Future Plans</b>	<p><b><u>General Comments:</u></b> No Response</p> <p><b><u>Future Plans:</u></b> No Response</p>					



MOZAMBIQUE				
	Status			Notes/Requirements
<b>Policies</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	
	Prevention & Mitigation	<i>No response</i>	<i>No response</i>	
	Preparedness	<i>No response</i>	<i>No response</i>	
	Emergency Response	<i>No response</i>	<i>No response</i>	
	Rehabilitation & Reconstruction	<i>No response</i>	<i>No response</i>	
<b>Plans</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	<b>Community</b>
	Prevention & Mitigation	<i>No response</i>	<i>No response</i>	<i>No response</i>
	Preparedness	<i>No response</i>	<i>No response</i>	<i>No response</i>
	Emergency Response	<i>No response</i>	<i>No response</i>	<i>No response</i>
	Rehabilitation & Reconstruction	<i>No response</i>	<i>No response</i>	<i>No response</i>
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>			
<b>Guidelines</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	
	Prevention & Mitigation	<i>No response</i>	<i>No response</i>	
	Preparedness	<i>No response</i>	<i>No response</i>	
	Emergency Response	<i>No response</i>	<i>No response</i>	
	Rehabilitation & Reconstruction	<i>No response</i>	<i>No response</i>	
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard assessment undertaken including: <b>Tsunami, cyclone, drought, earthquakes, epidemics, flooding</b></li> <li>• Tsunami hazard assessment undertaken at <b>city level</b></li> <li>• Products available: <b>Hazard, inundation and evacuation maps</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Fair</b></li> <li>• Capacity to train other countries: <b>Poor</b> (PTHA, DTHA, field studies) to <b>Moderate</b> (hazard, inundation and evacuation mapping)</li> </ul>			<p><b>Notes:</b> Hazard assessment conducted by: National Institute of Disaster Management/NMHS/Health/Agriculture/UN Agencies/UNESCO IOC/NGO/University Eduardo Mondlane</p> <p>Under the tsunami pilot project sponsored by UNDP three coastal cities were mapped on tsunami inundation and evacuation routes. The cities are Beira, Nacala and Pemba.</p>

MOZAMBIQUE		
	Status	Notes/Requirements
		<p>RIMES and INCOIS have also sponsored a case study for tsunami hazard and risk assessment and evacuation planning for Beira city in September 2018.</p> <p><b>Requirements:</b> There is a need for capacity building on tsunami hazard but at the moment no institution in the country capable of doing it without international collaboration</p>
<b>Risk Assessment</b>	<ul style="list-style-type: none"> <li>• Single risk assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard risk assessment undertaken including: <b>Tsunami, cyclone, drought, earthquakes, epidemics, flooding</b></li> <li>• Tsunami risk assessment undertaken at: <b>City level</b></li> <li>• Products available: <b>Risk map, evacuation map</b></li> <li>• Capacity to undertake tsunami risk assessment: <b>Fair</b></li> <li>• Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Moderate</b> (national and regional levels) to <b>Good</b> (city, village and community levels)</li> </ul>	<p><b>Notes:</b> The results of the case studies for Beira, Nacala and Pemba showed that none of cities are at risk from tsunami. Only in case of tsunami from earthquake of magnitude above 8 can cause impacts but the risk is very low</p>

MOZAMBIQUE								
	Status		Notes/Requirements					
Detection and Warning	<ul style="list-style-type: none"> <li>National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <i>No response</i></li> <li>Use IOTWMS TSP data or own assessment to determine national threats? <i>No response</i></li> <li>24x7 operations? <b>Yes</b></li> <li>Level of tsunami threat forecast information produced: <b>National level</b></li> <li>Access to national or international seismic networks: <b>Yes</b></li> <li>Access to national or international sea level networks: <b>No</b></li> <li>Other national observing networks used for tsunami early warning: <b>None</b></li> <li>Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>No</b></li> <li>Capability for tsunami modelling to support threat forecasts: <b>No</b></li> <li>Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>							
	Dissemination	How is tsunami information disseminated within country?	Email, SMS, Fax, Television, Public alert system, radio					
	How is warning terminated?	Cancellation based on the information received from tsunami warnings centres						
Standard Operating Procedures	SOPs for <b>upstream</b> emergency response: <ul style="list-style-type: none"> <li>24/7 Emergency Response Centre: <i>No response</i></li> <li>Receiving information from NTWC: <i>No response</i></li> <li>Response criteria/decision making: <i>No response</i></li> </ul>		<b>Support Required to Develop</b>					
			<table border="1"> <thead> <tr> <th>SOPs</th> <th>Human Resources</th> <th>Infrastructure</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><i>No response</i></td> <td style="text-align: center;"><i>No response</i></td> <td style="text-align: center;"><i>No response</i></td> </tr> </tbody> </table>	SOPs	Human Resources	Infrastructure	<i>No response</i>	<i>No response</i>
SOPs	Human Resources	Infrastructure						
<i>No response</i>	<i>No response</i>	<i>No response</i>						

MOZAMBIQUE					
	Status		Notes/Requirements		
	SOPs for <b>downstream</b> emergency response: <ul style="list-style-type: none"> <li>Warning dissemination: <i>No response</i></li> <li>Evacuation call procedures: <i>No response</i></li> <li>Community evacuation procedures: <i>No response</i></li> <li>Communication with NTWC: <i>No response</i></li> <li>Communication with local government: <i>No response</i></li> <li>Media arrangements: <i>No response</i></li> <li>Communication with other stakeholders: <i>No response</i></li> </ul>		<i>No response</i>	<i>No response</i>	<i>No response</i>
<b>Evacuation Infrastructure</b>	<ul style="list-style-type: none"> <li>Evacuation shelters: <b>Yes</b></li> <li>Vertical evacuation shelter: <b>Yes</b></li> <li>Natural or artificial hill for vertical evacuation: <b>No</b></li> <li>Evacuation signage: <b>No</b></li> <li>Evacuation infrastructure integrated in evacuation plan: <b>Yes</b></li> </ul>		<b>Notes:</b> <ul style="list-style-type: none"> <li>Coastal areas but low risk</li> <li>Coastal areas but low risk</li> </ul>		
<b>Tsunami Exercises</b>	<ul style="list-style-type: none"> <li>Tsunami exercises incorporated in national policies: <b>No</b></li> <li>Tsunami exercises incorporated in national guidelines: <b>Yes</b></li> </ul>				
	Level at which exercises are conducted: <ul style="list-style-type: none"> <li>National: <b>No</b></li> <li>Regional: <b>No</b></li> <li>City: <b>Yes</b></li> <li>Village: <b>No</b></li> <li>Community/neighbourhood: <b>No</b></li> <li>School: <b>No</b></li> </ul>				
<b>Public Awareness</b>	<ul style="list-style-type: none"> <li>Responsibility for tsunami public awareness programmes: <b>NDMO</b></li> </ul>				
	Tsunami related education and awareness material available: <ul style="list-style-type: none"> <li>Leaflets or flyers: <b>No</b></li> <li>Posters: <b>Yes</b></li> <li>Booklets: <b>Yes</b></li> <li>Information boards: <b>No</b></li> <li>Tsunami signage: <b>No</b></li> <li>Video or other visual or oral media: <b>Yes</b></li> <li>Indigenous knowledge, folklore etc: <b>No</b></li> <li>Teaching kits: <b>No</b></li> <li>Schools curricula: <b>No</b></li> </ul>	Tsunami awareness activities undertaken: <ul style="list-style-type: none"> <li>World Tsunami Awareness Day: <b>No</b></li> <li>Global Disaster Risk Reduction Day: <b>No</b></li> <li>Public tsunami preparedness outreach: <b>No</b></li> <li>School and/or children's awareness: <b>Yes</b> (not often)</li> <li>Exhibitions: <b>No</b></li> <li>Competitions/other ways of</li> </ul>			

MOZAMBIQUE				
	Status		Notes/Requirements	
	<ul style="list-style-type: none"> <li>Public evacuation maps: <b>No</b></li> </ul>		<ul style="list-style-type: none"> <li>highlighting tsunami safety: <b>No</b></li> <li>Tsunami exercise: <b>No</b></li> </ul>	
	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>Provision of general tsunami awareness materials</li> <li>Customization of general materials to country or community</li> <li>Development of tsunami awareness programmes, activities or campaigns</li> <li>Participation/support by international agencies or experts to your country's activities</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✗</li> <li>✓</li> <li>✓</li> </ul>	
	<ul style="list-style-type: none"> <li>Willing to support other countries to develop or enhance public awareness: <b>No</b></li> <li>Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>No</b></li> </ul>			
	<p><b>General Comments:</b> With INCOIS and RIMES in 2018 the country had opportunity to implement the pilot project on tsunami hazard risk assessment and evacuation mapping using INSPIRE and ESCAPE systems. Two technicians participated on the TEMPP-3 training in Indonesia. These were good for the country in order to strengthen the local capacity on tsunami risk assessment and evacuation mapping.</p> <p><b>Future Plans:</b> We hope to continue our collaboration and coordination with UNESCO IOC to improve many aspects related to tsunami as stated in different previous questions</p>			

MYANMAR					
	Status			Notes/Requirements	
<b>Policies</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> National: Myanmar Action Plan of Disaster Risk Reduction  Local: Community Based Disaster Risk Reduction
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
<b>Plans</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	<b>Community</b>	
	Prevention & Mitigation	-	-	-	
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Emergency Response	-	-	-	
	Rehabilitation & Reconstruction	-	-	-	
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>				
<b>Guidelines</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> Tsunami exercise guidelines
	Prevention & Mitigation	-	-		
	Preparedness	Standalone tsunami	Standalone tsunami		
	Emergency Response	-	-		
	Rehabilitation & Reconstruction	-	-		
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>Yes</b></li> <li>• Multi-hazard assessment undertaken including: <i>No response</i></li> <li>• Tsunami hazard assessment undertaken at <b>village level</b></li> <li>• Products available: <b>Inundation and evacuation maps</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Poor</b></li> <li>• Capacity to train other countries: <b>Moderate</b> (PTHA, DTHA, hazard and inundation mapping) to <b>Poor</b> (field studies, evacuation mapping)</li> </ul>			<b>Notes:</b> Hazard assessment conducted by Department of Meteorology and Hydrology was cooperated with RIMES-Regional Integrated Multi-hazard Early Warning System  One village mapped: Aung Hlaing Village, Labutta Township, Ayeyarwady Region	
<b>Risk Assessment</b>	<ul style="list-style-type: none"> <li>• Single risk assessment on tsunami undertaken: <b>Yes</b></li> <li>• Multi-hazard risk assessment undertaken including: <b>tsunami only</b></li> <li>• Tsunami risk assessment undertaken at <b>village level</b></li> <li>• Products available: <b>evacuation map</b></li> <li>• Capacity to undertake tsunami risk assessment: <b>Poor</b></li> <li>• Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Poor</b> (at all levels)</li> </ul>			<b>Notes:</b> Risk assessment conducted by Department of Meteorology and Hydrology with Regional Integrated Multi-hazard Early Warning System-RIMES  One village mapped: Aung Hlaing Village, Labutta Township, Ayeyarwady Region	

MYANMAR															
	Status		Notes/Requirements												
Detection and Warning	<ul style="list-style-type: none"> <li>National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>Department of Meteorology and Hydrology</b></li> <li>Use IOTWMS TSP data or own assessment to determine national threats? <b>Use TSP data</b></li> <li>24x7 operations? <b>Yes</b></li> <li>Level of tsunami threat forecast information produced: <b>National and local level</b></li> <li>Access to national or international seismic networks: <b>Yes</b> (see notes)</li> <li>Access to national or international sea level networks: <b>Yes</b> (see notes)</li> <li>Other national observing networks used for tsunami early warning: <b>None</b></li> <li>Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>Yes</b> (see notes)</li> <li>Capability for tsunami modelling to support threat forecasts: <b>No</b></li> <li>Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>		<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>Local Seismic Network, Regional Seismic Network, Global Seismic Network</li> <li>National seal level stations: Sittwe, Moulmein, Haing Gyi Kyun</li> <li>Seismic software: Use Antelope, SeisComp3, SeisAn</li> <li>Sea level data: GTS, internet, Tide Tool software</li> </ul>												
	Dissemination	How is tsunami information disseminated within country?	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media, Television												
How is warning terminated?		When tsunami disaster is clear or cannot effect to our coastal areas, we issue the tsunami cancellation													
Standard Operating Procedures	SOPs for <b>upstream</b> emergency response: <ul style="list-style-type: none"> <li>24/7 Emergency Response Centre: <b>Yes</b></li> <li>Receiving information from NTWC: <b>Yes</b></li> <li>Response criteria/decision making: <b>Yes</b></li> </ul>		<p align="center"><b>Support Required to Develop</b></p> <table border="1"> <thead> <tr> <th>SOPs</th> <th>Human Resources</th> <th>Infrastructure</th> </tr> </thead> <tbody> <tr> <td align="center">✓</td> <td align="center">✓</td> <td align="center">✓</td> </tr> <tr> <td align="center">✓</td> <td align="center">✓</td> <td align="center">✓</td> </tr> <tr> <td align="center">X</td> <td align="center">✓</td> <td align="center">✓</td> </tr> </tbody> </table>	SOPs	Human Resources	Infrastructure	✓	✓	✓	✓	✓	✓	X	✓	✓
	SOPs	Human Resources	Infrastructure												
✓	✓	✓													
✓	✓	✓													
X	✓	✓													

MYANMAR					
	Status	Notes/Requirements			
	<p>SOPs for <b>downstream</b> emergency response:</p> <ul style="list-style-type: none"> <li>Warning dissemination: <b>Yes</b></li> <li>Evacuation call procedures: <b>Yes</b></li> <li>Community evacuation procedures: <b>No</b></li> <li>Communication with NTWC: <b>Yes</b></li> <li>Communication with local government: <b>Yes</b></li> <li>Media arrangements: <b>Yes</b></li> <li>Communication with other stakeholders: <b>Yes</b></li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>X</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	
<b>Evacuation Infrastructure</b>	<ul style="list-style-type: none"> <li>Evacuation shelters: <b>Yes</b></li> <li>Vertical evacuation shelter: <b>No</b></li> <li>Natural or artificial hill for vertical evacuation: <b>No</b></li> <li>Evacuation signage: <b>No</b></li> <li>Evacuation infrastructure integrated in evacuation plan: <b>Yes</b></li> </ul>	<p><b>Notes:</b> Just have evacuation shelter for Multi-hazard, not only for Tsunami</p>			
<b>Tsunami Exercises</b>	<ul style="list-style-type: none"> <li>Tsunami exercises incorporated in national policies: <b>No</b></li> <li>Tsunami exercises incorporated in national guidelines: <b>Yes</b></li> </ul>				
	<p>Level at which exercises are conducted:</p> <ul style="list-style-type: none"> <li>National: <b>Yes</b></li> <li>Regional: <b>Yes</b></li> <li>City: <b>Yes</b></li> <li>Village: <b>Yes</b></li> <li>Community/neighbourhood: <b>Yes</b></li> <li>School: <b>No</b></li> </ul>				
<b>Public Awareness</b>	<ul style="list-style-type: none"> <li>Responsibility for tsunami public awareness programmes: <b>NTWC</b></li> </ul>				
	<p>Tsunami related education and awareness material available:</p> <ul style="list-style-type: none"> <li>Leaflets or flyers: <b>No</b></li> <li>Posters: <b>Yes</b></li> <li>Booklets: <b>No</b></li> <li>Information boards: <b>No</b></li> <li>Tsunami signage: <b>No</b></li> <li>Video or other visual or oral media: <b>Yes</b></li> <li>Indigenous knowledge, folklore etc: <b>No</b></li> <li>Teaching kits: <b>Yes</b></li> </ul>	<p>Tsunami awareness activities undertaken:</p> <ul style="list-style-type: none"> <li>World Tsunami Awareness Day: <b>Yes</b> (2 time)</li> <li>Global Disaster Risk Reduction Day: <i>No response</i></li> <li>Public tsunami preparedness outreach: <i>No response</i></li> <li>School and/or children's awareness: <b>Yes</b> (2 times)</li> <li>Exhibitions: <i>No response</i></li> </ul>			



MYANMAR			
	Status	Notes/Requirements	
	<ul style="list-style-type: none"> <li>Schools curricula: <b>No</b></li> <li>Public evacuation maps: <b>No</b></li> </ul>	<ul style="list-style-type: none"> <li>Competitions/other ways of highlighting tsunami safety: <i>No response</i></li> <li>Tsunami exercise: <b>Yes</b> (3 times)</li> </ul>	
	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>Provision of general tsunami awareness materials ✓</li> <li>Customization of general materials to country or community ✓</li> <li>Development of tsunami awareness programmes, activities or campaigns ✓</li> <li>Participation/support by international agencies or experts to your country's activities ✓</li> </ul>	
	<ul style="list-style-type: none"> <li>Willing to support other countries to develop or enhance public awareness: <b>Yes</b></li> <li>Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>No</b></li> </ul>	<b>Notes:</b> <ul style="list-style-type: none"> <li>Knowledge sharing to develop the hazard and risk assessment maps for Tsunami</li> </ul>	
<b>General Comments and Future Plans</b>	<b><u>General Comments:</u></b> Should do more research of tsunami and need to conduct more training and workshop for the tsunami risk reduction		
	<b><u>Future Plans:</u></b> Need to share more data and upgrade the existing communication systems		

OMAN				
	Status			Notes/Requirements
Policies	Phase	National	Local	
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
Plans	Phase	National	Local	Community
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	-
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	-
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	-
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	-
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>			
Guidelines	Phase	National	Local	
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
Hazard Assessment	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard assessment undertaken including: <b>Tsunami, cyclone, earthquakes</b></li> <li>• Tsunami hazard assessment undertaken at <b>national and city level</b></li> <li>• Products available: <b>PTHA, DTHA, field studies, hazard map and inundation maps, guidelines</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Good</b></li> <li>• Capacity to train other countries: <b>Moderate</b> (PTHA, DTHA, inundation mapping) to <b>Poor</b> (field studies, hazard and evacuation mapping)</li> </ul>			<p><b>Notes:</b> Hazard assessment conducted by national and international consultants.</p> <p>All coastline mapped with more detail for 9 cities</p> <p>Evacuation maps under process with the National Committee for Civil Defense. Guide lines are available such as SOP</p>

OMAN		
	Status	Notes/Requirements
<b>Risk Assessment</b>	<ul style="list-style-type: none"> <li>• Single risk assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard risk assessment undertaken including <b>Tsunami, cyclone, earthquakes</b></li> <li>• Tsunami risk assessment undertaken at <b>National and city levels</b></li> <li>• Products available: <b>Risk map, guidelines and action plan</b></li> <li>• Capacity to undertake tsunami risk assessment: <b>Good</b></li> <li>• Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Moderate</b> (national, city, village and community levels). <b>Poor</b> (regional level)</li> </ul>	<p><b>Notes:</b> Risk assessment conducted by national and international consultants.</p> <p>All coastline mapped with more detail for 9 cities</p> <p>4 districts are at high risk from local tsunami</p>
<b>Detection and Warning</b>	<ul style="list-style-type: none"> <li>• National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>• Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>National Multi Hazard Early Warning Center (NMHEWC)</b></li> <li>• Use IOTWMS TSP data or own assessment to determine national threats? <b>Use TSP data and own assessment</b></li> <li>• 24x7 operations? <b>Yes</b></li> <li>• Level of tsunami threat forecast information produced: <b>National and local level</b></li> <li>• Access to national or international seismic networks: <b>Yes</b> (see notes)</li> <li>• Access to national or international sea level networks: <b>Yes</b> (see notes)</li> <li>• Other national observing networks used for tsunami early warning: <b>Yes</b> (see notes)</li> <li>• Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>Yes</b> (see notes)</li> <li>• Capability for tsunami modelling to support threat forecasts: <b>Yes</b> (see notes)</li> <li>• Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>• Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>	<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• National seismic network, seedlink and internet</li> <li>• National sea level network, GTS, IOC website</li> <li>• GNSS/GPS, coastal radars</li> <li>• Use TOAST, SeisComp3, Antelope</li> <li>• Use Easywave, MHRAS</li> </ul>
<b>Dissemination</b>	How is tsunami information disseminated within country?	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media, Television, Police/military, Public alert , system, VPN
	How is warning terminated?	Cancellation message
<b>Standard</b>		<b>Support Required to Develop</b>

OMAN				
	Status	Notes/Requirements		
Operating Procedures	SOPs for <b>upstream</b> emergency response: <ul style="list-style-type: none"> <li>24/7 Emergency Response Centre: <b>Yes</b></li> <li>Receiving information from NTWC: <b>Yes</b></li> <li>Response criteria/decision making: <b>Yes</b></li> </ul>	SOPs	Human Resources	Infrastructure
		✓ X ✓	✓ X ✓	✓ X ✓
Operating Procedures	SOPs for <b>downstream</b> emergency response: <ul style="list-style-type: none"> <li>Warning dissemination: <b>Yes</b></li> <li>Evacuation call procedures: <b>Yes</b></li> <li>Community evacuation procedures: <b>No</b></li> <li>Communication with NTWC: <b>Yes</b></li> <li>Communication with local government: <b>Yes</b></li> <li>Media arrangements: <b>Yes</b></li> <li>Communication with other stakeholders: <b>Yes</b></li> </ul>			
		✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓
Evacuation Infrastructure	<ul style="list-style-type: none"> <li>Evacuation shelters: <b>Yes</b></li> <li>Vertical evacuation shelter: <b>No</b></li> <li>Natural or artificial hill for vertical evacuation: <b>No</b></li> <li>Evacuation signage: <b>No</b></li> <li>Evacuation infrastructure integrated in evacuation plan: <b>Yes</b></li> </ul>			
Tsunami Exercises	<ul style="list-style-type: none"> <li>Tsunami exercises incorporated in national policies: <b>Yes</b></li> <li>Tsunami exercises incorporated in national guidelines: <b>Yes</b></li> </ul>			
	Level at which exercises are conducted: <ul style="list-style-type: none"> <li>National: <b>Yes</b></li> <li>Regional: <b>Yes</b></li> <li>City: <b>Yes</b></li> <li>Village: <b>Yes</b></li> <li>Community/neighbourhood: <b>Yes</b></li> <li>School: <b>Yes</b></li> </ul>			
Public Awareness	<ul style="list-style-type: none"> <li>Responsibility for tsunami public awareness programmes: <b>NDMO</b></li> </ul>			
	Tsunami related education and awareness material available: <ul style="list-style-type: none"> <li>Leaflets or flyers: <b>Yes</b></li> <li>Posters: <b>Yes</b></li> <li>Booklets: <b>Yes</b></li> <li>Information boards: <b>No</b></li> </ul>	Tsunami awareness activities undertaken: <ul style="list-style-type: none"> <li>World Tsunami Awareness Day: <b>Yes</b> (2 times)</li> <li>Global Disaster Risk Reduction Day: <b>Yes</b> (2 times)</li> </ul>		

OMAN			
	Status	Notes/Requirements	
	<ul style="list-style-type: none"> <li>Tsunami signage: <b>No</b></li> <li>Video or other visual or oral media: <b>Yes</b></li> <li>Indigenous knowledge, folklore etc: <b>No</b></li> <li>Teaching kits: <b>No</b></li> <li>Schools curricula: <b>Yes</b></li> <li>Public evacuation maps: <b>No</b></li> </ul>	<ul style="list-style-type: none"> <li>Public tsunami preparedness outreach: <b>Yes</b> (2 times)</li> <li>School and/or children's awareness: <b>Yes</b> (many times)</li> <li>Exhibitions: <b>Yes</b> (1 time)</li> <li>Competitions/other ways of highlighting tsunami safety: <b>No</b></li> <li>Tsunami exercise: <b>Yes</b> (2 times)</li> </ul>	
	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>Provision of general tsunami awareness materials ✓</li> <li>Customization of general materials to country or community ✓</li> <li>Development of tsunami awareness programmes, activities or campaigns ✓</li> <li>Participation/support by international agencies or experts to your country's activities ✓</li> </ul>	
	<ul style="list-style-type: none"> <li>Willing to support other countries to develop or enhance public awareness: <b>No</b></li> <li>Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>Yes</b></li> </ul>		<b>Notes:</b> <ul style="list-style-type: none"> <li>Al Sawadi area</li> </ul>
<b>General Comments and Future Plans</b>	<b>General Comments:</b> No Response		
	<b>Future Plans:</b> Expanding observation network, improve and add Hazard and risk assessment for more cities level and implementing CBS using CAPs protocol		

PAKISTAN					
	Status			Notes/Requirements	
	Phase	National	Local		
<b>Policies</b>	Prevention & Mitigation	Multi-hazard inc. Tsunami	Standalone tsunami	<b>Notes:</b> National Earthquake & Tsunami Framework	
	Preparedness	Multi-hazard inc. Tsunami	Standalone tsunami		
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
<b>Plans</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	<b>Community</b>	<b>Notes:</b> National Earthquake & Tsunami Framework
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Not available	Not available	
	Preparedness	Multi-hazard inc. Tsunami	Not available	Not available	
	Emergency Response	Multi-hazard inc. Tsunami	Not available	Not available	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Not available	Not available	
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>				
<b>Guidelines</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		
	Prevention & Mitigation	Not available	Not available		
	Preparedness	Not available	Not available		
	Emergency Response	Not available	Not available		
	Rehabilitation & Reconstruction	Not available	Not available		
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>Yes</b></li> <li>• Multi-hazard assessment undertaken including: <b>Single hazard assessment on tsunami</b></li> <li>• Tsunami hazard assessment undertaken at <b>city level</b></li> <li>• Products available: <b>PTHA, hazard and inundation maps</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Very Good</b></li> <li>• Capacity to train other countries: <b>Very Good</b> (PTHA, hazard and inundation mapping)</li> </ul>			<b>Notes:</b> Hazard assessment conducted by Pakistan Meteorological Department  Gwadar and Karachi Cities mapped	

PAKISTAN														
	Status		Notes/Requirements											
<b>Risk Assessment</b>	<ul style="list-style-type: none"> <li>Single risk assessment on tsunami undertaken: <b>No</b></li> <li>Multi-hazard risk assessment undertaken including <b>No risk assessment undertaken</b></li> <li>Tsunami risk assessment undertaken at N/A</li> <li>Products available: N/A</li> <li>Capacity to undertake tsunami risk assessment: <b>Very poor</b></li> <li>Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>No capacity</b> (all levels)</li> </ul>													
<b>Detection and Warning</b>	<ul style="list-style-type: none"> <li>National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>Pakistan Meteorological Department</b></li> <li>Use IOTWMS TSP data or own assessment to determine national threats? <b>Use TSP data and own assessment</b></li> <li>24x7 operations? <b>No</b></li> <li>Level of tsunami threat forecast information produced: <b>National and local level</b></li> <li>Access to national or international seismic networks: <b>Yes</b> (see notes)</li> <li>Access to national or international sea level networks: <b>No</b></li> <li>Other national observing networks used for tsunami early warning: <b>None</b></li> <li>Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>Yes</b> (see notes)</li> <li>Capability for tsunami modelling to support threat forecasts: <b>Yes</b> (see notes)</li> <li>Does organisation responsible for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>No (?)</b></li> <li>Has the NTWC and/or TWFP participated in tsunami drills? <b>No (?)</b></li> </ul>		<b>Notes:</b> <ul style="list-style-type: none"> <li>National seismic network, seedlink and internet</li> <li>Use SeisComp3</li> <li>Use MOST, ComMIT</li> </ul>											
<b>Dissemination</b>	How is tsunami information disseminated within country?	Email, SMS, Telephone, Fax, Webpage, Radio, Sirens, Television												
	How is warning terminated?	After confirmation of no threat by second Bulletin												
<b>Standard Operating Procedures</b>	SOPs for <b>upstream</b> emergency response: <ul style="list-style-type: none"> <li>24/7 Emergency Response Centre: <b>Yes</b></li> <li>Receiving information from NTWC: <b>Yes</b></li> <li>Response criteria/decision making: <b>Yes</b></li> </ul>		<b>Support Required to: Develop</b>											
			<table border="1"> <thead> <tr> <th>SOPs</th> <th>Human Resources</th> <th>Infrastructure</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> <tr> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;">X</td> <td style="text-align: center;">✓</td> </tr> </tbody> </table>	SOPs	Human Resources	Infrastructure	✓	✓	✓	✓	✓	✓	X	X
SOPs	Human Resources	Infrastructure												
✓	✓	✓												
✓	✓	✓												
X	X	✓												

PAKISTAN				
	Status	Notes/Requirements		
	<p>SOPs for <b>downstream</b> emergency response:</p> <ul style="list-style-type: none"> <li>Warning dissemination: <b>Yes</b></li> <li>Evacuation call procedures: <b>Yes</b></li> <li>Community evacuation procedures: <b>No</b></li> <li>Communication with NTWC: <b>Yes</b></li> <li>Communication with local government: <b>Yes</b></li> <li>Media arrangements: <b>Yes</b></li> <li>Communication with other stakeholders: <b>Yes</b></li> </ul>	✓	X	✓
		✓	X	✓
		✓	X	✓
		✓	X	✓
		✓	X	✓
		✓	X	✓
		X	X	✓
<b>Evacuation Infrastructure</b>	<ul style="list-style-type: none"> <li>Evacuation shelters: <b>No</b></li> <li>Vertical evacuation shelter: <b>No</b></li> <li>Natural or artificial hill for vertical evacuation: <b>Yes</b></li> <li>Evacuation signage: <b>Yes</b></li> <li>Evacuation infrastructure integrated in evacuation plan: <i>No response</i></li> </ul>	<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>Gwadar area</li> </ul>		
<b>Tsunami Exercises</b>	<ul style="list-style-type: none"> <li>Tsunami exercises incorporated in national policies: <b>Yes</b></li> <li>Tsunami exercises incorporated in national guidelines: <b>Yes</b></li> </ul> <p>Level at which exercises are conducted:</p> <ul style="list-style-type: none"> <li>National: <b>No</b></li> <li>Regional: <b>No</b></li> <li>City: <b>No</b></li> <li>Village: <b>Yes</b></li> <li>Community/neighbourhood: <b>Yes</b></li> <li>School: <b>No</b></li> </ul>			
<b>Public Awareness</b>	<ul style="list-style-type: none"> <li>Responsibility for tsunami public awareness programmes: <b>NDMO</b></li> </ul> <p>Tsunami related education and awareness material available:</p> <ul style="list-style-type: none"> <li>Leaflets or flyers: <b>Yes</b></li> <li>Posters: <b>Yes</b></li> <li>Booklets: <b>No</b></li> <li>Information boards: <b>No</b></li> <li>Tsunami signage: <b>No</b></li> <li>Video or other visual or oral media: <b>No</b></li> <li>Indigenous knowledge, folklore etc: <b>No</b></li> <li>Teaching kits: <b>No</b></li> </ul>	<p>Tsunami awareness activities undertaken:</p> <ul style="list-style-type: none"> <li>World Tsunami Awareness Day: <b>Yes</b> (every year)</li> <li>Global Disaster Risk Reduction Day: <b>No</b></li> <li>Public tsunami preparedness outreach: <b>No</b></li> <li>School and/or children's awareness: <b>Yes</b> (occasionally)</li> <li>Exhibitions: <b>No</b></li> </ul>		



PAKISTAN			
	Status	Notes/Requirements	
	<ul style="list-style-type: none"> <li>Schools curricula: <b>Yes</b></li> <li>Public evacuation maps: <b>No</b></li> </ul>	<ul style="list-style-type: none"> <li>Competitions/other ways of highlighting tsunami safety: <b>No</b></li> <li>Tsunami exercise: <b>Yes</b> (3 times)</li> </ul>	
	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>Provision of general tsunami awareness materials ✓</li> <li>Customization of general materials to country or community ✓</li> <li>Development of tsunami awareness programmes, activities or campaigns ✓</li> <li>Participation/support by international agencies or experts to your country's activities X</li> </ul>	
	<ul style="list-style-type: none"> <li>Willing to support other countries to develop or enhance public awareness: <b>No</b></li> <li>Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>No</b></li> </ul>		
<b>General Comments and Future Plans</b>	<b>General Comments:</b> Research is needed to investigate the potential of Makran Subduction zone.		
	<b>Future Plans:</b> PMD is currently working installation of equipment for better understanding of the Arabian Sea. PMD is developing mechanism for data sharing with neighbouring countries like Oman and UAE for better location and fast information		

SINGAPORE					
	Status			Notes/Requirements	
Policies	Phase	National	Local		
	Prevention & Mitigation	Standalone tsunami	Not available		Notes: National Tsunami Response Plan (also applies locally)
	Preparedness	Standalone tsunami	Not available		
	Emergency Response	Standalone tsunami	Not available		
Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Not available			
Plans	Phase	National	Local	Community	Notes: National policy applies at local and community level
	Prevention & Mitigation	Standalone tsunami	Not available	Not available	
	Preparedness	Standalone tsunami	Not available	Not available	
	Emergency Response	Standalone tsunami	Not available	Not available	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Not available	Not available	
Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>					
Guidelines	Phase	National	Local		Notes: National guidelines apply locally
	Prevention & Mitigation	Standalone tsunami	Not available		
	Preparedness	Standalone tsunami	Not available		
	Emergency Response	Standalone tsunami	Not available		
Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Not available			
Hazard Assessment	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>Yes</b></li> <li>• Multi-hazard assessment undertaken including: <b>tsunami, earthquakes, flooding</b></li> <li>• Tsunami hazard assessment undertaken at <b>national level</b></li> <li>• Products available: <b>DTHA and inundation map</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Good</b></li> <li>• Capacity to train other countries: <b>Moderate</b> (DTHA, hazard and inundation mapping)</li> </ul>			Notes: Hazard assessment conducted by Meteorological Service Singapore and national university  Whole of Singapore is assessed, including offshore islands	
Risk Assessment	<ul style="list-style-type: none"> <li>• Single risk assessment on tsunami undertaken: <b>Yes</b></li> <li>• Multi-hazard risk assessment undertaken including: <b>tsunami, flooding</b></li> <li>• Tsunami risk assessment undertaken at <b>national level</b></li> <li>• Products available: <b>Risk map, action plan</b> (see notes)</li> <li>• Capacity to undertake tsunami risk assessment: <b>Good</b></li> <li>• Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Good</b> (national level)</li> </ul>			Notes: <ul style="list-style-type: none"> <li>• Risk assessed for all Singapore coastline including offshore islands</li> <li>• Guidelines: National Tsunami Response Plan</li> </ul>	

SINGAPORE					
	Status		Notes/Requirements		
Detection and Warning	<ul style="list-style-type: none"> <li>National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>Meteorological Service Singapore</b></li> <li>Use IOTWMS TSP data or own assessment to determine national threats? <b>Use TSP data and own assessment</b></li> <li>24x7 operations? <b>Yes</b></li> <li>Level of tsunami threat forecast information produced: <b>National and local level</b></li> <li>Access to national or international seismic networks: <b>Yes</b> (see notes)</li> <li>Access to national or international sea level networks: <b>Yes</b> (see notes)</li> <li>Other national observing networks used for tsunami early warning: <b>None</b></li> <li>Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>Yes</b> (see notes)</li> <li>Capability for tsunami modelling to support threat forecasts: <b>Yes</b> (see notes)</li> <li>Does organisation responsible for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>		<b>Notes:</b> <ul style="list-style-type: none"> <li>National seismic network, seedlink, internet, GSM</li> <li>National sea level network, GTS</li> <li>Use Operational Tsunami Prediction and Assessment System (OPTAS)</li> <li>Use OPTAS</li> </ul>		
	How is tsunami information disseminated within country?	Email, SMS, Telephone, Fax, Webpage, Radio, Television, Public alert system			
Dissemination	How is warning terminated?	Via the same modes used for dissemination of alerts/warnings			
Standard Operating Procedures	SOPs for <u>upstream</u> emergency response:		<b>Support Required to Develop</b>		
	<ul style="list-style-type: none"> <li>24/7 Emergency Response Centre: <b>Yes</b></li> <li>Receiving information from NTWC: <b>Yes</b></li> <li>Response criteria/decision making: <b>Yes</b></li> </ul>		<b>SOPs</b>	<b>Human Resources</b>	<b>Infrastructure</b>
			X	X	X
			X	X	X
		X	X	X	

SINGAPORE				
	Status	Notes/Requirements		
	<p>SOPs for <b>downstream</b> emergency response:</p> <ul style="list-style-type: none"> <li>• Warning dissemination: <b>Yes</b></li> <li>• Evacuation call procedures: <b>No</b></li> <li>• Community evacuation procedures: <b>No</b></li> <li>• Communication with NTWC: <b>Yes</b></li> <li>• Communication with local government: <b>No</b></li> <li>• Media arrangements: <b>Yes</b></li> <li>• Communication with other stakeholders: <b>Yes</b></li> </ul>	X	X	X
		X	X	X
		X	X	X
		X	X	X
		X	X	X
		X	X	X
		X	X	X
		X	X	X
<b>Evacuation Infrastructure</b>	<ul style="list-style-type: none"> <li>• Evacuation shelters: <b>No</b></li> <li>• Vertical evacuation shelter: <b>No</b></li> <li>• Natural or artificial hill for vertical evacuation: <b>No</b></li> <li>• Evacuation signage: <b>No</b></li> <li>• Evacuation infrastructure integrated in evacuation plan: <b>No</b></li> </ul>			
<b>Tsunami Exercises</b>	<ul style="list-style-type: none"> <li>• Tsunami exercises incorporated in national policies: <b>Yes</b></li> <li>• Tsunami exercises incorporated in national guidelines: <b>Yes</b></li> </ul>			
	<p>Level at which exercises are conducted:</p> <ul style="list-style-type: none"> <li>• National: <b>Yes</b></li> <li>• Regional: <b>No</b></li> <li>• City: <b>No</b></li> <li>• Village: <b>No</b></li> <li>• Community/neighbourhood: <b>No</b></li> <li>• School: <b>No</b></li> </ul>			
<b>Public Awareness</b>	<ul style="list-style-type: none"> <li>• Responsibility for tsunami public awareness programmes: <b>NTWC</b></li> </ul>			
	<p>Tsunami related education and awareness material available:</p> <ul style="list-style-type: none"> <li>• Leaflets or flyers: <b>No</b></li> <li>• Posters: <b>No</b></li> <li>• Booklets: <b>No</b></li> <li>• Information boards: <b>No</b></li> <li>• Tsunami signage: <b>No</b></li> <li>• Video or other visual or oral media: <b>No</b></li> <li>• Indigenous knowledge, folklore etc: <b>No</b></li> <li>• Teaching kits: <b>No</b></li> <li>• Schools curricula: <b>Yes</b></li> <li>• Public evacuation maps: <b>No</b></li> </ul>	<p>Tsunami awareness activities undertaken:</p> <ul style="list-style-type: none"> <li>• World Tsunami Awareness Day: <b>No</b></li> <li>• Global Disaster Risk Reduction Day: <b>No</b></li> <li>• Public tsunami preparedness outreach: <b>No</b></li> <li>• School and/or children's awareness: <b>No</b></li> <li>• Exhibitions: <b>No</b></li> <li>• Competitions/other ways of highlighting tsunami safety: <b>No</b></li> </ul>		

SINGAPORE		
	Status	Notes/Requirements
		<ul style="list-style-type: none"> <li>Tsunami exercise: <b>No</b></li> </ul>
	Support from IOTIC required to develop or enhance public awareness	<i>No response</i>
	<ul style="list-style-type: none"> <li>Willing to support other countries to develop or enhance public awareness: <b>No</b></li> <li>Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>No</b></li> </ul>	
<b>General Comments and Future Plans</b>	<b>General Comments:</b> No response	
	<b>Future Plans:</b> Upgrading central monitoring and processing system for collating, integrating, and assessing seismic and tsunami data	

SOUTH AFRICA				
	Status			Notes/Requirements
<b>Policies</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	
	Prevention & Mitigation	Not available	Not available	
	Preparedness	Not available	Not available	
	Emergency Response	Not available	Not available	
	Rehabilitation & Reconstruction	Not available	Not available	
<b>Plans</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	<b>Community</b>
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>			
<b>Guidelines</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	
	Prevention & Mitigation	Not available	Not available	
	Preparedness	Not available	Not available	
	Emergency Response	Not available	Not available	
	Rehabilitation & Reconstruction	Not available	Not available	
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard assessment undertaken including: <b>Tsunami, drought, flooding, windstorms and snow</b></li> <li>• Tsunami hazard assessment undertaken at <b>regional level</b></li> <li>• Products available: <b>Hazard and inundation maps</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Good</b></li> <li>• Capacity to train other countries: <b>Poor</b> (PTHA, DTHA, field studies) to <b>Moderate</b> (hazard, inundation and evacuation mapping)</li> </ul>			<p><b>Notes:</b> Hazard assessment conducted by SA Weather Services and Council for Geosciences</p> <p>Eastern Coastal from Richards Bay to port Elizabeth with a focus on the ports and harbour areas. The percentage mapped was between 40-90 kilometres within each of the regional centres</p>

SOUTH AFRICA					
	Status		Notes/Requirements		
<b>Risk Assessment</b>	<ul style="list-style-type: none"> <li>Single risk assessment on tsunami undertaken: <b>No</b></li> <li>Multi-hazard risk assessment undertaken including <i>No response</i></li> <li>Tsunami risk assessment undertaken at <i>No response</i></li> <li>Products available: <i>No response</i></li> <li>Capacity to undertake tsunami risk assessment: <b>Good</b></li> <li>Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Poor</b> (at all levels)</li> </ul>				
<b>Detection and Warning</b>	<ul style="list-style-type: none"> <li>National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>SA Weather Services</b></li> <li>Use IOTWMS TSP data or own assessment to determine national threats? <b>Use TSP data</b></li> <li>24x7 operations? <b>Yes</b></li> <li>Level of tsunami threat forecast information produced: <b>National level</b></li> <li>Access to national or international seismic networks: <b>Yes</b> (see notes)</li> <li>Access to national or international sea level networks: <b>Yes</b> (see notes)</li> <li>Other national observing networks used for tsunami early warning: <b>Yes</b> (see notes)</li> <li>Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>No</b></li> <li>Capability for tsunami modelling to support threat forecasts: <b>No</b></li> <li>Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>		<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>Seismic Network operated by the Council for Geoscience in collaboration with other seismic monitoring networks such as NASA</li> <li>Use GTS for sea level data</li> <li>SA Weather services operates a series of coastal weather radars</li> </ul>		
<b>Dissemination</b>	How is tsunami information disseminated within country?	Email, SMS, Telephone, Webpage, Radio, National Television			
	How is warning terminated?	A media statement is produced			
<b>Standard Operating Procedures</b>	SOPs for <b>upstream</b> emergency response:		<b>Support Required to Develop</b>		
	<ul style="list-style-type: none"> <li>24/7 Emergency Response Centre: <b>No</b></li> <li>Receiving information from NTWC: <b>Yes</b></li> <li>Response criteria/decision making: <b>Yes</b></li> </ul>		<b>SOPs</b>	<b>Human Resources</b>	<b>Infrastructure</b>
			✓	✓	✓
			X	X	X
			✓	✓	✓

SOUTH AFRICA				
	Status	Notes/Requirements		
	<p>SOPs for <b>downstream</b> emergency response:</p> <ul style="list-style-type: none"> <li>Warning dissemination: <b>Yes</b></li> <li>Evacuation call procedures: <b>No</b></li> <li>Community evacuation procedures: <b>No</b></li> <li>Communication with NTWC: <b>Yes</b></li> <li>Communication with local government: <b>Yes</b></li> <li>Media arrangements: <b>Yes</b></li> <li>Communication with other stakeholders: <b>No</b></li> </ul>	X	X	X
		✓	✓	✓
		✓	✓	✓
		X	X	X
		X	X	X
		✓	X	✓
		✓	✓	X
<b>Evacuation Infrastructure</b>	<ul style="list-style-type: none"> <li>Evacuation shelters: <b>No</b></li> <li>Vertical evacuation shelter: <b>Yes</b></li> <li>Natural or artificial hill for vertical evacuation: <b>Yes</b></li> <li>Evacuation signage: <b>No</b></li> <li>Evacuation infrastructure integrated in evacuation plan: <b>No</b></li> </ul>	<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>Many coastal towns have high rise buildings that can be used to evacuate people</li> <li>All 3 coastal regions have vertical evacuation based on topography although distances to these areas vary</li> <li>Limited signage in each of the coastal regions</li> </ul>		
<b>Tsunami Exercises</b>	<ul style="list-style-type: none"> <li>Tsunami exercises incorporated in national policies: <b>No</b></li> <li>Tsunami exercises incorporated in national guidelines: <b>Yes</b></li> </ul>			
	<p>Level at which exercises are conducted:</p> <ul style="list-style-type: none"> <li>National: <b>Yes</b></li> <li>Regional: <b>No</b></li> <li>City: <b>No</b></li> <li>Village: <b>No</b></li> <li>Community/neighbourhood: <b>No</b></li> <li>School: <b>No</b></li> </ul>			
<b>Public Awareness</b>	<ul style="list-style-type: none"> <li>Responsibility for tsunami public awareness programmes: <b>LDMO</b></li> </ul>			
	<p>Tsunami related education and awareness material available:</p> <ul style="list-style-type: none"> <li>Leaflets or flyers: <b>Yes</b></li> <li>Posters: <b>No</b></li> <li>Booklets: <b>No</b></li> <li>Information boards: <b>No</b></li> <li>Tsunami signage: <b>No</b></li> <li>Video or other visual or oral media: <b>No</b></li> <li>Indigenous knowledge, folklore etc: <b>Yes</b></li> <li>Teaching kits: <b>No</b></li> </ul>	<p>Tsunami awareness activities undertaken:</p> <ul style="list-style-type: none"> <li>World Tsunami Awareness Day: <b>No</b></li> <li>Global Disaster Risk Reduction Day: <b>Yes</b> (annually)</li> <li>Public tsunami preparedness outreach: <b>No</b></li> <li>School and/or children's awareness: <b>No</b></li> <li>Exhibitions: <b>No</b></li> </ul>		



SOUTH AFRICA			
	Status		Notes/Requirements
	<ul style="list-style-type: none"> <li>Schools curricula: <b>No</b></li> <li>Public evacuation maps: <b>No</b></li> </ul>	<ul style="list-style-type: none"> <li>Competitions/other ways of highlighting tsunami safety: <b>No</b></li> <li>Tsunami exercise: <b>Yes</b> (annually as part of TSP comms tests)</li> </ul>	
	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>Provision of general tsunami awareness materials</li> <li>Customization of general materials to country or community</li> <li>Development of tsunami awareness programmes, activities or campaigns</li> <li>Participation/support by international agencies or experts to your country's activities</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>X</li> <li>X</li> </ul>
	<ul style="list-style-type: none"> <li>Willing to support other countries to develop or enhance public awareness: <b>No</b></li> <li>Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>No</b></li> </ul>		
	<p><b>General Comments:</b> The NDMC, SA Weather Services and Council for Geoscience held joint meetings and briefing session post each tsunami related activity to perform three main activities that include the following: 1) Consider new implications for the regional impact of tsunami 2) factor new learnings from each exercise into the SOP to allow for improvement and clearer warnings procedures 3) Update any relevant information</p> <p><b>Future Plans:</b> 1. Complete a full hazard mapping exercise with the relevant models that have impact for South Africa. 2. Use the hazard mapping product to compile an indicative risk assessment for the coastal regions of SA. 3. Workshop this product with other stakeholders and regional/ Provincial Disaster Management Centres (PDMC's). 4. Improve the SOP to include new information</p>		
<p><b>General Comments and Future Plans</b></p>			

SRI LANKA					
	Status			Notes/Requirements	
<b>Policies</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> Disaster Management Act No 13 of 2005 and Disaster Management policy
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
<b>Plans</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	<b>Community</b>	<b>Notes:</b> Disaster Management Plan
	Prevention & Mitigation	Not available	Not available	Not available	
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Rehabilitation & Reconstruction	Not available	Not available	Not available	
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>				
<b>Guidelines</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>		<b>Notes:</b> Disaster preparedness plans, response plans and guidelines
	Prevention & Mitigation	Not available	Not available		
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Rehabilitation & Reconstruction	Not available	Not available		
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard assessment undertaken including: <b>Tsunami, cyclone, drought, earthquakes, epidemics, flooding, landslide, coastal erosion, lightning</b></li> <li>• Tsunami hazard assessment undertaken at <b>national, district and village level</b></li> <li>• Products available: <b>PTHA, field studies, hazard, inundation and evacuation maps</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Poor</b></li> <li>• Capacity to train other countries: <b>Poor</b> (PTHA, DTHA, field studies, evacuation mapping) to <b>Moderate</b> (hazard and inundation mapping)</li> </ul>			<b>Notes:</b> Hazard assessment conducted by DMC with all the relevant technical agencies DOM, ID, NARA, GSMB, Health Ministry, NBRO with the support of UNDP  All 14 coastal districts with the scale of high, moderate and low inundation and proximity analysis	

SRI LANKA						
	Status	Notes/Requirements				
<b>Risk Assessment</b>	<ul style="list-style-type: none"> <li>• Single risk assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard risk assessment undertaken including <i>No response</i></li> <li>• Tsunami risk assessment undertaken at <i>No response</i></li> <li>• Products available: <i>No response</i></li> <li>• Capacity to undertake tsunami risk assessment: <b>Poor</b></li> <li>• Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Poor</b> (at all levels)</li> </ul>					
<b>Detection and Warning</b>	<ul style="list-style-type: none"> <li>• National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>• Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>Department of Meteorology</b></li> <li>• Use IOTWMS TSP data or own assessment to determine national threats? <b>Use TSP data</b></li> <li>• 24x7 operations? <b>Yes</b></li> <li>• Level of tsunami threat forecast information produced: <b>National and local level</b></li> <li>• Access to national or international seismic networks: <b>Yes</b> (see notes)</li> <li>• Access to national or international sea level networks: <b>Yes</b> (see notes)</li> <li>• Other national observing networks used for tsunami early warning: <b>No</b></li> <li>• Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>Yes</b> (see notes)</li> <li>• Capability for tsunami modelling to support threat forecasts: <b>Yes</b> (see notes)</li> <li>• Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>• Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>	<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• Seismic: California Integrated Seismic Network (CISN), USGS network</li> <li>• Also access NDBC DART buoy network</li> <li>• Use SeisComp3</li> <li>• Use ComMIT with local or remote databases</li> </ul>				
<b>Dissemination</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">How is tsunami information disseminated within country?</td> <td>Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social, media, Sirens, Television, Warning towers, Megaphone, Police/military, Public alert system, VHF radio</td> </tr> <tr> <td>How is warning terminated?</td> <td>Issuing tsunami threat clear message</td> </tr> </table>	How is tsunami information disseminated within country?	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social, media, Sirens, Television, Warning towers, Megaphone, Police/military, Public alert system, VHF radio	How is warning terminated?	Issuing tsunami threat clear message	
How is tsunami information disseminated within country?	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social, media, Sirens, Television, Warning towers, Megaphone, Police/military, Public alert system, VHF radio					
How is warning terminated?	Issuing tsunami threat clear message					
<b>Standard</b>		<b>Support Required to Develop</b>				

SRI LANKA				
	Status	Notes/Requirements		
Operating Procedures	SOPs for <b>upstream</b> emergency response: <ul style="list-style-type: none"> <li>• 24/7 Emergency Response Centre: <b>Yes</b></li> <li>• Receiving information from NTWC: <b>Yes</b></li> <li>• Response criteria/decision making: <b>Yes</b></li> </ul>	SOPs	Human Resources	Infrastructure
	SOPs for <b>downstream</b> emergency response: <ul style="list-style-type: none"> <li>• Warning dissemination: <b>Yes</b></li> <li>• Evacuation call procedures: <b>No</b></li> <li>• Community evacuation procedures: <b>No</b></li> <li>• Communication with NTWC: <b>Yes</b></li> <li>• Communication with local government: <b>Yes</b></li> <li>• Media arrangements: <b>Yes</b></li> <li>• Communication with other stakeholders: <b>No</b></li> </ul>			
Evacuation Infrastructure	<ul style="list-style-type: none"> <li>• Evacuation shelters: <b>Yes</b></li> <li>• Vertical evacuation shelter: <b>Yes</b></li> <li>• Natural or artificial hill for vertical evacuation: <b>Yes</b></li> <li>• Evacuation signage: <b>Yes</b></li> <li>• Evacuation infrastructure integrated in evacuation plan: <b>Yes</b></li> </ul>			
Tsunami Exercises	<ul style="list-style-type: none"> <li>• Tsunami exercises incorporated in national policies: <b>No</b></li> <li>• Tsunami exercises incorporated in national guidelines: <b>Yes</b></li> </ul>			
	Level at which exercises are conducted: <ul style="list-style-type: none"> <li>• National: <b>Yes</b></li> <li>• Regional: <b>No</b></li> <li>• City: <b>No</b></li> <li>• Village: <b>Yes</b></li> <li>• Community/neighbourhood: <b>Yes</b></li> <li>• School: <b>Yes</b></li> </ul>	<b>Notes:</b> Tsunami exercises also carried out at district, divisional and “GN” level as well as hospital and school drills		
Public Awareness	<ul style="list-style-type: none"> <li>• Responsibility for tsunami public awareness programmes: <b>NDMO</b></li> </ul>			
	Tsunami related education and awareness material available: <ul style="list-style-type: none"> <li>• Leaflets or flyers: <b>Yes</b></li> <li>• Posters: <b>Yes</b></li> <li>• Booklets: <b>Yes</b></li> <li>• Information boards: <b>Yes</b></li> </ul>	Tsunami awareness activities undertaken: <ul style="list-style-type: none"> <li>• World Tsunami Awareness Day: <b>Yes</b> (2017)</li> <li>• Global Disaster Risk Reduction Day: <b>No</b></li> </ul>		

SRI LANKA			
	Status	Notes/Requirements	
	<ul style="list-style-type: none"> <li>• Tsunami signage: <b>Yes</b></li> <li>• Video or other visual or oral media: <b>Yes</b></li> <li>• Indigenous knowledge, folklore etc: <b>Yes</b></li> <li>• Teaching kits: <b>Yes</b></li> <li>• Schools curricula: <b>Yes</b></li> <li>• Public evacuation maps: <b>Yes</b></li> </ul>	<ul style="list-style-type: none"> <li>• Public tsunami preparedness outreach: <b>Yes</b> (26 December annually)</li> <li>• School and/or children's awareness: <b>Yes</b></li> <li>• Exhibitions: <b>Yes</b></li> <li>• Competitions/other ways of highlighting tsunami safety: <b>Yes</b></li> <li>• Tsunami exercise: <b>Yes</b></li> </ul>	
	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>• Provision of general tsunami awareness materials <span style="float: right;">X</span></li> <li>• Customization of general materials to country or community <span style="float: right;">✓</span></li> <li>• Development of tsunami awareness programmes, activities or campaigns <span style="float: right;">✓</span></li> <li>• Participation/support by international agencies or experts to your country's activities <span style="float: right;">✓</span></li> </ul>	
	<ul style="list-style-type: none"> <li>• Willing to support other countries to develop or enhance public awareness: <b>Yes</b></li> <li>• Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <i>No response</i></li> </ul>	<b>Notes:</b> <ul style="list-style-type: none"> <li>• DMC willing to provide support</li> </ul>	
<b>General Comments and Future Plans</b>	<b><u>General Comments:</u></b> DMC has developed the hazard profile of Sri Lanka and established 24/7 EOC and EW system also all the districts having Disaster Management plans and operation plans		
	<b><u>Future Plans:</u></b> EOC have their own SOPs and National Emergency Operation Plan is finalized there we have all the roles and responsibilities of Stakeholder agencies before, during and after a disaster Hazard wise and scenario wise. based on the NEOP Tsunami risk assessment have to completed and also sectoral SOPs have to be developed		

TANZANIA				
	Status			Notes/Requirements
<b>Policies</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
<b>Plans</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	<b>Community</b>
	Prevention & Mitigation	Not available	Not available	Not available
	Preparedness	Not available	Not available	Not available
	Emergency Response	Not available	Not available	Not available
	Rehabilitation & Reconstruction	Not available	Not available	Not available
Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>				
<b>Guidelines</b>	<b>Phase</b>	<b>National</b>	<b>Local</b>	
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard assessment undertaken including: <b>Tsunami, cyclone, drought, flooding</b></li> <li>• Tsunami hazard assessment undertaken at <b>regional level</b></li> <li>• Products available: <b>Field studies, hazard map</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Good</b></li> <li>• Capacity to train other countries: <b>Moderate</b> (PTHA, DTHA). <b>Good</b> (field studies, hazard and inundation mapping). <b>Very Good</b> (evacuation mapping)</li> </ul>			<b>Notes:</b> Hazard assessment conducted by National/Local University

TANZANIA		
	Status	Notes/Requirements
<b>Risk Assessment</b>	<ul style="list-style-type: none"> <li>Single risk assessment on tsunami undertaken: <b>No</b></li> <li>Multi-hazard risk assessment undertaken including: <b>Tsunami, drought, flooding</b></li> <li>Tsunami risk assessment undertaken at <b>regional level</b></li> <li>Products available: <b>Guidelines, Action Plan</b></li> <li>Capacity to undertake tsunami risk assessment: <b>Fair</b></li> <li>Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Good</b> (national, regional and city levels). <b>Moderate</b> (village and community level)</li> </ul>	
<b>Detection and Warning</b>	<ul style="list-style-type: none"> <li>National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <i>No response</i></li> <li>Use IOTWMS TSP data or own assessment to determine national threats? <b>Use TSP data</b></li> <li>24x7 operations? <b>Yes</b></li> <li>Level of tsunami threat forecast information produced: <b>National and local level</b></li> <li>Access to national or international seismic networks: <b>Yes</b></li> <li>Access to national or international sea level networks: <b>Yes</b></li> <li>Other national observing networks used for tsunami early warning: <b>None</b></li> <li>Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>No</b></li> <li>Capability for tsunami modelling to support threat forecasts: <b>Yes</b></li> <li>Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>	
<b>Dissemination</b>	How is tsunami information disseminated within country?	Email, Telephone, Fax, Webpage, Radio, Television, Police/military, Public alert system
	How is warning terminated?	<i>No response</i>
<b>Standard</b>		<b>Support Required to Develop</b>

TANZANIA				
	Status	Notes/Requirements		
Operating Procedures	SOPs for <b>upstream</b> emergency response: <ul style="list-style-type: none"> <li>• 24/7 Emergency Response Centre: <b>Yes</b></li> <li>• Receiving information from NTWC: <b>Yes</b></li> <li>• Response criteria/decision making: <b>Yes</b></li> </ul>	SOPs	Human Resources	Infrastructure
		✓	✓	✓
Operating Procedures	SOPs for <b>downstream</b> emergency response: <ul style="list-style-type: none"> <li>• Warning dissemination: <b>Yes</b></li> <li>• Evacuation call procedures: <b>No</b></li> <li>• Community evacuation procedures: <b>No</b></li> <li>• Communication with NTWC: <b>Yes</b></li> <li>• Communication with local government: <b>Yes</b></li> <li>• Media arrangements: <b>Yes</b></li> <li>• Communication with other stakeholders: <b>No</b></li> </ul>			
		✓	✓	✓
		✓	✓	✓
		✓	✓	✓
		✓	✓	✓
		✓	✓	✓
		✓	✓	✓
		✓	✓	✓
Evacuation Infrastructure	<ul style="list-style-type: none"> <li>• Evacuation shelters:</li> <li>• Vertical evacuation shelter:</li> <li>• Natural or artificial hill for vertical evacuation:</li> <li>• Evacuation signage:</li> <li>• Evacuation infrastructure integrated in evacuation plan:</li> </ul>	<b>Notes</b> No response to this section		
Tsunami Exercises	<ul style="list-style-type: none"> <li>• Tsunami exercises incorporated in national policies: <b>Yes</b></li> <li>• Tsunami exercises incorporated in national guidelines: <b>No</b></li> </ul>			
	Level at which exercises are conducted: <ul style="list-style-type: none"> <li>• National: <b>No</b></li> <li>• Regional: <b>No</b></li> <li>• City: <b>Yes</b></li> <li>• Village: <b>No</b></li> <li>• Community/neighbourhood: <b>No</b></li> <li>• School: <b>Yes</b></li> </ul>			
Public Awareness	<ul style="list-style-type: none"> <li>• Responsibility for tsunami public awareness programmes: <b>NDMO</b></li> </ul>			
	Tsunami related education and awareness material available: <ul style="list-style-type: none"> <li>• Leaflets or flyers: <b>Yes</b></li> <li>• Posters: <b>No</b></li> <li>• Booklets: <b>No</b></li> <li>• Information boards: <b>No</b></li> </ul>	Tsunami awareness activities undertaken: <ul style="list-style-type: none"> <li>• World Tsunami Awareness Day: <b>No</b></li> <li>• Global Disaster Risk Reduction Day: <b>Yes</b></li> <li>• Public tsunami preparedness</li> </ul>		



<b>TANZANIA</b>				
	<b>Status</b>		<b>Notes/Requirements</b>	
	<ul style="list-style-type: none"> <li>• Tsunami signage: <b>No</b></li> <li>• Video or other visual or oral media: <b>Yes</b></li> <li>• Indigenous knowledge, folklore etc: <b>No</b></li> <li>• Teaching kits: <b>No</b></li> <li>• Schools curricula: <b>No</b></li> <li>• Public evacuation maps: <b>Yes</b></li> </ul>		<ul style="list-style-type: none"> <li>outreach: <b>No</b></li> <li>• School and/or children's awareness: <b>Yes</b></li> <li>• Exhibitions: <b>No</b></li> <li>• Competitions/other ways of highlighting tsunami safety: <b>No</b></li> <li>• Tsunami exercise: <b>No</b></li> </ul>	
	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>• Provision of general tsunami awareness materials</li> <li>• Customization of general materials to country or community</li> <li>• Development of tsunami awareness programmes, activities or campaigns</li> <li>• Participation/support by international agencies or experts to your country's activities</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>X</li> <li>✓</li> <li>✓</li> </ul>	
	<ul style="list-style-type: none"> <li>• Willing to support other countries to develop or enhance public awareness: <b>Yes</b></li> <li>• Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>No</b></li> </ul>			
	<b>General Comments:</b> No response			
<b>General Comments and Future Plans</b>	<b>Future Plans:</b> SOPs have to be developed			

THAILAND					
	Status			Notes/Requirements	
	Phase	National	Local		
<b>Policies</b>	Prevention & Mitigation	Standalone tsunami	Standalone tsunami	<b>Notes:</b> National: Tsunami Prevention and Mitigation Master Plan (2015-2019) Local: 1. Tsunami Emergency Action Plan for local administrative; 2. Prevention and Mitigation action plan for local, administrative	
	Preparedness	Standalone tsunami	Standalone tsunami		
	Emergency Response	Standalone tsunami	Standalone tsunami		
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
<b>Plans</b>	Prevention & Mitigation	Standalone tsunami	Standalone tsunami	<b>Notes:</b> 1. Tsunami Risk Mitigation Strategy for Thailand 2. Disaster Risk Reduction, 3. Risk Reduction from Geo hazard : Tsunami 4. Emergency action plan and Incident Plan are in the process	
	Preparedness	Standalone tsunami	Multi-hazard inc. Tsunami		Multi-hazard inc. Tsunami
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		Multi-hazard inc. Tsunami
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		Multi-hazard inc. Tsunami
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>				
<b>Guidelines</b>	Prevention & Mitigation	Standalone tsunami	Standalone tsunami	<b>Notes:</b> Guideline for Tsunami preparation	
	Preparedness	Standalone tsunami	Standalone tsunami		
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>Multi-hazard assessment undertaken including: <b>Tsunami, cyclone, drought, earthquakes, flooding and landslide</b></li> <li>Tsunami hazard assessment undertaken at <b>national, city, village and local level</b></li> <li>Products available: <b>PTHA, DTHA, field studies, hazard, inundation and evacuation mapping, guidelines</b></li> <li>Capacity to undertake tsunami hazard assessment: <b>Fair</b></li> <li>Capacity to train other countries: <b>Moderate</b> (PTHA, DTHA, field studies, hazard, inundation and evacuation mapping).</li> </ul>			<b>Notes:</b> Hazard assessment conducted by: Department of Mineral Resources, The Thai Meteorological Department, Department of Marine and Coastal Resources, Department of Fisheries, Department of Disaster Prevention and Mitigation, Chulalongkorn University, Burapha university, Kasetsart university, Prince of Songkla University, UNISDR, ADPC Approx 100% of coastline is mapped for tsunami hazard	

THAILAND		
	Status	Notes/Requirements
<b>Risk Assessment</b>	<ul style="list-style-type: none"> <li>• Single risk assessment on tsunami undertaken: <b>Yes</b></li> <li>• Multi-hazard risk assessment undertaken including: <b>Tsunami, cyclone, drought, earthquakes, epidemics, flooding, landslide</b></li> <li>• Tsunami risk assessment undertaken at <b>national, regional, city, village, community level</b></li> <li>• Products available: <b>Risk map, evacuation map, guidelines, action plan</b></li> <li>• Capacity to undertake tsunami risk assessment: <b>Good</b></li> <li>• Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Good</b> (national, regional and city levels). <b>Moderate</b> (all levels)</li> </ul>	<p><b>Notes:</b> Asian Disaster Preparedness Center (ADPC) and Department of Disaster Prevention and Mitigation, Ministry of Interior Thailand can provide training/consultancy</p>
<b>Detection and Warning</b>	<ul style="list-style-type: none"> <li>• National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>• Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>National Disaster Warning Centre</b></li> <li>• Use IOTWMS TSP data or own assessment to determine national threats? <b>Use TSP data and own assessment</b></li> <li>• 24x7 operations? <b>Yes</b></li> <li>• Level of tsunami threat forecast information produced: <b>National and local level</b></li> <li>• Access to national or international seismic networks: <b>Yes</b></li> <li>• Access to national or international sea level networks: <b>Yes</b> (see notes)</li> <li>• Other national observing networks used for tsunami early warning: <b>Yes</b> (see notes)</li> <li>• Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>No</b></li> <li>• Capability for tsunami modelling to support threat forecasts: <b>Yes</b> (see notes)</li> <li>• Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>• Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b></li> </ul>	<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• Hydrographics Department, Royal Thai Navy, IOC sea level monitoring website, GTS</li> <li>• DART buoys and coastal radar stations</li> <li>• Use WINITDB, TUNAMI and TSUCAT</li> </ul>
<b>Dissemination</b>	How is tsunami information disseminated within country?	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social, media, Sirens, Television, Warning towers, Public alert system, VHF radio, broadcast alert system
	How is warning terminated?	2 hours after the last tsunami wave pass or there is no longer A Destructive Tsunami threat to the coast, Thailand. Therefore, the tsunami warning for Thailand is cancelled.

THAILAND																					
	Status		Notes/Requirements																		
<b>Standard Operating Procedures</b>	SOPs for <b>upstream</b> emergency response: <ul style="list-style-type: none"> <li>• 24/7 Emergency Response Centre: <b>Yes</b></li> <li>• Receiving information from NTWC: <b>Yes</b></li> <li>• Response criteria/decision making: <b>Yes</b></li> </ul>		<b>Support Required to Develop</b> <table border="1"> <thead> <tr> <th>SOPs</th> <th>Human Resources</th> <th>Infrastructure</th> </tr> </thead> <tbody> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> </tbody> </table>	SOPs	Human Resources	Infrastructure	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	SOPs	Human Resources	Infrastructure																		
✓	✓	✓																			
✓	✓	✓																			
✓	✓	✓																			
	SOPs for <b>downstream</b> emergency response: <ul style="list-style-type: none"> <li>• Warning dissemination: <b>Yes</b></li> <li>• Evacuation call procedures: <b>No</b></li> <li>• Community evacuation procedures: <b>No</b></li> <li>• Communication with NTWC: <b>Yes</b></li> <li>• Communication with local government: <b>Yes</b></li> <li>• Media arrangements: <b>Yes</b></li> <li>• Communication with other stakeholders: <b>No</b></li> </ul>		<table border="1"> <tbody> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> </tr> </tbody> </table>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
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✓	✓	✓																			
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✓	✓	✓																			
✓	✓	✓																			
✓	✓	✓																			
<b>Evacuation Infrastructure</b>	<ul style="list-style-type: none"> <li>• Evacuation shelters: <b>Yes</b></li> <li>• Vertical evacuation shelter: <b>Yes</b></li> <li>• Natural or artificial hill for vertical evacuation: <b>Yes</b></li> <li>• Evacuation signage: <b>Yes</b></li> <li>• Evacuation infrastructure integrated in evacuation plan: <b>Yes</b></li> </ul>		<b>Notes</b> <ul style="list-style-type: none"> <li>• 233 shelters in 6 provinces: Krabi, Trang, Satun, Phang Nga, Phuket, Ranong, and Satun</li> </ul>																		
<b>Tsunami Exercises</b>	<ul style="list-style-type: none"> <li>• Tsunami exercises incorporated in national policies: <b>Yes</b></li> <li>• Tsunami exercises incorporated in national guidelines: <b>Yes</b></li> </ul>																				
	Level at which exercises are conducted: <ul style="list-style-type: none"> <li>• National: <b>Yes</b></li> <li>• Regional: <b>Yes</b></li> <li>• City: <b>No</b></li> <li>• Village: <b>No</b></li> <li>• Community/neighbourhood: <b>Yes</b></li> <li>• School: <b>No</b></li> </ul>																				
<b>Public Awareness</b>	<ul style="list-style-type: none"> <li>• Responsibility for tsunami public awareness programmes: <b>NDMO/LDMO/NTWC</b></li> </ul>																				
	Tsunami related education and awareness material available:	Tsunami awareness activities undertaken:																			

<b>THAILAND</b>			
	<b>Status</b>	<b>Notes/Requirements</b>	
	<ul style="list-style-type: none"> <li>• Leaflets or flyers: <b>Yes</b></li> <li>• Posters: <b>Yes</b></li> <li>• Booklets: <b>Yes</b></li> <li>• Information boards: <b>Yes</b></li> <li>• Tsunami signage: <b>Yes</b></li> <li>• Video or other visual or oral media: <b>Yes</b></li> <li>• Indigenous knowledge, folklore etc: <b>Yes</b></li> <li>• Teaching kits: <b>No</b></li> <li>• Schools curricula: <b>Yes</b></li> <li>• Public evacuation maps: <b>No</b></li> </ul>	<ul style="list-style-type: none"> <li>• World Tsunami Awareness Day: <b>Yes</b> (2 times)</li> <li>• Global Disaster Risk Reduction Day: <b>Yes</b> (many)</li> <li>• Public tsunami preparedness outreach: <b>Yes</b> (many)</li> <li>• School and/or children’s awareness: <b>Yes</b> (many)</li> <li>• Exhibitions: <b>Yes</b> (many)</li> <li>• Competitions/other ways of highlighting tsunami safety: <b>No</b></li> <li>• Tsunami exercise: <b>Yes</b> (many)</li> </ul>	
	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>• Provision of general tsunami awareness materials ✓</li> <li>• Customization of general materials to country or community ✓</li> <li>• Development of tsunami awareness programmes, activities or campaigns ✓</li> <li>• Participation/support by international agencies or experts to your country’s activities ✓</li> </ul>	
	<ul style="list-style-type: none"> <li>• Willing to support other countries to develop or enhance public awareness: <b>Yes</b></li> <li>• Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>No</b></li> </ul>	Notes: <ul style="list-style-type: none"> <li>• Can provide experts, materials, training, consultancy</li> </ul>	
<b>General Comments and Future Plans</b>	<p><b>General Comments:</b>            NDWC is operating 24 hours under the supervision DDPM ,NDMO, Ministry of Interior. NDWC has its responsibility in planning, coordinating, controlling, implementing and preparing the national warning systems and equipment for issue tsunami early warning and evacuation in the role of warning operation part under central emergency operation center that the Director General is a commander. NDWC receives earthquake information from TMD national responsible for seismic evaluations and receives Sea level information from Hydrographic Department of the Royal Thai Navy. GTS is fully operational to TMD and NDWC. There is also provide the information from Indian Ocean and Pacific Ocean.            The SOPs of NDWC for earthquake in the sea will analyse situation within 5 minutes after the earthquake occurs. Then disseminate warning message in the risk area via fax, email, SMS, Line application, website and broadcast alert system (On Digital Television Channels and Radio Stations) including the warning tower.            TMD is operating 24 hours to monitoring seismic network in Thailand and Outside Thailand. TMD has been developing estimate time of arrival for tsunami model including generated shake map and evaluated Focal mechanism. Moreover, TMD has also increases seismic network around the country.            LDMO along Andaman Provinces have the tsunami exercised by themselves very regular with some support from NDMO. Tsunami evacuation maps, routes and signage have been installed along Andaman Provinces and will be upgrade for the smart signage (This project is in process). The education sectors have created tsunami awareness in the curriculum for schools.</p>		

THAILAND		
	Status	Notes/Requirements
	<b>Future Plans:</b> NDWC and TMD are cooperating together in the SOP especially with the Tsunami Modelling and Focal mechanism analysis. NDWC are improving criteria and SOP for Tsunami Warning and also improving the Tsunami model. NDMO will plan to improve master plan for Tsunami Prevention and Mitigation include Emergency Response plan.	

TIMOR-LESTE					
	Status			Notes/Requirements	
	Phase	National	Local		
<b>Policies</b>	Prevention & Mitigation	Multi-hazard inc. Tsunami	-	<b>Notes:</b> National Disaster Management Policy 2008, currently being revised  At the Municipal level, the local tsunami policy will form part of municipal disaster management plans however these are still in development	
	Preparedness	Multi-hazard inc. Tsunami	-		
	Emergency Response	Multi-hazard inc. Tsunami	-		
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	-		
<b>Plans</b>	Prevention & Mitigation	Standalone tsunami	Multi-hazard inc. Tsunami	<b>Notes:</b> Comprehensive guide to tsunami exercise at national level in Timor - Leste which would form the basis for standalone plan at sub national level planning form part of municipal disaster management plan which are currently in development	
	Preparedness	Standalone tsunami	Multi-hazard inc. Tsunami		
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		Not available
	Rehabilitation & Reconstruction	Standalone tsunami	Not available		Not available
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: <b>Yes</b>				
<b>Guidelines</b>	Prevention & Mitigation	Not available	Not available	<b>Notes:</b> National Disaster Management Policy 2008  Tsunami DRR guidelines at municipal level are the responsibilities of municipalities and these currently in development as part of multi hazard planning	
	Preparedness	Multi-hazard inc. Tsunami	Not available		
	Emergency Response	Multi-hazard inc. Tsunami	Not available		
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Not available		
<b>Hazard Assessment</b>	<ul style="list-style-type: none"> <li>• Single hazard assessment on tsunami undertaken: <b>No</b></li> <li>• Multi-hazard assessment undertaken including: <b>Tsunami, cyclone, drought, earthquakes, flooding, landslide, strong wind</b></li> <li>• Tsunami hazard assessment undertaken at <b>regional, city, sub-district level</b></li> <li>• Products available: <b>DTHA</b></li> <li>• Capacity to undertake tsunami hazard assessment: <b>Fair</b></li> <li>• Capacity to train other countries: <b>Poor</b> (PTHA, DTHA, field studies, hazard, inundation and evacuation mapping).</li> </ul>			<b>Notes:</b> Hazard assessment conducted by UNDP  Areas mapped: municipalities of Ainaro, Baucau, Bobonaro, Covalima, Dili, Liquica, Lautem, Manatuto, Manufahi, Viqueque - and the Special Economic Region of Oecusse.	

TIMOR-LESTE		
	Status	Notes/Requirements
Risk Assessment	<ul style="list-style-type: none"> <li>Single risk assessment on tsunami undertaken: <b>No</b></li> <li>Multi-hazard risk assessment undertaken including: <b>Tsunami, cyclone, drought, earthquakes, flooding, landslide, strong wind</b></li> <li>Tsunami risk assessment undertaken at <b>national, regional and sub-district level</b></li> <li>Products available: <b>Risk map, evacuation map</b></li> <li>Capacity to undertake tsunami risk assessment: <b>Fair</b></li> <li>Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: <b>Poor</b> (all levels)</li> </ul>	<p><b>Notes:</b> Risk assessment conducted by UNDP</p> <p>Municipalities of Ainaro, Baucau, Bobonaro, Covalima, Dili, Liquica, Lautem, Manatuto, Manufahi, Viqueque - and the Special Economic Region of Oecusse. Only major population centers mapped</p> <p>Risk map and evacuation map are in draft form for Dili, but yet to be finalised</p>
Detection and Warning	<ul style="list-style-type: none"> <li>National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: <b>Yes</b></li> <li>Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: <b>National Disaster Risk Management Directorate</b></li> <li>Use IOTWMS TSP data or own assessment to determine national threats? <b>Use TSP data</b></li> <li>24x7 operations? <b>Yes</b></li> <li>Level of tsunami threat forecast information produced: <b>National and local level</b></li> <li>Access to national or international seismic networks: <b>Yes</b></li> <li>Access to national or international sea level networks: <b>Yes</b> (see notes)</li> <li>Other national observing networks used for tsunami early warning: <i>No response</i></li> <li>Capability to analyse real-time seismic and sea-level data for potential tsunami threat: <b>Yes</b> (see notes)</li> <li>Capability for tsunami modelling to support threat forecasts: <b>Yes</b> (basic level)</li> <li>Does organisation for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? <b>Yes</b></li> <li>Has the NTWC and/or TWFP participated in tsunami drills? <b>Yes</b> (see notes)</li> </ul>	<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>Sea level via RIMES, BMKG Ocean Forecast, BOM – Australia</li> <li>Use JISView and Linuh</li> <li>IOWave only (not in IOTWMS Communications Tests)</li> </ul>
Dissemination	How is tsunami information disseminated within country?	Email, SMS, Telephone, WhatsApp / Facebook / Other social, media, Sirens, Television, Warning towers, Megaphone, Police/military, Public alert system, traditional alert methods, eg. bells and gongs
	How is warning terminated?	Email, sms, phone call, public alert system.



TIMOR-LESTE					
	Status		Notes/Requirements		
Standard Operating Procedures	SOPs for <b>upstream</b> emergency response:		<b>Support Required to Develop</b>		
	<ul style="list-style-type: none"> <li>24/7 Emergency Response Centre: <b>Yes</b></li> <li>Receiving information from NTWC: <b>Yes</b></li> <li>Response criteria/decision making: <b>Yes</b></li> </ul>		<b>SOPs</b>	<b>Human Resources</b>	<b>Infrastructure</b>
Standard Operating Procedures	SOPs for <b>downstream</b> emergency response:		✓	✓	✓
	<ul style="list-style-type: none"> <li>Warning dissemination: <b>Yes</b></li> <li>Evacuation call procedures: <b>No</b></li> <li>Community evacuation procedures: <b>No</b></li> <li>Communication with NTWC: <b>Yes</b></li> <li>Communication with local government: <b>Yes</b></li> <li>Media arrangements: <b>Yes</b></li> <li>Communication with other stakeholders: <b>No</b></li> </ul>		✓	✓	✓
Evacuation Infrastructure	<ul style="list-style-type: none"> <li>Evacuation shelters: <b>Yes</b></li> <li>Vertical evacuation shelter: <b>Yes</b></li> <li>Natural or artificial hill for vertical evacuation: <b>Yes</b></li> <li>Evacuation signage: <b>Yes</b></li> <li>Evacuation infrastructure integrated in evacuation plan: <b>Yes</b></li> </ul>		<b>Notes</b> <ul style="list-style-type: none"> <li>2 dedicated shelters completed in Viqueque and Covalima Municipalities</li> <li>Potential to utilise the multi story Timor Plaza shopping center but no formal agreement yet</li> <li>Limited signage is in place Viqueque and Covalima. However <b>this is an area that urgently needs to be addressed</b></li> </ul>		
	Tsunami Exercises	<ul style="list-style-type: none"> <li>Tsunami exercises incorporated in national policies: <b>Yes</b></li> <li>Tsunami exercises incorporated in national guidelines: <b>No</b></li> </ul>			
Level at which exercises are conducted: <ul style="list-style-type: none"> <li>National: <b>Yes</b></li> <li>Regional: <b>Yes</b></li> <li>City: <b>No</b></li> <li>Village: <b>No</b></li> <li>Community/neighbourhood: <b>Yes</b></li> <li>School: <b>Yes</b></li> </ul>		<b>Notes:</b> UNDP coordinated and Japanese Government funded School Tsunami Exercise and the awareness program conducted in 6 school in 3 municipalities during 2018			
Public Awareness	<ul style="list-style-type: none"> <li>Responsibility for tsunami public awareness programmes: <b>NDMO</b></li> </ul>				
	Tsunami related education and awareness material available: <ul style="list-style-type: none"> <li>Leaflets or flyers: <b>Yes</b></li> </ul>		Tsunami awareness activities undertaken: <ul style="list-style-type: none"> <li>World Tsunami Awareness Day: <b>No</b></li> </ul>		

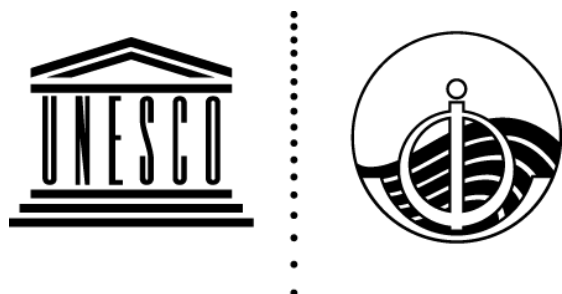
<b>TIMOR-LESTE</b>			
	<b>Status</b>	<b>Notes/Requirements</b>	
	<ul style="list-style-type: none"> <li>• Posters: <b>Yes</b></li> <li>• Booklets: <b>Yes</b></li> <li>• Information boards: <b>No</b></li> <li>• Tsunami signage: <b>No</b></li> <li>• Video or other visual or oral media: <b>Yes</b></li> <li>• Indigenous knowledge, folklore etc: <b>Yes</b></li> <li>• Teaching kits: <b>Yes</b></li> <li>• Schools curricula: <b>Yes</b></li> <li>• Public evacuation maps: <b>Yes</b></li> </ul>	<ul style="list-style-type: none"> <li>• Global Disaster Risk Reduction Day: <b>Yes</b> (1 time)</li> <li>• Public tsunami preparedness outreach: <b>No</b></li> <li>• School and/or children’s awareness: <b>Yes</b> (6 times)</li> <li>• Exhibitions: <b>Yes</b> (1 time)</li> <li>• Competitions/other ways of highlighting tsunami safety: <b>No</b></li> <li>• Tsunami exercise: <b>Yes</b> (1 time)</li> </ul>	
	Support from IOTIC required to develop or enhance public awareness	<ul style="list-style-type: none"> <li>• Provision of general tsunami awareness materials ✓</li> <li>• Customization of general materials to country or community ✓</li> <li>• Development of tsunami awareness programmes, activities or campaigns ✓</li> <li>• Participation/support by international agencies or experts to your country’s activities ✓</li> </ul>	
	<ul style="list-style-type: none"> <li>• Willing to support other countries to develop or enhance public awareness: <b>No</b></li> <li>• Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: <b>No</b></li> </ul>		
<b>General Comments and Future Plans</b>	<p><b><u>General Comments:</u></b> Some material in Bahasa Indonesia been translated to Tetun language.</p>		
	<p><b><u>Future Plans:</u></b></p> <ul style="list-style-type: none"> <li>• Policy Integration of the Viqueque and Covalima evacuation center in to Tsunami awareness and evacuation planning.</li> <li>• Integration of the BSRP (Building Safety Resilience Pacific) Project funded Tsunami warning towers in Dili in to National Early Warning System and development of Public Awareness campaign.</li> <li>• Integration of Tsunami hazard mapping and evacuation planning and community awareness into municipal disaster management plan and policy</li> </ul>		

ANNEX V

**ACRONYMS**

<b>BMKG</b>	Indonesian Agency for Meteorology, Climatology and Geophysics
<b>BoM</b>	Australian Bureau of Meteorology
<b>CARIBE-EWS</b>	Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions
<b>CATP</b>	This Capacity Assessment of Tsunami Preparedness
<b>CFZ</b>	Coastal Forecast Zone
<b>CISN</b>	California Integrated Seismic Network
<b>CTBTO</b>	Comprehensive Nuclear-Test-Ban Treaty Organization
<b>DART</b>	Deep-ocean Assessment and Reporting of Tsunami Project
<b>DMO</b>	Disaster Management Organization
<b>EOC</b>	Emergency Operation Centre
<b>EOP</b>	Emergency Operation Plan
<b>GNSS</b>	Global Navigation Satellite System
<b>GPS</b>	Global Positioning System
<b>GTS</b>	Global Telecommunication System
<b>HF</b>	high frequency
<b>ICG</b>	Intergovernmental Coordination Group
<b>ICG/IOTWMS</b>	Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System
<b>IMS</b>	International Monitoring System
<b>IOC</b>	Intergovernmental Oceanographic Commission
<b>IOTIC</b>	Indian Ocean Tsunami Information Center
<b>IOTR</b>	Indian Ocean Tsunami Ready
<b>IOWave Exercise</b>	Exercise Indian Ocean Wave
<b>IRIS</b>	Incorporated Research Institutions for Seismology
<b>JATWC</b>	Joint Australian Tsunami Warning Centre
<b>JMA</b>	Japan Meteorological Agency
<b>LDMO</b>	Local Disaster Management Organization
<b>MSZ</b>	Makran Subduction Zone

<b>NDMO</b>	National Disaster Management Organization
<b>NEAMTWS</b>	Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas
<b>NTWC</b>	National Tsunami Warning Centre
<b>OTPAS</b>	(Operational Tsunami Prediction and Assessment System
<b>PTHA</b>	Probabilistic Tsunami Hazard Assessment
<b>PTWC</b>	Pacific Tsunami Warning Center
<b>RIMES</b>	Regional Integrated Multi-Hazard Early Warning System for Africa and Asia
<b>SDGs</b>	Sustainable Development Goals
<b>SIDS</b>	Small Island Developing States
<b>SMS</b>	Short Message Service
<b>SOP</b>	Standard Operating Procedures
<b>TNC</b>	Tsunami National Contact
<b>TOAST</b>	Tsunami Observation and Simulation Terminal
<b>TOWS-WG</b>	Working Group on Tsunami and Other Hazards related to Sea-Level Warning and Mitigation Systems
<b>TSP</b>	Tsunami Service Provider
<b>TsuCAT</b>	Tsunami Coastal Assessment Tool
<b>TT-CATP</b>	Task Team on Capacity Assessment of Tsunami Preparedness
<b>TWFP</b>	Tsunami Warning Focal Point
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>UPS</b>	Uninterruptible Power Supply
<b>USGS</b>	United States Geological Survey
<b>VHF</b>	Very High Frequency
<b>VPN</b>	Virtual Private Network
<b>VSAT</b>	Very Small Aperture Terminal



# Capacity Assessment of Tsunami Preparedness in the Indian Ocean

Status Report, 2018

**Supplement**

**National Reports**

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**Capacity Assessment of Tsunami  
Preparedness in the Indian Ocean**

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**National Reports**

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IOC Technical Series, 143 Supplement 1  
Paris, April 2019  
English only

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**For bibliographic purposes, this document should be cited as follows:**

UNESCO/IOC. 2020. *Capacity Assessment of Tsunami Preparedness in the Indian Ocean –Status Report, 2018. Supplement 1*. Paris, UNESCO, IOC Technical Series No. 143, Supplement (English only).

Report prepared by: ICG/IOTWMS Task Team  
on Capacity Assessment of Tsunami Preparedness

This supplement contains national reports received from 21 Member States during the capacity assessment of tsunami preparedness in the Indian Ocean. The Secretariat trusts that the reader will find a fresh interest in perusing the national information in light of the findings of the overall regional assessment.

Published in 2020  
by United Nations Educational, Scientific  
and Cultural Organization  
7, Place de Fontenoy, 75352 Paris 07 SP

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(IOC/2020/TS/143 Supp.1)

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**NATIONAL REPORT OF AUSTRALIA**

<b>PART I: Basic Information</b>		
<b>Q3</b>	TNC Name:	Mr Rob Webb
<b>Q4</b>	Position:	Group Executive, National Forecast Services
<b>Q5</b>	Organization	Bureau of Meteorology
<b>Q6</b>	Telephone Number:	+613 9669 4217
<b>Q7</b>	E-mail Address:	rob.webb@bom.gov.au
<b>Q8</b>	Fax Number:	+613 9669 8162
<b>Q9</b>	Postal Address:	GPO Box 1289, Melbourne, VIC 3001, AUSTRALIA
<b>Q10</b>	NTWC Agency Name:	Joint Australian Tsunami Warning Centre (JATWC)
<b>Q11</b>	NTWC URL (web link) for tsunami warnings:	<a href="http://www.bom.gov.au/tsunami">www.bom.gov.au/tsunami</a>
<b>Q12</b>	NTWC Agency Contact or Officer in Charge (person):	Co-Director, JATWC
<b>Q16</b>	Postal Address:	GPO Box 1289, Melbourne, VIC 3001, AUSTRALIA
<b>Q17</b>	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes
<b>Q18</b>	TWFP Agency Name (if different from the NTWC Agency):	Respondent skipped this question
<b>Q23</b>	Postal Address:	Respondent skipped this question
<b>Q24</b>	TWFP 24x7 point of contact (office, operational unit or position, not a person):	JATWC operation desk, National Operations Centre, Bureau of Meteorology

<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Hazard Assessment</b>		
<b>Q29</b>	4a) Has your country undertaken a hazard assessment?	Yes
<b>Q30</b>	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunami

<b>Q31</b>	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclone, Earthquakes, Flooding	
<b>Q32</b>	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National Agency National / Local University National / International Consultant	
	Please specify the name(s) of the agencies:	Geoscience Australia (GA); Macquarie University, University of New South Wales (UNSW), University of Newcastle (UoN); Cardno engineering services company etc.	
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Level, Regional Level, City Level	
	Other (please specify):	National & local (GA), state & local (QLD Department of Environment and Science or DES), local (NSW State Emergency Service or NSW SES, Cardno, Mineral Resources Tasmania (MRT), UoN, Macquarie Uni/UNSW)	
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	Western Australia (WA): Broome, Port Hedland, Karratha/Dampier, Onslow, Exmouth, Carnarvon, Perth, Mandurah, Busselton, Bunbury Queensland (QLD): Sunshine Coast, Moreton Bay New South Wales (NSW): Swansea/Lake Macquarie, Manly, Botany Bay/Cronulla/Kurnell, Wollongong/Port Kembla, Merimbula, Sydney Northern Territory (NT): Darwin South Australia (SA): Victor Harbor Victoria (VIC): Lakes Entrance, Port Fairy Tasmania (TAS): Hobart National: PTHA (national in scale, providing hazard data at offshore locations for all Australian offshore territories and mainland)	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Yes	Yes
	Seismo-tectonic model	Yes	Yes
	Topography	Yes	Yes
	Land Cover	Yes	Yes
	Infrastructure details	Yes	No
	Other data used (please specify):	Re availability of Infrastructure details, some studies have used GA's NEXIS which has publicly available data but at an aggregated level due to licence constraints. Also, land cover has been used for a subset of the studies above only.	
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply)	Probabilistic Tsunami Hazard Assessment (PTHA)	

	<p>Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)</p>	
	<p>Other (please specify):</p>	<p>Tsunami Hazard Modelling Guidelines available via <a href="https://knowledge.aidr.org.au/resources/tsunami-planning-handbook/">https://knowledge.aidr.org.au/resources/tsunami-planning-handbook/</a> Inundation mapping is available for locations at 4f above for a subset of scenarios only. The bulk of this mapping used the 2008 PTHA which has now been updated with the 2018 PTHA. Relevant governments will assess need to update that mapping given the significant changes to the PTHA product.</p>
<b>Q37</b>	<p>4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment</p>	<p>Good</p>
<b>Q38</b>	<p>4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?</p>	
	<p>Probabilistic Tsunami Hazard Assessment (PTHA)</p>	<p>Medium priority</p>
	<p>Deterministic Tsunami Hazard Analysis</p>	<p>Medium priority</p>
	<p>Field Studies on Tsunami Impacts</p>	<p>Not a priority</p>
	<p>Hazard map</p>	<p>Low priority</p>
	<p>Inundation map</p>	<p>Low priority</p>
	<p>Evacuation map</p>	<p>Medium priority</p>
<b>Q39</b>	<p>4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?</p>	
	<p>Probabilistic Tsunami Hazard Assessment (PTHA)</p>	<p>Good</p>
	<p>Deterministic Tsunami Hazard Analysis</p>	<p>Good</p>
	<p>Field Studies on Tsunami Impacts</p>	<p>Not a priority</p>
	<p>Hazard map</p>	<p>Good</p>
	<p>Inundation map</p>	<p>Good</p>
	<p>Evacuation map</p>	<p>Good</p>
	<p>Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy</p>	<p>Geoscience Australia has previously provided training on offshore and onshore hazard modelling (i.e. PTHA and inundation modelling) through the overseas aid program delivered by the Australian Department of Foreign Affairs and Trade. Previous PTHA training required access to proprietary software, With the update of the Australian PTHA, Geoscience Australia has developed open source software for PTHA assessments. A number of open source inundation tools are now available. Other state/territory agencies such as NSW SES can also assist with many of these aspects too.</p>

<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	Yes
<b>Q41</b>	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Earthquakes, Epidemics, Flooding, Landslide
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	Every Australian state government is required to maintain a state-wide risk assessment as part of the National Partnership Arrangement with the Commonwealth.
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Regional Level
	Other (please specify):	For Australia, Regional refers to State/Territory
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	Work has started in assessing tsunami risk at local scale within each State/Territory (refer answer to Question 4F).
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Australia is an island nation meaning that all coastal communities have potential tsunami risk. The PTHA shows how the offshore hazard varies around the country which could be potentially used to prioritise further work. However, there is not necessarily a direct relationship between high offshore hazard and high onshore hazard due to the nature of the nearshore environment and the source of the event itself.
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	DMOs can refer to the National Emergency Risk Assessment Guidelines (NERAG) at <a href="https://knowledge.aidr.org.au/resources/handbook-10-national-emergency-risk-assessment-guidelines/">https://knowledge.aidr.org.au/resources/handbook-10-national-emergency-risk-assessment-guidelines/</a> as well as the IOTWMS Risk Assessment Guidelines. The 2018 Tsunami Hazard Modelling Guidelines (see question 4h) form an important knowledge base that can complement the NERAG.
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Good
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	Low priority
	Tsunami risk assessment at regional level	Medium priority
	Tsunami risk assessment at city level	Medium priority

	Tsunami risk assessment at village level	Low priority
	Tsunami risk assessment at community / neighbourhood level	Low priority
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	
	Tsunami risk assessment at national level	Good
	Tsunami risk assessment at regional level	Good
	Tsunami risk assessment at city level	Good
	Tsunami risk assessment at village level	Moderate
	Tsunami risk assessment at community / neighbourhood level	Moderate
	Other (specify below)	No capacity
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Policies</b>		
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Multi hazard including tsunami
	Preparedness	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami
	Rehabilitation and reconstruction	Multi hazard including tsunami
	What is the name of policy? (if available):	National Strategy for Disaster Resilience (Feb 2011); National Disaster Risk Reduction Framework (draft); Australian Emergency Management Arrangements Handbook at <a href="https://knowledge.aidr.org.au/resources/handbook-9-australian-emergency-management-arrangements/">https://knowledge.aidr.org.au/resources/handbook-9-australian-emergency-management-arrangements/</a> ; Tsunami Emergency Planning in Australia Handbook at <a href="https://knowledge.aidr.org.au/resources/tsunami-planning- handbook/">https://knowledge.aidr.org.au/resources/tsunami-planning- handbook/</a> Australian Evacuation Planning Handbook at <a href="https://knowledge.aidr.org.au/media/5617/aidr-evacuation-planning- handbook.pdf">https://knowledge.aidr.org.au/media/5617/aidr-evacuation-planning- handbook.pdf</a>
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Policy is not available
	Preparedness	Policy is not available
	Emergency response	Policy is not available
	Rehabilitation and reconstruction	Policy is not available

<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Plans</b>				
<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	Multi hazard including tsunami	Standalone tsunami only	Multi hazard including tsunami
	Preparedness	Multi hazard including tsunami	Standalone tsunami only	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami	Standalone tsunami only	Multi hazard including tsunami
	Rehabilitation and reconstruction	National plan is not available	Multi hazard including tsunami	Multi hazard including tsunami
	What is the name of the plan(s) (if available):	COMDISPLAN stipulates when and how to seek Federal Government assistance in a major disaster; Tsunami subplan in each State/Territory Emergency Service; Multi-hazard plan in each State/Territory and local government area		
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?	Yes		
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Guidelines</b>				
<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation	Standalone tsunami guidelines		
	Preparedness	Standalone tsunami guidelines		
	Emergency response	Standalone tsunami guidelines		
	Rehabilitation and reconstruction	Guidelines not available		
		What is the name of guidelines? (if available):	Tsunami Emergency Planning in Australia Handbook and its companion documents at <a href="https://knowledge.aidr.org.au/resources/tsunami-planning-handbook/">https://knowledge.aidr.org.au/resources/tsunami-planning-handbook/</a>	
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation	Standalone tsunami guidelines		
	Preparedness	Standalone tsunami guidelines		
	Emergency response	Standalone tsunami guidelines		

Rehabilitation and reconstruction	Guidelines not available
What is the name of guidelines? (if available):	Tsunami Emergency Planning in Australia Handbook and its companion documents at <a href="https://knowledge.aidr.org.au/resources/tsunami-planning-handbook/">https://knowledge.aidr.org.au/resources/tsunami-planning-handbook/</a> refer to local procedures including Evacuation Planning and Community Recovery.

### PART III: Detection, Warning and Dissemination

#### Detection and Warning

<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use own threat assessments
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	Joint Australian Tsunami Warning Centre, Bureau of Meteorology
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, Satellite Phone, Fax, GTS (WMO Global Telecommunication System), UPS (Uninterruptable Power Supply, VSAT)
	Please specify any other infrastructure:	24x7 staffed earthquake monitoring at Geoscience Australia, Canberra (JATWC-GA); 24x7 staffed sea-level monitoring at Bureau of Meteorology's National Operations Centre, Melbourne (JATWC-BOM); 24x7 business continuity sites; redundant infrastructure and communications services; direct GA-BOM video conferencing facility; and media room allowing JATWC spokesperson to provide live TV interviews to any TV station remotely.
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	Ocean-wide, National, Local

<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	Real-time seismic data from Geoscience Australia's seismic monitoring network are transmitted to and received by JATWC via both land-based and satellite communication channels; Real-time seismic data from the International Monitoring System (IMS) of the Comprehensive Nuclear- Test-Ban Treaty (CTBT) are accessed under agreement from the CTBT Organization's International Data Centre (IDC) via secure VPN; Real-time data from other international seismic monitoring networks are accessed from IRIS and other public SEEDlink servers.
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	Yes
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	Real-time data from Australian operated 43 coastal sea level stations are transmitted to JATWC through both land-based and satellite communication channels. Data from Australian network of 6 tsunameters are received by satellite. All received sea level data are displayed at the Bureau of Meteorology with an in-house built interactive data viewer.  Bureau of Meteorology also receives via GTS some overseas sea level observations. The IOC Sea Level Facility is accessed for wider and more extensive coverage of the global sea level stations, particularly for distant events. The NDBC website is accessed for deep ocean tsunami detection observations from the global tsunameter network.
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php">http://www.ioc-tsunami.org/index.php</a> )?	Yes



	option=com_oe&task=viewDocumentRecord&docID=20833)?	
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	GNSS/GPS (please specify below)
	Please provide the Station Name/Location, email Contact of any other observing network operator (IOTWMS Secretariat will contact for more information)	A network map and summary information for each GNSS station including site name, network name, stream operator, stream format, constellation(s), latency statistics, and current status is available at <a href="http://auscors.ga.gov.au/status/">http://auscors.ga.gov.au/status/</a> . Detailed information about each GNSS station, including location, instrumentation and agency point-of-contact is available at <a href="ftp://ftp.ga.gov.au/geodesy-outgoing/gnss/logs/">ftp://ftp.ga.gov.au/geodesy-outgoing/gnss/logs/</a> .
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	Yes
	Please specify the software tools used:	Seismic data: Seiscomp3. Deep sea level data - Inversion to calculate equivalent earthquake magnitude
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	Yes
	Please specify the modelling tools and data used:	MOST Model used to develop a pre-computed scenario database with travel time and amplitude prediction in the open ocean deeper than 20 metres. In addition, a Tsunami Travel Time model (TTT) is run, using Geoware proprietary software, to provide prediction of travel time without amplitude information
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	The model output has been calibrated against known impacts in Australia from a number of real tsunami events since 1960, in consultation with emergency response authorities. The resulting threshold values of predicted tsunami amplitude offshore (deep water) for Australian

		<p>coastal zones are used to assign one of three threat levels.</p> <p>No Threat &lt;20 cm Marine Threat 20 - 55 cm Land Threat &gt;55 cm</p> <p>The above deep-water thresholds roughly equates to the near shore shallow water values of, after considering the very crude Green's Law approximation.</p> <p>No Threat &lt;40 cm Marine Threat 40 - 100 cm Land Threat &gt;100 cm</p> <p>It's important to note that decision making for JATWC to issue a tsunami warning is solely based on deep-water thresholds.</p>
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-sessional period?	Australia has its own independent national tsunami warning system, so did not use products from the other IOTWMS TSPs.
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	JATWC (Australia's NTWC)
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes
	Please name the organisation(s) that participated in the exercise):	<p>IOWave18 (5 Sep): JATWC (Geoscience Australia and Bureau of Meteorology) Department of Fire and Emergency Services, Western Australia Emergency Management Authorities on Christmas and Cocos Islands Surf Live Saving Australia Australian Maritime Safety Authority Australian Antarctic Division Australian Department of Defence</p> <p>PacWave18 (11 Sep 2018): JATWC (Geoscience Australia and Bureau of Meteorology) Australian Government Crisis Coordination Centre Queensland Fire and Emergency Services NSW State Emergency Service Victoria State Emergency Service Surf Live Saving Australia Australian Maritime Safety Authority Australian Antarctic Division Australian Department of Defence Others: Gold Coast City Council in QLD did a tsunami exercise to test processes etc in Sep 2018 NSWSES conducted many local tsunami exercises at Ballina, Manly, Old Bar, Hawkes Nest/Tea Gardens, Bathurst, Batemans Bay. It also conducted the state-wide table top exercises three times at its headquarter.</p>

<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	Yes
	Please indicate below your national response to each event:	<p>No major damaging tsunami affecting Australia but there are two noteworthy ones. 17 Jul 2006 Java event generated a very localised impact to Steep Point of Western Australia (WA) where a camp site was destroyed and evidence of inundation to 200m inland. No tsunami warning was issued. A field impact assessment survey was subsequently conducted. Tide gauge observations along the WA coasts provided little clue to this very localised impact. 11 Mar 2011 Japan event. JATWC issued a National No Threat Bulletin to Australia for this event. A few tide gauges in Australia recorded tsunami waves up to 55 cm. Unusual currents and waves were noted at Port Kembla and Sydney Harbour.</p> <p>Several swimmers were washed into a lagoon at Merimbula NSW although inconclusive whether due to tsunami. Overall the impact to Australia is minor.</p>
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc.) disseminated within country? (select all that apply)	Email SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media Door-to-door, Sirens, Television, Warning towers, Megaphone, Police/military, Public alert system, VHF radio, VPN
	Other:	Emergency Alert; Phone trees; 1300 TSUNAMI telephone services
<b>Q79</b>	10b) How is the warning situation terminated?	<p>JATWC will issue a warning cancellation when it assesses that either no tsunami has eventuated or the tsunami threat has passed. In the latter case, the observed wave amplitudes must be below the Marine Threat threshold for at least two hours, although abnormal sea level changes and currents may persist for many hours.</p> <p>The All Clear advice on when it's safe to return to coastal areas is not issued by the JATWC, but by the State/Territory emergency management authorities who have jurisdictional responsibility for public safety and response to any tsunami impacts.</p>
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	The JATWC website <a href="http://www.bom.gov.au/tsunami">www.bom.gov.au/tsunami</a> DMOs have their own agency websites to display threat status in their area.

PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
Standard Operating Procedures					
<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Yes	No	No	No
	Receiving information from the NTWC	Yes	No	No	No
	Response Criteria / decision making	Yes	Yes	No	No
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	Warning dissemination	Yes	Yes	Yes	No
	Evacuation call procedures	Yes	Yes	Yes	No
	Community evacuation procedures	Yes	Yes	Yes	No
	Communication with NTWC	Yes	Yes	Yes	Yes
	Communication with Local Government	Yes	Yes	Yes	No
	Media arrangements	Yes	Yes	Yes	No
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and	Yes	Yes	Yes	No

	Rescue, Police, Army, Navy etc.				
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?	Yes			
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)				
	National DMOs	Telephone, Fax, Email, SMS, Other (please specify below)			
	Local DMOs	Telephone, Fax, Email, SMS, Siren, Other (please specify below)			
	General Public	Telephone, Fax, Email, SMS, Siren, Other (please specify below)			
	Coastal Communities	Telephone, Fax, Email, SMS, Siren			
	Media	Telephone, Fax, Email, SMS, Other (please specify below)			
	Other communication methods (please specify)	As per Q10a depending on circumstances			
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Evacuation Infrastructure</b>					
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.				
	Evacuation shelter	No There are shelters but not specifically for tsunami			
	Vertical evacuation structure	No There are shelters but not specifically for tsunami			
	Natural or artificial hill for vertical evacuation	Yes But no definitive percentage			
	Evacuation signage	Yes Limited to some individual coastal cities such as Manly Beach			
	Other (please specify)	No			
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	No			
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Tsunami Exercises</b>					
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National guidelines			
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level, Regional level, City level, Village level			

<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	Yes: 5-10
	Inter-organization table top exercise	Yes: 5-10
	National tsunami drill/exercise	Yes: 2, leveraging off the IOWave18 and PacWave18
	Indian Ocean Wave exercise	Yes: 1
	Other (please specify)	Yes: more than 10
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	Local Disaster Management Office
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Leaflets or flyers, Posters, Booklets, Information boards, Tsunami Signage, Video, or other visual or oral media, Teaching kits on tsunamis, School curricula, Public Evacuation Map
	Other (please specify):	A tailored-to-Australia online tsunami education resource called "Tsunami: The Ultimate Guide" at <a href="https://knowledge.aidr.org.au/resources/the-ultimate-guide-tsunami/#/">https://knowledge.aidr.org.au/resources/the-ultimate-guide-tsunami/#/</a>
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	Yes: once every year
	Global Disaster Risk Reduction Day	Yes: once every year
	Public tsunami preparedness outreach	Yes: more than 10
	School and/or children awareness	No response: unknown
	Exhibitions	No
	Competitions or other ways of highlighting tsunami safety	No
	Tsunami Exercise	Yes: more than 10 times
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Development of tsunami awareness programmes, activities or campaigns, Participation/support by international agencies or experts to your country's activities
	Other (please specify):	Keen to work with IOTIC to enhance tsunami preparedness
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or	Yes

	enhance public awareness in their country?	
	Please specify what type of support:	Keen to work with IOTIC and all MSs to enhance tsunami preparedness
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	Yes
	Please list the names	Christmas Island and Cocos (Keeling) Islands
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	3 (Fair)
	Have designated and mapped tsunami hazard zones	3 (Fair)
	Have a public display of tsunami information	2 (Poor)
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	3 (Fair)
	Develop and distribute outreach and public education materials	3 (Fair)
	Hold at least three outreach or educational activities annually	2 (Poor)
	Conduct an annual tsunami community exercise	2 (Poor)
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	3 (Fair)
	Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	5 (Very good)
	Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	3 (Fair)
	Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	3 (Fair)

<b>PART V: Narrative</b>	
<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.
→	Australian Tsunami Advisory Group (ATAG) has updated the national Tsunami Emergency Planning Handbook and developed national Tsunami Hazard Modelling Guidelines (reviewed internationally). Both documents were released on World Tsunami Awareness Day on 5 Nov 2018. They are hosted by the Australian Institute for Disaster Resilience. Geoscience Australia (GA) upgraded the National Earthquake Alert Centre in June 2018 which is a key component of the JATWC

	<p>GA released a new version of the PTHA on World Tsunami Awareness Day, see <a href="http://www.ga.gov.au/ptha">www.ga.gov.au/ptha</a> (includes open source software, rptha. Reviewed at EGU and journal publications are progressing)</p> <p>GA have provided options to the IOTWMS to leverage the PTHA for Indian Ocean nations (the IOPTHA was developed in 2009 following the original 2008 PTHA for Australia)</p> <p>Through a DFAT funded project, GA has trained scientists in the Pacific to develop tsunami inundation maps and to integrate into disaster management plans using the open-source PacSAFE software tool, see <a href="http://www.ga.gov.au/news-events/news/latest-news/pacsafe-helping-build-a-more-resilient-pacific">http://www.ga.gov.au/news-events/news/latest-news/pacsafe-helping-build-a-more-resilient-pacific</a> . Project is due for completion at end of 2018.</p> <p>GA participated in the UNESCO/IOC Scientific meeting of experts (Nov 2018) to understand tsunami sources, hazards, risks and uncertainties associated with the Tonga-Kermadec Subduction Zone</p> <p>Bureau of Meteorology performed a major upgrade to its tsunami Decision Support Tool.</p> <p>Bureau of Meteorology published a real-time tsunami warning status page for the Indian Ocean at <a href="http://www.bom.gov.au/tsunami/iotwms">www.bom.gov.au/tsunami/iotwms</a> which was successfully tested during the IOWave18 exercise</p> <p>University of Newcastle completed a study into the potential for submarine landslide inundation off the NSW coast</p> <p>QLD Department of Environment and Science has conducted detailed inundation modelling for a small subset of scenarios at the Sunshine Coast and Moreton Bay</p> <p>LDMOs conducted various community tsunami exercises and awareness activities including a tsunami exercise ran by the Gold Coast City Council in QLD in Sep 2018, local tsunami exercises ran in NSW at Ballina, Manly, Old Bar, Hawkes Nest/Tea Gardens, Bathurst, and Batemans Bay.</p>
<p><b>Q99</b></p> <p>→</p>	<p>15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements</p> <p>Develop local tsunami hazard information using the 2018 PTHA and the Tsunami Hazard Modelling Guidelines</p> <p>Collect elevation data in priority areas and support national initiatives in this regard</p> <p>Develop nationally consistent storm surge services</p> <p>Continue to collaborate on science improvements to the warning system (e.g. upgrade the JATWC T2 scenario database based on new data in the PTHA18)</p> <p>Develop and/or refine tsunami evacuation maps</p> <p>More inundation modelling and mapping</p> <p>Increase tsunami awareness for coastal communities and marine users</p>
<p><b>Q100</b></p>	<p>Upload Documents</p> <p>Respondent skipped this question</p>



**NATIONAL REPORT OF BANGLADESH**

<b>PART I: Basic Information</b>		
<b>Q3</b>	TNC Name:	Shamsuddin Ahmed
<b>Q4</b>	Position:	Director
<b>Q5</b>	Organization	Bangladesh Meteorological Department (BMD)
<b>Q6</b>	Telephone Number:	+88 02 912 3838
<b>Q7</b>	E-mail Address:	info@bmd.gov.bd
<b>Q8</b>	Fax Number:	+88 02 581 5209 / +88 02 811 8230
<b>Q9</b>	Postal Address:	Bangladesh Meteorological Department, E-24, Agargaon, Dhaka-1207
<b>Q10</b>	NTWC Agency Name:	Bangladesh Meteorological Department (BMD)
<b>Q11</b>	NTWC URL (web link) for tsunami warnings:	www.bmd.gov.bd
<b>Q12</b>	NTWC Agency Contact or Officer in Charge (person):	Meteorologist
<b>Q16</b>	Postal Address:	Seismic Observatory and Research Center, Bangladesh Meteorological Department (BMD), E-24, Agargaon, Dhaka-1207.
<b>Q17</b>	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes
<b>Q18</b>	TWFP Agency Name (if different from the NTWC Agency):	Respondent skipped this question
<b>Q23</b>	Postal Address:	Respondent skipped this question
<b>Q24</b>	TWFP 24x7 point of contact (office, operational unit or position, not a person):	Seismic Observatory and Research Center, Bangladesh Meteorological Department (BMD)

<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Hazard Assessment</b>		
<b>Q29</b>	4a) Has your country undertaken a hazard assessment?	Yes

<b>Q30</b>	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunamis	
<b>Q31</b>	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclone, Drought, Earthquakes, Flooding, Landslide	
<b>Q32</b>	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National Agency, National / International Consultant	
	Please specify the name(s) of the agencies:	Respondent skipped this question	
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Level	
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	0.5 percent coastal areas of total Khulna, Barishal, Chattogram division have been mapped for tsunami hazard	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.	Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Yes	Yes
	Seismo-tectonic model	Don't know	Don't know
	Topography	Yes	Yes
	Land Cover	Yes	Yes
	Infrastructure details	Don't know	Don't know
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Probabilistic Tsunami Hazard Assessment (PTHA), Deterministic Tsunami Hazard Analysis, Hazard Map, Inundation Map	
	Other (please specify):		
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Poor	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Essential	
	Deterministic Tsunami Hazard Analysis	Essential	
	Field Studies on Tsunami Impacts	Essential	

	Hazard map	Essential
	Inundation map	Essential
	Evacuation map	Essential
	What other areas of capacity in tsunami hazard assessment require improvement?	Not priority
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	Poor
	Deterministic Tsunami Hazard Analysis	Poor
	Field Studies on Tsunami Impacts	Poor
	Hazard map	Poor
	Inundation map	Poor
	Evacuation map	Poor
	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	Bangladesh Meteorological Department (BMD) and Department of Disaster Management (DDM)
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	Yes
<b>Q41</b>	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Drought, Earthquakes, Flooding, Landslide
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	National Agency, National/International Consultant
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National Level
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	0.5 percent coastal areas of total Khulna, Barishal, Chattogram division have been mapped for tsunami risk.
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	More than five (5) important cities are at risk from tsunami.
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Risk Map
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	

	Capability to undertake tsunami risk assessment	Poor
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	Essential
	Tsunami risk assessment at regional level	Essential
	Tsunami risk assessment at city level	Essential
	Tsunami risk assessment at village level	Essential
	Tsunami risk assessment at community / neighbourhood level	Essential
	What other areas of capacity in tsunami hazard assessment require improvement?	Not priority
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	
	Tsunami risk assessment at national level	Poor
	Tsunami risk assessment at regional level	Poor
	Tsunami risk assessment at city level	Poor
	Tsunami risk assessment at village level	Poor
	Tsunami risk assessment at community / neighbourhood level	Poor
	Please give the names of any individuals / institutions in your country that could provide this training / consultancy	Bangladesh Meteorological Department (BMD) and Department of Disaster Management (DDM)
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Policies</b>		
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Multi hazard including tsunami
	Preparedness	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami
	Rehabilitation and reconstruction	Multi hazard including tsunami
	What is the name of policy? (if available):	Respondent skipped this question

<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?			
	Prevention and mitigation	Multi hazard including tsunami		
	Preparedness	Multi hazard including tsunami		
	Emergency response	Multi hazard including tsunami		
	Rehabilitation and reconstruction	Multi hazard including tsunami		
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Plans</b>				
<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	Preparedness	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	Rehabilitation and reconstruction	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	What is the name of the plan(s) (if available):	Respondent skipped this question		
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?	Yes		
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Guidelines</b>				
<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation	Multi hazard guidelines including tsunami		
	Preparedness	Multi hazard guidelines including tsunami		
	Emergency response	Multi hazard guidelines including tsunami		
	Rehabilitation and reconstruction	Multi hazard guidelines including tsunami		
	What is the name of guidelines? (if available):	Not provided		
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation	Multi hazard guidelines including tsunami		

	Preparedness	Multi hazard guidelines including tsunami
	Emergency response	Multi hazard guidelines including tsunami
	Rehabilitation and reconstruction	Multi hazard guidelines including tsunami
	What is the name of guidelines? (if available):	Not provided

<b>PART III: Detection, Warning and Dissemination</b>		
<b>Detection and Warning</b>		
<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	Bangladesh Meteorological Department (BMD), E-24, Agargaon, Dhaka-1207
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Fax, UPS (Uninterruptable Power Supply)
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	National data through national communication infrastructures mobile telecommunication etc.
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	Yes

<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	National data through national communication infrastructure, mobile telecommunication & GLOSS-36 etc.
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Yes
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	No other observing networks are operated by the country
	Please provide the Station Name/Location, email Contact of any other observing network operator (IOTWMS Secretariat will contact for more information)	Not provided
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	Yes
	Please specify the software tools used:	CSDP-IAS (Seismic data Analysis)
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	No
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami	Yes

	watches, advisories, alerts and/or warnings?	
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	Magnitude focal depth of earthquake, epicentral distance from the seismic station to the coastal line (6.8+ magnitude; 10km to 70km depth distance near or regional etc.)
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-sessional period?	Disseminate the message of Tsunami warning issued by IOTWMS TSPs to the Department of Disaster Management, the Local government and the concerned authorities.
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	Bangladesh Meteorological Department (BMD), E-24, Agargaon, Dhaka-1207
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes
	Please name the organisation(s) that participated in the exercise:	Bangladesh Meteorological Department (BMD), E-24, Agargaon, Dhaka-1207.
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	No

### PART III: Detection, Warning and Dissemination

#### Dissemination

<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc) disseminated within country? (select all that apply)	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social, media Sirens, Television, VHF radio
<b>Q79</b>	10b) How is the warning situation terminated?	Based on the updated information on tsunami warning from IOTWMS TSPs the warning situation in terminated
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	www.bmd.gov.bd

### PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness

#### Standard Operating Procedures



<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Yes	Yes	Yes	Yes
	Receiving information from the NTWC	Yes	Yes	Yes	Yes
	Response Criteria / decision making	Yes	Yes	Yes	Yes
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	Warning dissemination	Yes	Yes	Yes	Yes
	Evacuation call procedures	Yes	Yes	Yes	Yes
	Community evacuation procedures	Yes	Yes	Yes	Yes
	Communication with NTWC	Yes	Yes	Yes	Yes
	Communication with Local Government	Yes	Yes	Yes	Yes
	Media arrangements	Yes	Yes	Yes	Yes
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	Yes	Yes	Yes	Yes
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?		Yes		
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)				
	National DMOs	Fax, Email			
	Local DMOs	Fax, Email			
	General Public	SMS, Siren			

	Coastal Communities	SMS, Siren
	Media	Telephone, Fax, SMS
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Evacuation Infrastructure</b>		
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.	
	Evacuation shelter	Yes Evacuation infrastructure are not sufficient in number compare to populations in tsunami risk areas.
	Vertical evacuation structure	Yes Vertical evacuation infrastructures are not sufficient is number compare to population in tsunami risk areas
	Natural or artificial hill for vertical evacuation	Yes Chattogram. Two (2) percent of the risk prone areas
	Evacuation signage	Yes Evacuation signage are insufficient
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Tsunami Exercises</b>		
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National guidelines
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	Yes 10 times
	Inter-organization table top exercise	Yes 10 times
	National tsunami drill/exercise	Yes One time
	Indian Ocean Wave exercise	Yes 3 times
	Local tsunami exercise	Yes 3 times
	Other (please specify)	No response DREE by Armed Forces Division (For earthquake disaster)

<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Information boards
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	Yes 10 times
	Global Disaster Risk Reduction Day	Yes One day per year
	Public tsunami preparedness outreach	Yes One day per year
	School and/or children awareness	Yes One day per year
	Exhibitions	Yes 3 days per year
	Competitions or other ways of highlighting tsunami safety	Yes One day per year
	Tsunami Exercise	Yes One day per year
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Provision of general tsunami awareness, materials Customization of general materials to country or community, Development of tsunami awareness programmes, activities or campaigns, Participation/support by international agencies or experts to your country's activities
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	Yes
	Please specify what type of support:	Information boards
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	Yes
	Please list the names	Bangladesh Meteorological Department

<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	4 (Good)
	Have designated and mapped tsunami hazard zones	4 (Good)
	Have a public display of tsunami information	4 (Good)
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	4 (Good)
	Develop and distribute outreach and public education materials	4 (Good)
	Hold at least three outreach or educational activities annually	4 (Good)
	Conduct an annual tsunami community exercise	4 (Good)
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	5 (Very good)
	Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	5 (Very good)
	Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	5 (Very good)
	Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	5 (Very good)

**PART V: Narrative**

<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.
→	Bangladesh Meteorological Department, Dhaka is involved with tsunami exercise. But we have lack of knowledge of tsunami modeling and tsunami risk assessment documentation.
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements
→	Bangladesh Meteorological Department has an interest on developing the computed tsunami modeling system as well as tsunami inundation map with evacuation route, training the emergency personnel, supporting to build sufficient evacuation centers, coastal wall of particular height as a part for future tsunami warning and mitigation system improvements.
<b>Q100</b>	Upload Documents
	Respondent skipped this question

**NATIONAL REPORT OF COMOROS**

<b>PART I: Basic Information</b>		
<b>Q3</b>	TNC Name:	An-Ynaya Bintie Abdourazakou
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<b>Q8</b>	Fax Number:	002697738003
<b>Q9</b>	Postal Address:	ANACM, Boulevard de Strasbourg B.P 72, Moroni Union des Comores
<b>Q10</b>	NTWC Agency Name:	Agence Nationale de l'Aviation Civile et de la Météorologie
<b>Q11</b>	NTWC URL (web link) for tsunami warnings:	No link, we just have agreement to build a separate website for NMHS
<b>Q12</b>	NTWC Agency Contact or Officer in Charge (person):	Director General
<b>Q16</b>	Postal Address:	ANACM, Boulevard de Strasbourg B.P 72, Moroni Union des Comores
<b>Q17</b>	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes
<b>Q18</b>	TWFP Agency Name (if different from the NTWC Agency):	Respondent skipped this question
<b>Q23</b>	Postal Address:	Respondent skipped this question
<b>Q24</b>	TWFP 24x7 point of contact (office, operational unit or position, not a person):	Service Prévisions, Exploitation des Alertes et Recherche

<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Hazard Assessment</b>		
<b>Q29</b>	4a) Has your country undertaken a hazard assessment?	Yes

<b>Q30</b>	4b) What type of hazard assessment has been carried out?	Single hazard assessment on tsunami AND multi-hazard assessment including tsunami	
<b>Q31</b>	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclone, Flooding, Volcanic eruptions	
<b>Q32</b>	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National / International Consultant	
	Please specify the name(s) of the agencies:	Not provided	
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Level	
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	All coastal Area	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Don't know	Don't know
	Seismo-tectonic model	Don't know	Don't know
	Topography	Don't know	Don't know
	Land Cover	Don't know	Don't know
	Infrastructure details	Don't know	Don't know
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Hazard map, Inundation map, Evacuation map, Guidelines	
	Other (please specify):	Guidelines (SOP) for national level (stakeholders)	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Fair	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Low priority	
	Deterministic Tsunami Hazard Analysis	Medium priority	
	Field Studies on Tsunami Impacts	Low priority	
	Hazard map	High priority	

	Inundation map	High priority
	Evacuation map	High priority
	What other areas of capacity in tsunami hazard assessment require improvement?	Collect of Near coastal bathymetry and topography data
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	Poor
	Deterministic Tsunami Hazard Analysis	Poor
	Field Studies on Tsunami Impacts	Poor
	Hazard map	Poor
	Inundation map	Poor
	Evacuation map	Poor
	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	Not provided
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	Yes
<b>Q41</b>	5b) What type of risk assessment?	Single risk assessment on tsunami AND multi-hazard risk assessment including tsunami
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Earthquakes, Epidemics, Flooding
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	National/International Consultant
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National Level
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	All country coastal Areas
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Respondent skipped this question
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Risk map, Evacuation map, Guidelines (please specify below)
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Fair
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	Low priority
	Tsunami risk assessment at regional level	Not a priority

	Tsunami risk assessment at city level	High priority	
	Tsunami risk assessment at village level	High priority	
	Tsunami risk assessment at community / neighbourhood level	High priority	
	What other areas of capacity in tsunami hazard assessment require improvement?	Harbor areas	
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?		
	Tsunami risk assessment at national level	Poor	
	Tsunami risk assessment at regional level	Poor	
	Tsunami risk assessment at city level	Poor	
	Tsunami risk assessment at village level	Poor	
	Tsunami risk assessment at community / neighbourhood level	Poor	
	Other (specify below)	Poor	
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>			
<b>Policies</b>			
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?		
	Prevention and mitigation	Multi hazard including tsunami	
	Preparedness	Multi hazard including tsunami	
	Emergency response	Standalone tsunami only	
	Rehabilitation and reconstruction	Multi hazard including tsunami	
	What is the name of policy? (if available):	Not provided	
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?		
	Prevention and mitigation	Policy is not available	
	Preparedness	Policy is not available	
	Emergency response	Policy is not available	
	Rehabilitation and reconstruction	Policy is not available	
	<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Plans</b>			
<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.		
		National level	Local level
	Prevention and mitigation	Respondent skipped this question	



	Preparedness	
	Emergency response	
	Rehabilitation and reconstruction	
	What is the name of the plan(s) (if available):	Disaster risk reduction plans are not yet adapted to the local level (it's under an ongoing project)
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?	Yes
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Guidelines</b>		
<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?	
	Prevention and mitigation	Guidelines not available
	Preparedness	Guidelines not available
	Emergency response	Guidelines not available
	Rehabilitation and reconstruction	Guidelines not available
	What is the name of guidelines? (if available):	Not provided
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?	
	Prevention and mitigation	Guidelines not available
	Preparedness	Guidelines not available
	Emergency response	Guidelines not available
	Rehabilitation and reconstruction	Guidelines not available
	What is the name of guidelines? (if available):	Not provided

<b>PART III: Detection, Warning and Dissemination</b>		
<b>Detection and Warning</b>		
<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential	Agence National de l'Aviation Civile et de la Météorologie

	tsunami threat information? Please provide the name and contact details.	Direction Technique de la Météorologie
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	No. Not completely 24x7 It operate 15 or 12x7 depending to weekend days
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, Fax
	Please specify any other infrastructure:	GTS is still working but based on airport (remote site)
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	No
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	No
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	Not applicable
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	<a href="http://loc-sealevelmonitoring.org">loc-sealevelmonitoring.org</a>
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Yes
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	We added a buoy, operated by Metocean
	Please provide the Station Name/Location, email Contact of any other observing network operator (IOTWMS Secretariat will contact for more information)	Not provided
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	No

<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	No
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	No
	Which organisation provides the tsunami products?	RTSPs
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	0.5m of heigh wave
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-sessional period?	Programmation of a permanent link between stakeholders involved in the early warning (earthquake, NTWC and NDMO)
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	NTWC and NDMO
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes
	Please name the organisation(s) that participated in the exercise):	Not provided
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	No
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc.) disseminated within country? (select all that apply)	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social, media, Television, Megaphone
<b>Q79</b>	10b) How is the warning situation terminated?	By a message confirm the no threat in our coastal area
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	The existing website (for ANACM) is not appropriate and doesn't working well. We have just have the agreement from DG to build a specific website for Meteorological Service (NTWC)



<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>
<b>Standard Operating Procedures</b>

<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Yes	Yes	No	Yes
	Receiving information from the NTWC	Yes	Yes	No	Yes
	Response Criteria / decision making	No	Yes	Yes	No
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	Warning dissemination	Yes	Yes	Yes	Yes
	Evacuation call procedures	Yes	Yes	Yes	No
	Community evacuation procedures	No	Yes	Yes	No
	Communication with NTWC	Yes	Yes	Yes	Yes
	Communication with Local Government	Yes	No	No	Yes
	Media arrangements	No	Yes	Yes	Yes
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	Yes	Yes	Yes	Yes
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?			Yes	
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)				
	National DMOs			Telephone, Fax, Email, SMS	
	Local DMOs			Telephone, Fax, Email, SMS	

	General Public	SMS, Other (please specify below)
	Coastal Communities	Telephone, SMS, Other (please specify below)
	Media	Telephone, Fax, Email
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Evacuation Infrastructure</b>		
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.	
	Evacuation shelter	No
	Vertical evacuation structure	No
	Natural or artificial hill for vertical evacuation	Yes
	Evacuation signage	No
	Other (please specify)	No
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	No
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Tsunami Exercises</b>		
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level, Regional level, Village level, Community/Neighbourhood level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	Yes 4 times
	Inter-organization table top exercise	Yes 2 times
	National tsunami drill/exercise	No
	Indian Ocean Wave exercise	Yes Many times
	Local tsunami exercises	No
	Other (please specify)	Yes Many (international or National Disasters days)
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office

<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Leaflets or flyers, Booklets, Teaching kits on tsunamis, School curricula
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	Yes One time
	Global Disaster Risk Reduction Day	Yes More than three
	Public tsunami preparedness outreach	No
	School and/or children awareness	Yes Occasionally: scientific days
	Exhibitions	Yes
	Competitions or other ways of highlighting tsunami safety	No
	Tsunami Exercise	No
	Other (Please specify)	No
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Development of tsunami awareness programmes, activities or campaigns, Participation/support by international agencies or experts to your country's activities, Customization of general materials to country or community
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No
	Please specify what type of support:	Respondent skipped this question
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	No
	Please list the names	Respondent skipped this question
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	Respondent skipped this question
	Have designated and mapped tsunami hazard zones	
	Have a public display of tsunami information	
Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities		

Develop and distribute outreach and public education materials	
Hold at least three outreach or educational activities annually	
Conduct an annual tsunami community exercise	
Address tsunami hazards in the community's Emergency Operations Plan (EOP)	
Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	
Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	
Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	

PART V: Narrative		
<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.	
	Not provided	
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements	
	Not provided	
<b>Q100</b>	Upload Documents	Respondent skipped this question

4

**NATIONAL REPORT OF FRANCE,  
INDIAN OCEAN TERRITORIES**

<b>PART I: Basic Information</b>		
<b>Q3</b>	TNC Name:	David Goutx
<b>Q4</b>	Position:	Regional Director
<b>Q5</b>	Organization	Météo-France
<b>Q6</b>	Telephone Number:	+262 262 92 11 01
<b>Q7</b>	E-mail Address:	david.goutx@meteo.fr
<b>Q8</b>	Fax Number:	Respondent skipped this question
<b>Q9</b>	Postal Address:	Météo-France, 50 boulevard du Chaudron, F-97490 Sainte Clotilde La Réunion (France)
<b>Q10</b>	NTWC Agency Name:	Météo-France
<b>Q11</b>	NTWC URL (web link) for tsunami warnings:	Respondent skipped this question
<b>Q12</b>	NTWC Agency Contact or Officer in Charge (person):	Head of the Forecast Division
<b>Q16</b>	Postal Address:	Météo-France DIROI, 50, boulevard du Chaudron 97490 Sainte Clotilde, La Réunion
<b>Q17</b>	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes
<b>Q24</b>	TWFP 24x7 point of contact (office, operational unit or position, not a person):	Meteo-France La Réunion Weather Forecasting Service

<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Hazard Assessment</b>		
<b>Q29</b>	4a) Has your country undertaken a hazard assessment?	Yes
<b>Q30</b>	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunami
<b>Q31</b>	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclone, Earthquakes, Flooding, Landslide, Volcanic eruptions
<b>Q32</b>	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National / Local University



	Please specify the name(s) of the agencies:	Not provided	
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	Regional Level	
	Other (please specify):		
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	Eastern and northern coasts (Saint Benoit - Saint André - Sainte Suzanne - Sainte Marie - Saint Denis - Saint Paul).	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Yes	Yes
	Seismo-tectonic model	Don't know	No
	Topography	Yes	Yes
	Land Cover	Yes	No
	Infrastructure details	Yes	No
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Inundation map	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Fair	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Medium priority	
	Deterministic Tsunami Hazard Analysis	High priority	
	Field Studies on Tsunami Impacts	Medium priority	
	Hazard map	Essential	
	Inundation map	Medium priority	
	Evacuation map	Essential	
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Poor	
	Deterministic Tsunami Hazard Analysis	Poor	
	Field Studies on Tsunami Impacts	Poor	
	Hazard map	Moderate	
	Inundation map	Moderate	
	Evacuation map	Moderate	

	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	Yes
<b>Q41</b>	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Flooding, Landslide, Volcanic eruptions
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	National Agency
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Regional Level
	Other (please specify):	
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	Mostly concerned the East - North and West costs.
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Estimated low risk for 8 cities (on 24). It concerns 3 municipalities (on 4).
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Risk map
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Good
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	Not a priority
	Tsunami risk assessment at regional level	Medium priority
	Tsunami risk assessment at city level	High priority
	Tsunami risk assessment at village level	High priority
	Tsunami risk assessment at community / neighbourhood level	High priority
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	
	Tsunami risk assessment at national level	Moderate
	Tsunami risk assessment at regional level	Moderate
	Tsunami risk assessment at city level	Poor
	Tsunami risk assessment at village level	Poor
	Tsunami risk assessment at community / neighbourhood level	Poor

Other (specify below)				
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Policies</b>				
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?			
	Prevention and mitigation	Multi hazard including tsunami		
	Preparedness	Multi hazard including tsunami		
	Emergency response	Multi hazard including tsunami		
	Rehabilitation and reconstruction	Multi hazard including tsunami		
	What is the name of policy? (if available):	Not provided		
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?			
	Prevention and mitigation	Policy is not available		
	Preparedness	Policy is not available		
	Emergency response	Policy is not available		
	Rehabilitation and reconstruction	Policy is not available		
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Plans</b>				
<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	Multi hazard including tsunami	Local plan is not available	Community plan is not available
	Preparedness	Multi hazard including tsunami	Local plan is not available	Community plan is not available
	Emergency response	Multi hazard including tsunami	Multi hazard including tsunami	Community plan is not available
	Rehabilitation and reconstruction	Multi hazard including tsunami	Local plan is not available	Community plan is not available
	What is the name of the plan(s) (if available):	Not provided		
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?		Yes	
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Guidelines</b>				
<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			

	Prevention and mitigation	Respondent skipped this question
	Preparedness	
	Emergency response	
	Rehabilitation and reconstruction	
	What is the name of guidelines? (if available):	
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?	
	Prevention and mitigation	Respondent skipped this question
	Preparedness	
	Emergency response	
	Rehabilitation and reconstruction	
	What is the name of guidelines? (if available):	

<b>PART III: Detection, Warning and Dissemination</b>		
<b>Detection and Warning</b>		
<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	Météo-France
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, Satellite Phone, Fax, GTS (WMO Global Telecommunication System), UPS (Uninterruptable Power Supply)
	Please specify any other infrastructure:	
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	Ocean-wide
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	No

	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	Yes
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	Must be confirmed
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Yes
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	No other observing networks are operated by the country
	Please provide the Station Name/Location, email Contact of any other observing network operator (IOTWMS Secretariat will contact for more information)	Not provided
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	No
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	No
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Respondent skipped this question
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	Magnitude and epicenter
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-sessional period?	To inform the different prefectures (La Réunion, Mayotte, French Southern and Antarctic Lands)

<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	Météo-France
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes
	Please name the organisation(s) that participated in the exercise):	Météo-France Regional emergency center
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	No
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc.) disseminated within country? (select all that apply)	Email, SMS, Radio, Television, Megaphone
<b>Q79</b>	10b) How is the warning situation terminated?	Media info and official communication (email - sms)
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	Respondent skipped this question

<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Standard Operating Procedures</b>					
<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?	
	24/7 Emergency Operation Centre (EOC)	Yes	No	No	Yes
	Receiving information from the NTWC	Yes	No	No	Yes
	Response Criteria / decision making	Yes	Yes	Yes	Yes
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?	Is support required to	Is support required to	Is support required to	

		develop/improve this aspect of tsunami emergency response in your SOP?	develop Human Resources in this aspect of tsunami emergency response?	develop infrastructure for this aspect of tsunami emergency response?	
	Warning dissemination	Yes	Yes	No	Yes
	Evacuation call procedures	Yes	Yes	No	Yes
	Community evacuation procedures	No	Yes	No	Yes
	Communication with NTWC	Yes	Yes	Yes	No
	Communication with Local Government	Yes	No	No	No
	Media arrangements	Yes	No	No	No
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	Yes	No	No	No
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?		Yes		
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)				
	National DMOs		Telephone, Fax, Email, SMS, Siren		
	Local DMOs		Telephone, Fax, Email, SMS		
	General Public		Other (please specify below)		
	Coastal Communities		Telephone, Fax, Email, SMS		
	Media		Telephone, Email, SMS		
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Evacuation Infrastructure</b>					
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.				
	Evacuation shelter		No		
	Vertical evacuation structure		No		
	Natural or artificial hill for vertical evacuation		Yes		
	Evacuation signage		No		
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?		No		
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Tsunami Exercises</b>					
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)		National guidelines		

<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	Regional level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	No
	Inter-organization table top exercise	No
	National tsunami drill/exercise	No
	Indian Ocean Wave exercise	Yes, 1
	Local tsunami exercise	No
	Other (please specify)	No
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Information boards
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	No
	Global Disaster Risk Reduction Day	No
	Public tsunami preparedness outreach	No
	School and/or children awareness	No
	Exhibitions	No
	Competitions or other ways of highlighting tsunami safety	No
	Tsunami Exercise	No
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Provision of general tsunami awareness materials
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	No
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	Respondent skipped this question



Have designated and mapped tsunami hazard zones	
Have a public display of tsunami information	
Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	
Develop and distribute outreach and public education materials	
Hold at least three outreach or educational activities annually	
Conduct an annual tsunami community exercise	
Address tsunami hazards in the community's Emergency Operations Plan (EOP)	
Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	
Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	
Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	

<b>PART V: Narrative</b>		
<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.	
→	Respondent skipped this question	
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements	
→	Respondent skipped this question	
<b>Q100</b>	Upload Documents	Respondent skipped this question

**NATIONAL REPORT OF INDIA**

<b>PART I: Basic Information</b>		
<b>Q3</b>	TNC Name:	Dr. Satheesh C. Shenoi
<b>Q4</b>	Position:	Director
<b>Q5</b>	Organization	Indian National Centre for Ocean Information Services (INCOIS)
<b>Q6</b>	Telephone Number:	91-40-2389 5000
<b>Q7</b>	E-mail Address:	shenoi@incois.gov.in
<b>Q8</b>	Fax Number:	+91-40-2389 5001
<b>Q9</b>	Postal Address:	Indian National Centre for Ocean Information Services (INCOIS) Ocean Valley, Pragathi Nagar (BO), Nizampet (SO) Hyderabad – 500 090, INDIA
<b>Q10</b>	NTWC Agency Name:	Indian National Centre for Ocean Information Services (INCOIS)
<b>Q11</b>	NTWC URL (web link) for tsunami warnings:	<a href="http://www.incois.gov.in/tsunami/eqevents.jsp">http://www.incois.gov.in/tsunami/eqevents.jsp</a>
<b>Q12</b>	NTWC Agency Contact or Officer in Charge (person):	In-charge, Indian Tsunami Early Warning Centre; Head- ODG & TWG
<b>Q16</b>	Postal Address:	Indian National Centre for Ocean Information Services (INCOIS) Ocean Valley, Pragathi Nagar (BO), Nizampet (SO) Hyderabad – 500 090, INDIA
<b>Q17</b>	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes
<b>Q24</b>	TWFP 24x7 point of contact (office, operational unit or position, not a person):	Indian Tsunami Early Warning Centre (ITEWC), Indian National Centre for Ocean Information Services (INCOIS)

<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Hazard Assessment</b>		
<b>Q29</b>	4a) Has your country undertaken a hazard assessment?	Yes
<b>Q30</b>	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunami

<b>Q31</b>	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclone, Flooding	
<b>Q32</b>	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National Agency	
	Please specify the name(s) of the agencies:	Ministry of Environment and Forest (MoEF), Government of India is the nodal agency to implement coastal zone management plan and policy. As part of national policy MoEF is generating the coastal hazard zones. However, National Centre for Coastal Research (NCCR) and INCOIS are also involved in generation of coastal hazard maps (Multi hazards including tsunami) pertaining to Indian coast under National Tsunami Early Warning System	
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Level, Regional Level	
	Other (please specify):		
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	Entire Indian coast line except Andaman and Nicobar Islands Province	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Yes	No
	Seismo-tectonic model	Yes	No
	Topography	Yes	No
	Land Cover	Yes	Yes
	Infrastructure details	Yes	No
	Other data used (please specify):	Land Cover data publicly available as map service on ISRO/NRSC Bhuvan portal	
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Deterministic Tsunami Hazard Analysis Field Studies on Tsunami Impacts Hazard map, Inundation map.	
	Other (please specify):	Besides, the multi-hazard vulnerability mapping was carried out by holistic approach using data of historical extreme water levels, events, sea level change and coastal topography.	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Very good	

<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	High priority
	Deterministic Tsunami Hazard Analysis	Essential
	Field Studies on Tsunami Impacts	High priority
	Hazard map	Essential
	Inundation map	Essential
	Evacuation map	High priority
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	Good
	Deterministic Tsunami Hazard Analysis	Very good
	Field Studies on Tsunami Impacts	Good
	Hazard map	Very good
	Inundation map	Very good
	Evacuation map	Good
	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	Not provided
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	Yes
<b>Q41</b>	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Flooding
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	National Agency
	Please specify the name(s) of the agency(ies):	Indian National Centre for Ocean Information Services (INCOIS); National Centre for Coastal Research (NCCR)
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National Level, Regional Level, City Level
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	Entire Coast line of India except Andaman and Nicobar Islands Province
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Coastal cities of 9 provinces

<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Risk map, Guidelines
	Other (please specify):	Hazard Map, Vulnerability Map, PTHA, Inundation Map
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Very good
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	High priority
	Tsunami risk assessment at regional level	High priority
	Tsunami risk assessment at city level	High priority
	Tsunami risk assessment at village level	High priority
	Tsunami risk assessment at community / neighbourhood level	High priority
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	
	Tsunami risk assessment at national level	Good
	Tsunami risk assessment at regional level	Good
	Tsunami risk assessment at city level	Good
	Tsunami risk assessment at village level	Good
	Tsunami risk assessment at community / neighbourhood level	Good
	Other (specify below)	Good
	Please give the names of any individuals / institutions in your country that could provide this training / consultancy	Indian National Centre for Ocean Information Services (INCOIS); National Centre for Coastal Research (NCCR)
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Policies</b>		
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Standalone tsunami only
	Preparedness	Standalone tsunami only
	Emergency response	Standalone tsunami only
	Rehabilitation and reconstruction	Standalone tsunami only
	What is the name of policy? (if available):	National Disaster Management Guidelines- Management of Tsunamis by National Disaster Management Authority (NDMA)

<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?			
	Prevention and mitigation	Multi hazard including tsunami		
	Preparedness	Multi hazard including tsunami		
	Emergency response	Multi hazard including tsunami		
	Rehabilitation and reconstruction	Multi hazard including tsunami		
	What is the name of policy? (if available):	Multi Hazard Policies are available at Provinces level		
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Plans</b>				
<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	Standalone tsunami only	Multi hazard including tsunami	Multi hazard including tsunami
	Preparedness	Standalone tsunami only	Multi hazard including tsunami	Multi hazard including tsunami
	Emergency response	Standalone tsunami only	Multi hazard including tsunami	Multi hazard including tsunami
	Rehabilitation and reconstruction	Standalone tsunami only	Multi hazard including tsunami	Multi hazard including tsunami
	What is the name of the plan(s) (if available):		Not provided	
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?		Yes	
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Guidelines</b>				
<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation	Standalone tsunami guidelines		
	Preparedness	Standalone tsunami guidelines		
	Emergency response	Standalone tsunami guidelines		
	Rehabilitation and reconstruction	Standalone tsunami guidelines		
	What is the name of guidelines? (if available):	National Disaster Management Guidelines- Management of Tsunamis by National Disaster Management Authority (NDMA)		
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available).			

	In what form are the guidelines?	
	Prevention and mitigation	Multi hazard guidelines including tsunami
	Preparedness	Multi hazard guidelines including tsunami
	Emergency response	Multi hazard guidelines including tsunami
	Rehabilitation and reconstruction	Multi hazard guidelines including tsunami
	What is the name of guidelines? (if available):	Multi Hazard Policies are available at Provinces level

PART III: Detection, Warning and Dissemination		
Detection and Warning		
<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data, Use own threat assessment Ocean-wide, National, Local
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	Indian Tsunami Early Warning Centre (ITEWC) at INCOIS
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, Fax, GTS (WMO Global Telecommunication System), UPS (Uninterruptable Power Supply), VSAT
	Please specify any other infrastructure:	Video conference facilities
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	Respondent skipped this question
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	National Seismic Network (RTSMN & ISGN) through VSAT connectivity 2. International seismic data from GSN & IRIS servers through Internet (seedlink)
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	Yes

<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	1. National sea level data through INSAT, GPRS & Iridium connectivity 2. International sea level data from NOAA- NDBC & IOC sea level station monitoring facility servers through internet
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Yes
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	GNSS/GPS, Coastal radars (please specify, below)
	Please provide the Station Name/Location, email Contact of any other observing network operator (IOTWMS Secretariat will contact for more information)	35 Nos of GNSS stations & 10 Nos of HF Radars operated by INCOIS. Contact Person: Dr. S.S.C. Shenoi, Director, INCOIS, Email: shenoi@incois.gov.in
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	Yes
	Please specify the software tools used:	1. Seiscomp & Bulletin Hydra for analyzing real-time seismic data; 2. In-house developed application for analysis of sea-level data
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	Yes
	Please specify the modelling tools and data used:	In-house developed application which uses TUNAMI-N2 and ADCIRC models
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes



<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	<p>The criteria for generation of different threat types (WARNING / ALERT / WATCH) for a particular region of the Indian coast are based on the available warning time (i.e. time taken by the tsunami wave to reach the particular coast).</p> <p>WARNING is issued to the Indian coastal areas that fall within 60 minutes travel time from a tsunamigenic earthquake source and those coastal areas falling outside the 60 minutes travel time will be put under ALERT/WATCH status. Only upon confirmation from water-level data the status will be upgraded to WARNING/ALERT.</p> <p>Estimated Wave Amplitude (EWA) &gt; 2.0 m - WARNING EWA 0.5 to 2.0 m - ALERT EWA 0.2 to 0.5 m - WATCH</p>
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-sessional period?	NTWC-India followed national SOP for the events that occurred in inter-sessional period and issued relevant advisories to national/local authorities.
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	ITEWC INCOIS
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes
	Please name the organisation(s) that participated in the exercise):	ITEWC, INCOIS
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	Yes
	Please indicate below your national response to each event:	There was no event which generated a major tsunami that impacted India after December 2004. However, on 11 April 2012 twin events (M 8.5 & M 8.2) generated a minor tsunami, NTWC-India issued appropriate bulletins for those events.
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc.)	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media,

	disseminated within country? (select all that apply)	Door-to-door, Sirens, Television, Warning towers, Megaphone, Police/military, VHF radio, VPN
<b>Q79</b>	10b) How is the warning situation terminated?	After receiving the final bulletin from INCOIS, local DMOs are taking decision on termination of warning situation.
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	<a href="http://www.incois.gov.in/tsunami/eqevents.jsp">http://www.incois.gov.in/tsunami/eqevents.jsp</a>

**PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness**

**Standard Operating Procedures**

<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Yes	No	Yes	Yes
	Receiving information from the NTWC	Yes	No	No	No
	Response Criteria / decision making	Yes	No	No	No
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	Warning dissemination	Yes	No	No	No
	Evacuation call procedures	Yes	No	Yes	Yes
	Community evacuation procedures	Yes	No	Yes	Yes
	Communication with NTWC	Yes	No	No	No
Communication with Local Government	Yes	No	No	No	

	Media arrangements	Yes	No	No	No
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	Yes	No	No	No
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?	Yes			
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)				
	National DMOs	Telephone, Fax, Email, SMS, Siren, Other (please specify below)			
	Local DMOs	Telephone, Fax, Email, SMS, Siren, Other (please specify below)			
	General Public	Telephone, Email, SMS, Other (please specify below)			
	Coastal Communities	Telephone, Email, SMS, Other (please specify below)			
	Media	Telephone, Fax, Email, SMS, Other (please specify below)			
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Evacuation Infrastructure</b>					
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.				
	Evacuation shelter	Yes Evacuation shelters are available at Province Level. Around 60% of risk prone areas covered			
	Vertical evacuation structure	Yes Evacuation shelters are available at Province Level. Around 60% of risk prone areas covered			
	Natural or artificial hill for vertical evacuation	Yes Natural hills are available in few coastal provinces.			
	Evacuation signage	Yes Evacuation signage is available in few places.			
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes			
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Tsunami Exercises</b>					
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines			

<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level, Regional level, City level, Village level, Community/Neighbourhood level, School level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	Yes 4 times
	Inter-organization table top exercise	Yes 2 times
	National tsunami drill/exercise	Yes 2 times
	Indian Ocean Wave exercise	Yes 1 time - IOWave18 Exercise
	Local tsunami exercise	Yes 3 times - National Mega Mock Tsunami Exercise on 27 November 2017; HADR Exercise at Karwar on 18 May 2017; Mock drill at VSSC through Kerala SEOC on 28 May 2018
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Leaflets or flyers, Posters, Booklets, Tsunami Signage, Video, or other visual or oral media, Indigenous knowledge, folklore, or oral history accounts or compilations, Teaching kits on tsunamis, Public Evacuation Map
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	Yes 2 times
	Global Disaster Risk Reduction Day	No
	Public tsunami preparedness outreach	Yes 4 times during INCOIS & MoES formation days
	School and/or children awareness	Yes More than 50 times - Awareness programmes at INCOIS are conducted every week for school children
	Exhibitions	Yes 4 times

	Competitions or other ways of highlighting tsunami safety	Yes 1 time
	Tsunami Exercise	Yes 3 times
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Provision of general tsunami awareness materials Customization of general materials to country or community, Development of tsunami awareness programmes, activities or campaigns, Participation/support by international agencies or experts to your country's activities
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	Yes
	Please specify what type of support:	Training on preparing SOPs, GIS maps, tsunami modelling, Seismic & Sea level analysis, preparation of education material etc.
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	Yes
	Please list the names	In Odisha Province, 6 communities are piloting the IOTR programme. Community Names: 1) Jayadevkasaba Pahi 2) Podhuan 3) Tantiapal Sasan 4) Noliasahi 5) Keutajanga 6) Venkatraipur
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	4 (Good)
	Have designated and mapped tsunami hazard zones	4 (Good)
	Have a public display of tsunami information	4 (Good)
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	4 (Good)
	Develop and distribute outreach and public education materials	5 (Very good)
	Hold at least three outreach or educational activities annually	5 (Very good)
	Conduct an annual tsunami community exercise	5 (Very good)
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	5 (Very good)
	Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	5 (Very good)
	Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	5 (Very good)
	Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	4 (Good)

<b>PART V: Narrative</b>			
<b>Q98</b>	<p>14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.</p> <p>➔ INCOIS has initiated preliminary work on cutting edge research areas such as:                      Multi-hazard Vulnerability Mapping has been done for most vulnerable areas                      Real-time tsunami inundation modelling using ADCIRC has been evaluated and ready for operational usage                      3D GIS Mapping has been completed for around 5000 sq.km area                      Conducted National SOP workshops, Mock exercise, WTAD, Open days, Exhibitions, etc.                      Indian Ocean Tsunami Ready (IOTR) implemented in 6 coastal communities in Odisha Province</p>		
<b>Q99</b>	<p>15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements</p> <p>➔ Enhance observational network by deployment of additional stations                      Enhancements in Tsunami Modelling and Sea-level Inversion                      Utilization of real-time GNSS &amp; SMA data for rupture characterization of the tsunamigenic earthquakes                      Implementation of Service Level 3 inundation modelling for Indian Ocean coastal zones                      Development of webpage to calculate performance indicators of all TSPs automatically                      Continuing technical enhancements as part of the new IOTWMS Service Definition from time to time                      Contribute to training and capacity building activities as per the requirements of the ICG/IOTWMS                      Contribute to the planning and conduct of ongoing 6-monthly IOTWMS COMMs Tests</p>		
<b>Q100</b>	<table border="1" style="width: 100%;"> <tr> <td style="width: 50%;">Upload Documents</td> <td style="width: 50%;">Respondent skipped this question</td> </tr> </table>	Upload Documents	Respondent skipped this question
Upload Documents	Respondent skipped this question		

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NATIONAL REPORT OF INDONESIA

PART I: Basic Information		
Q3	TNC Name:	Dr. Ir. Muhamad Sadly, M.Eng
Q4	Position:	Deputy for Geophysics
Q5	Organization	BMKG
Q6	Telephone Number:	0811826804
Q7	E-mail Address:	muhamad.sadly@bmgk.go.id
Q8	Fax Number:	6546329
Q9	Postal Address:	10610
Q10	NTWC Agency Name:	BMKG
Q11	NTWC URL (web link) for tsunami warnings:	www.bmgk.go.id
Q12	NTWC Agency Contact or Officer in Charge (person):	Director for Earthquake and Tsunami Centre
Q16	Postal Address:	10610
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency?  <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes
Q18	TWFP Agency Name (if different from the NTWC Agency):	BMKG
Q20	Position	Head of Earthquake Information and Tsunami Early Warning Division
Q23	Postal Address:	10610

PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines		
Hazard Assessment		
Q29	4a) Has your country undertaken a hazard assessment?	Yes
Q30	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunami

<b>Q31</b>	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Earthquakes, Epidemics, Flooding, Landslide, Volcanic eruptions	
	Other (please specify):	Forest and land fires	
<b>Q32</b>	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National, Agency, National / Local University National / International Consultant	
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Level, Regional Level, City Level, Village Level	
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	All over Indonesia region nearly 100% Indonesia has a basic map in Inarisk, which can be used as a calculation for tsunami hazards with a modified scenario	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Yes	No
	Seismo-tectonic model	Yes	No
	Topography	Yes	No
	Land Cover	Yes	Yes
	Infrastructure details	Yes	No
	Other data used (please specify):		
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami, Impacts, Hazard map, Inundation map, Evacuation map, Guidelines.	
	Other (please specify):	Sign of evacuation tsunami and sign of Tsunami Warning	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Fair	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Respondent skipped this question	
	Deterministic Tsunami Hazard Analysis		
	Field Studies on Tsunami Impacts		



	Hazard map	
	Inundation map	
	Evacuation map	
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	Respondent skipped this question
	Deterministic Tsunami Hazard Analysis	
	Field Studies on Tsunami Impacts	
	Hazard map	
	Inundation map	
	Evacuation map	
	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	Yes
<b>Q41</b>	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Drought, Earthquakes, Flooding, Landslide, Volcanic eruptions,
	Other (please specify):	Forest and line fire, and trying to do industrial failure risk
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	National Agency, National/local University, National/International Consultant,
	Please specify the name(s) of the agency(ies):	BMKG; UGM; ITB (Local Agency)
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National Level, Regional Level, City Level, Village Level
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	For the risk tsunami risk mapped, we can see on the InaRISK website. most of the coastal areas in Indonesia have been risk tsunami assessment. But for the exposure data still on the process of refinement.
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	There are 26 provinces included tsunami risk area
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Risk map, Evacuation map, Action Plan

	Other (please specify):	Sign evacuation, Information boards, community village tough
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Good
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	Medium priority
	Tsunami risk assessment at regional level	High priority
	Tsunami risk assessment at city level	High priority
	Tsunami risk assessment at village level	High priority
	Tsunami risk assessment at community / neighbourhood level	High priority
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	
	Tsunami risk assessment at national level	Good
	Tsunami risk assessment at regional level	Moderate
	Tsunami risk assessment at city level	Moderate
	Tsunami risk assessment at village level	Moderate
	Tsunami risk assessment at community / neighbourhood level	Moderate
	Please give the names of any individuals / institutions in your country that could provide this training / consultancy	NDMO (BNPB) and UNDP
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Policies</b>		
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Multi hazard including tsunami
	Preparedness	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami
	Rehabilitation and reconstruction	Multi hazard including tsunami
	What is the name of policy? (if available):	UU No. 24 tahun 2007 (for general policy)

<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Multi hazard including tsunami
	Preparedness	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami
	Rehabilitation and reconstruction	Multi hazard including tsunami

**PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines**

**Plans**

<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	Standalone tsunami only	Standalone tsunami only	Standalone tsunami only
	Preparedness	Standalone tsunami only	Standalone tsunami only	Standalone tsunami only
	Emergency response	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	Rehabilitation and reconstruction	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	What is the name of the plan(s) (if available):			NDMO (BNPB) and UNDP
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?		Yes	

**PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines**

**Guidelines**

<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?		
	Prevention and mitigation	Standalone tsunami guidelines	
	Preparedness	Standalone tsunami guidelines	
	Emergency response	Multi hazard guidelines including tsunami	
	Rehabilitation and reconstruction	Multi hazard guidelines including tsunami	
	What is the name of guidelines? (if available):		SNI rambu evakuasi Tsunami (sign evacuation), SNI Jalur Evakuasi Tsunami (Evacuation route), SNI Sirine Peringatan Dini Tsunami (Sirine of Early Warning System), SNI Manajemen Pelatihan menghadapi bencana tsunami (Manajemen Training for Tsunami disaster)

<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?	
	Prevention and mitigation	Guidelines not available
	Preparedness	Guidelines not available
	Emergency response	Guidelines not available
	Rehabilitation and reconstruction	Guidelines not available
	What is the name of guidelines? (if available):	Not provided

<b>PART III: Detection, Warning and Dissemination</b>		
<b>Detection and Warning</b>		
<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data, Use own threat assessments
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	NTWC (BMKG), NDMO (BNPB), LDMO (BPBD), National Search and Rescue Agency (BASARNAS)
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Mobile Phone or Cell Phone, Fax, GTS (WMO Global Telecommunication System), UPS (Uninterruptable Power Supply), VSAT
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	Ocean-wide, National, Local
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	Not provided

<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	No
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	Some stations have been added
	Please indicate which stations have been decommissioned or added, including the Station Name/Location, email Contact of the Station Operator (IOTWMS Secretariat will contact for more information).:	CAN HTT NWA0 BBOO MUN STKA CMSA KMBL FORT BLDU LCRK ARMA MULG MORW OOD INKA MEEK QLP EIDS WRKA AS31 GIRL PSA00 QIS CTA WRAB WB2 FITZ KNRA COEN MTN KDU HYB SHL BATI SOEI WSI PLAI MMRI MMPI JAGI SAUI UGM CISI SMRI LEM KAPI BNDI MNAI KSI PMBI FAKI GENI JAY SANI BKB LUWI SWI PPI BKNI TNTI TOLI2 GSI PSI LHMI BSI KIBK NBI KMBO LODK FOMA VOI ABPO SBV KSM KOM SBM BNM JRM IPM SPM LDM KUM KKM KAAM HMDM MRIV ROCAM TETE SIM NIL MSEY CER SOE SUR CVNA HVD BOSA UPI SNKL POGA SWZ WDLM CRLN MOPA MSNA MTVE MBEY DODT GETA SKLT SRIT SURA PRAC CHBT TMDB NAYO SRDT UBPT PBKT PANO
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	<a href="http://www.ioc-sealevelmonitoring.org">http://www.ioc-sealevelmonitoring.org</a> (IOC) ; <a href="http://tides.big.go.id/index.html">http://tides.big.go.id/index.html</a> (BIG)
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	No
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea	Some stations have been decommissioned

	level stations operated by your country (Check all that apply and include details in the comments section below)	
	Please indicate which stations have been decommissioned or added, including the Station Name/Location, email Contact of the Station Operator (IOTWMS Secretariat will contact for more information).:	syow porl espe thev hill - cuvie pmur - brom groo darw cocb chrs chtt como djib kerg2 - reun2 smar dzao2 nanc mini coch ptbl chenn marm vish verav rote waik beno lemba prig prgi sade saum cili cila pana - sema koli engg ambon sebla pada tnbl telu sibo meul sab2 saba chab jask momb lamu toama lank ganm male hani blueb ptlu rodr agal inha pemba hain moult sitt sala duqm masi ashk suro qura musc wuda maji diba kara gwda orma laru2 denis tanjo mais prte durb krna colo colb trin mtwa zanz kota garc aden
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	No other observing networks are operated by the country
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	Yes
	Please specify the software tools used:	Not provided
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	Yes
	Please specify the modelling tools and data used:	The Tsunami Modelling used TOAST with Pre calculated and real time scenario
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	No
	Which organisation provides the tsunami products?	BMKG
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	watch: <0.5 m; alert: 0.5 m; advising of warning: 0.5-3 m major warning: > 3 m
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-session period?	Do validation with own system.
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes

	Please name the organisation(s) that participated:	We did the communication test regularly, together with Australia and India
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes
	Please name the organisation(s) that participated in the exercise):	We did the tsunami Drill National Disaster Day and IOWave'18
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	Yes
	Please indicate below your national response to each event:	Mentawai 2010 - Aceh 2012 - Palu 2018
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc) disseminated within country? (select all that apply)	Email, SMS, Fax, Webpage, Radio, WhatsApp / Facebook / Other social, media, Sirens, Television, Police/military
	Other:	DVB-WRS
<b>Q79</b>	10b) How is the warning situation terminated?	based on: sea level observation and monitoring; Modelling Tsunami on the last ETA +2 hours
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	www.bmkg.go.id

<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>				
<b>Standard Operating Procedures</b>				
<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.			
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Yes	Yes	Yes

	Receiving information from the NTWC	Yes	Yes	Yes	Yes
	Response Criteria / decision making	Yes	Yes	Yes	Yes
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	Warning dissemination	Yes	Yes	Yes	Yes
	Evacuation call procedures	Yes	Yes	Yes	Yes
	Community evacuation procedures	Yes	Yes	Yes	Yes
	Communication with NTWC	Yes	Yes	Yes	Yes
	Communication with Local Government	Yes	Yes	Yes	Yes
	Media arrangements	Yes	Yes	Yes	Yes
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	Yes	Yes	Yes	Yes
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?	Yes			
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)				
	National DMOs	Fax, Email, SMS			
	Local DMOs	Fax, Email, SMS, Siren, Other			
	General Public	Other			
	Coastal Communities	Other			
	Media	Email, Other			
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Evacuation Infrastructure</b>					
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.				
	Evacuation shelter	Yes Many areas such as at Padang, Pacitan, Bali			



	Vertical evacuation structure	Yes Many areas
	Natural or artificial hill for vertical evacuation	Yes Due to limit areas, we had explored for Pandeglang
	Evacuation signage	Yes All evacuation areas given the signage
	Other (please specify)	Yes
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Tsunami Exercises</b>		
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level, Regional level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	Yes More than 10 times
	Inter-organization table top exercise	Yes one time for Ardex (Asean Country)
	National tsunami drill/exercise	Yes More than 5 times at many areas
	Indian Ocean Wave exercise	Yes 3 times
	Local tsunami exercise	Yes More than 5 times at many areas
	Other (please specify)	Yes at BMKG Office at National Disaster Day
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Tsunami Warning Centre
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Leaflets or flyers, Posters, Booklets, Information boards, Tsunami Signage, Video, or other visual or oral media, Indigenous knowledge, folklore, or oral history

		accounts or compilations, Teaching kits on tsunamis, Public Evacuation Map
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	No
	Global Disaster Risk Reduction Day	No
	Public tsunami preparedness outreach	Yes 1 time
	School and/or children awareness	Yes More than 5 times
	Exhibitions	Yes More than 3 times in a year around Indonesia
	Competitions or other ways of highlighting tsunami safety	No
	Tsunami Exercise	Yes Twice a year
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Provision of general tsunami awareness materials Participation/support by international agencies or experts to your country's activities
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	Yes
	Please specify what type of support:	BMKG had Cooperation with IOTIC for 5 (five) consecutive years since 2017 until 2021
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	Yes
	Please list the names	NDMO (BNPB) develop about Destana (Disaster Resilience Village ) at several villages spreading in Indonesia
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	3 (Fair)
	Have designated and mapped tsunami hazard zones	4 (Good)
	Have a public display of tsunami information	5 (Very good)

Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	3 (Fair)
Develop and distribute outreach and public education materials	4 (Good)
Hold at least three outreach or educational activities annually	5 (Very good)
Conduct an annual tsunami community exercise	5 (Very good)
Address tsunami hazards in the community's Emergency Operations Plan (EOP)	4 (Good)
Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	4 (Good)
Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	5 (Very good)
Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	5 (Very good)

### PART V: Narrative

<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.
→	BMKG as NTWC currently focusing about Tsunami Early Warning caused by the volcano eruption, we realized that we need to establish our system, capacity building and public awareness to deal with Tsunami in Indonesia. This establishing might implicate the NDMO, Media and many stakeholders to educate the society about awareness of vulnerability hazard of the tsunami and its cause not only from earthquake.
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements
→	BMKG and many stakeholders make some cooperation for preparing the standard operating procedure for each institute in order to make synergy tsunami evacuation, then the output will be the regulation for tsunami evacuation.
<b>Q100</b>	Upload Documents
	Respondent skipped this question

**NATIONAL REPORT OF IRAN (ISLAMIC REPUBLIC OF)**

<b>PART I: Basic Information</b>		
<b>Q3</b>	TNC Name:	Behrooz Abtahi
<b>Q4</b>	Position:	Director of INIOAS
<b>Q5</b>	Organization	Iranian National Institute for Oceanography and Atmospheric Science
<b>Q6</b>	Telephone Number:	+982166944873
<b>Q7</b>	E-mail Address:	inioas@inio.ac.ir
<b>Q8</b>	Fax Number:	+982166944869
<b>Q9</b>	Postal Address:	No.3, Etemad Zadeh St., Fatemi Ave., Tehran, IR. Iran
<b>Q10</b>	NTWC Agency Name:	Iranian National Institute for Oceanography and Atmospheric Science
<b>Q11</b>	NTWC URL (web link) for tsunami warnings:	<a href="http://www.inio.ac.ir/Default.aspx?tabid=2725">http://www.inio.ac.ir/Default.aspx?tabid=2725</a>
<b>Q16</b>	Postal Address:	No.3, Etemad Zadeh St., Fatemi Ave., Tehran, IR. Iran
<b>Q17</b>	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	No
<b>Q18</b>	TWFP Agency Name (if different from the NTWC Agency):	Iranian National Center for Ocean Hazards (INCOH)
<b>Q23</b>	Postal Address:	No.3, Etemad Zadeh St., Fatemi Ave., Tehran, IR. Iran

<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Hazard Assessment</b>		
<b>Q29</b>	4a) Has your country undertaken a hazard assessment?	Yes
<b>Q30</b>	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunami

<b>Q31</b>	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclone, Drought, Earthquakes, Epidemics, Flooding, Landslide	
<b>Q32</b>	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National Agency; National / Local University	
	Please specify the name(s) of the agencies:	Iranian National Institute for Oceanography and Atmospheric Science - Tarbiat Modares University, Tehran, Iran - Ports & Maritime Organization	
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	Regional Level, Village Level	
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	Chabahar - 100% Jask - 20%	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Yes	Yes
	Seismo-tectonic model	Yes	Yes
	Topography	Yes	Yes
	Land Cover	No	
	Infrastructure details	No	
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Deterministic Tsunami Hazard Analysis, Hazard map, Inundation map, Evacuation map, Guidelines	
	Other (please specify):	Educational Brochure as Guidelines	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Good	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Medium priority	
	Deterministic Tsunami Hazard Analysis	Medium priority	
	Field Studies on Tsunami Impacts	Medium priority	
	Hazard map	High priority	

	Inundation map	High priority
	Evacuation map	High priority
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	Moderate
	Deterministic Tsunami Hazard Analysis	Very good
	Field Studies on Tsunami Impacts	Moderate
	Hazard map	Very good
	Inundation map	Very good
	Evacuation map	Very good
	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	Not provided
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	No
<b>Q41</b>	5b) What type of risk assessment?	Respondent skipped this question
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Respondent skipped this question
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	Respondent skipped this question
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Respondent skipped this question
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	Respondent skipped this question
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Respondent skipped this question
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Respondent skipped this question
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	Respondent skipped this question
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	

	Tsunami risk assessment at national level	Respondent skipped this question
	Tsunami risk assessment at regional level	
	Tsunami risk assessment at city level	
	Tsunami risk assessment at village level	
	Tsunami risk assessment at community / neighbourhood level	
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	Respondent skipped this question
	Tsunami risk assessment at national level	
	Tsunami risk assessment at regional level	
	Tsunami risk assessment at city level	
	Tsunami risk assessment at village level	
	Tsunami risk assessment at community / neighbourhood level	
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Policies</b>		
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?	A national tsunami policy is undergoing preparation
	Prevention and mitigation	
	Preparedness	
	Emergency response	
	Rehabilitation and reconstruction	
	What is the name of policy? (if available):	
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?	Local tsunami policies are undergoing preparation
	Prevention and mitigation	
	Preparedness	
	Emergency response	
	Rehabilitation and reconstruction	
	What is the name of policy? (if available):	
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Plans</b>		

<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	There are under-development plans which will be issued		
	Preparedness			
	Emergency response			
	Rehabilitation and reconstruction			
What is the name of the plan(s) (if available):				
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?	Yes		

**PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines**

**Guidelines**

<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?		
	Prevention and mitigation	Respondent skipped this question	
	Preparedness		
	Emergency response		
	Rehabilitation and reconstruction		
	What is the name of guidelines? (if available):		
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?		
	Prevention and mitigation	Respondent skipped this question	
	Preparedness		
	Emergency response		
	Rehabilitation and reconstruction		
	What is the name of guidelines? (if available):		

**PART III: Detection, Warning and Dissemination**

**Detection and Warning**

<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information	Yes
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	and advise/warn its coastal communities?	
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data, Use own threat assessments
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	Iranian National Institute for Oceanography and Atmospheric Science
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	No
	Please specify below the hours of operation and reason(s) why 24x7 operations are not done	We are working on infrastructures to operate 24x7
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, Satellite Phone, Fax, UPS (Uninterruptable Power Supply)
	Please specify any other infrastructure:	Short Message System
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	Institute of Geophysics University of Tehran (IGUT) Indian Ocean's RTSPs
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	No
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and	Respondent skipped this question

	include details in the comments section below)	
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	Through <a href="http://www.ioc-sealevelmonitoring.org/">http://www.ioc-sealevelmonitoring.org/</a>
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Yes
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	No other observing networks are operated by the country
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	No
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	Yes
	Please specify the modelling tools and data used:	ComMIT
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	Sea Level < 0.5 m : Watch; 0.5 ~ 2.0 m : Alert; > 2.0 m : Warning
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS	Issuing tsunami warning bulletins to DMO and local authorities

	TSPs during the inter-sessional period?	
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	Iranian National Institute for Oceanography and Atmospheric Science
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes
	Please name the organisation(s) that participated in the exercise):	Iranian National Institute for Oceanography and Atmospheric Science
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	No

### PART III: Detection, Warning and Dissemination

#### Dissemination

<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc) disseminated within country? (select all that apply)	Email, SMS, Telephone, Fax, Webpage, WhatsApp / Facebook / Other social media, Sirens
<b>Q79</b>	10b) How is the warning situation terminated?	When sea level would be less than 0.5 meters according to observation and model results
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	<a href="http://www.inio.ac.ir/Default.aspx?tabid=2725">http://www.inio.ac.ir/Default.aspx?tabid=2725</a>

### PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness

#### Standard Operating Procedures

<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.			
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Respondent skipped this question		

	Receiving information from the NTWC			
	Response Criteria / decision making			
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.			
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	Warning dissemination	Respondent skipped this question		
	Evacuation call procedures			
	Community evacuation procedures			
	Communication with NTWC			
	Communication with Local Government			
	Media arrangements			
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.			
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?	Respondent skipped this question		
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)			
	National DMOs	Respondent skipped this question		
	Local DMOs			
	General Public			
	Coastal Communities			
	Media			
	Other communication methods (please specify)			
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>				
<b>Evacuation Infrastructure</b>				
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.			

	Evacuation shelter	No
	Vertical evacuation structure	No
	Natural or artificial hill for vertical evacuation	Yes
	Evacuation signage	No
	Other (please specify)	No
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Tsunami Exercises</b>		
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	Respondent skipped this question
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	Village level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	No
	Inter-organization table top exercise	No
	National tsunami drill/exercise	No
	Indian Ocean Wave exercise	Yes, IOWave
	Local tsunami exercises	No
	Other (please specify)	No
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Tsunami Warning Centre
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Posters, Booklets, School curricula
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	Yes, 1 time in 2018
	Public tsunami preparedness outreach	Yes
	School and/or children awareness	Yes

	Exhibitions	No
	Competitions or other ways of highlighting tsunami safety	No
	Tsunami Exercise	Yes
	Other (Please specify)	No
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Provision of general tsunami awareness materials Customization of general materials to country or community, Development of tsunami awareness programmes, activities or campaigns, Participation/support by international agencies or experts to your country's activities
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	No
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	Respondent skipped this question
	Have a community tsunami risk reduction plan	
	Have designated and mapped tsunami hazard zones	
	Have a public display of tsunami information	
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	
	Develop and distribute outreach and public education materials	
	Hold at least three outreach or educational activities annually	
	Conduct an annual tsunami community exercise	
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	
	Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	
	Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	
	Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	

<b>PART V: Narrative</b>	
<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.
→	Developing inundation and evacuation maps for Chabahar and Jask Building a dedicated website for tsunami warnings and bulletins Setting up SMS and Fax panels for issuing warnings and bulletins
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements
→	Iranian National Center for Ocean Hazards has planned its future improvements as follows: Make the warning dissemination process automated. Develop and integrate NTWC, NDMO, and LDMO tsunami Standard Operating Procedures. Cooperate with more organizations to improve their involvement in tsunami exercises. Continue numerical Modeling for different parts of Iranian coastline. Produce inundation and evacuation maps. Set up inter-organizational tsunami exercises. Improve education and public awareness.
<b>Q100</b>	Upload Documents
	Respondent skipped this question

**NATIONAL REPORT OF KENYA**

<b>PART I: Basic Information</b>		
<b>Q3</b>	TNC Name:	Ms. Stella Aura MBS
<b>Q4</b>	Position:	Ag. Director
<b>Q5</b>	Organization	Kenya Meteorological Department
<b>Q6</b>	Telephone Number:	+254-722 822553
<b>Q7</b>	E-mail Address:	stellahaura@gmail.com
<b>Q8</b>	Fax Number:	Respondent skipped this question
<b>Q9</b>	Postal Address:	P.O BOX 30259 00100 Nairobi, Kenya
<b>Q10</b>	NTWC Agency Name:	Kenya Meteorological Department
<b>Q11</b>	NTWC URL (web link) for tsunami warnings:	www.meteo.go.ke
<b>Q12</b>	NTWC Agency Contact or Officer in Charge (person):	Ag. Senior Assistant Director
<b>Q16</b>	Postal Address:	P.O BOX 30259 00100 Nairobi, Kenya
<b>Q17</b>	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes

<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Hazard Assessment</b>		
<b>Q29</b>	4a) Has your country undertaken a hazard assessment?	Yes
<b>Q30</b>	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunami
<b>Q31</b>	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclone, Drought, Earthquakes, Epidemics, Flooding, Landslide, Volcanic eruptions
	Other (please specify):	Lightning



<b>Q32</b>	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National Agency	
	Please specify the name(s) of the agencies:		
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Level	
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	Mapping planned	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	No	No
	Seismo-tectonic model	No	No
	Topography	No	No
	Land Cover	No	No
	Infrastructure details	No	No
Other data used (please specify):	Assessment to be completed		
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Guidelines	
	Other (please specify):	Historic data	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Fair	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Essential	
	Deterministic Tsunami Hazard Analysis	Essential	
	Field Studies on Tsunami Impacts	Essential	
	Hazard map	Essential	

	Inundation map	Essential
	Evacuation map	Essential
	What other areas of capacity in tsunami hazard assessment require improvement?	Modelling and social economics in tsunami hazards
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	No capacity
	Deterministic Tsunami Hazard Analysis	No capacity
	Field Studies on Tsunami Impacts	No capacity
	Hazard map	No capacity
	Inundation map	No capacity
	Evacuation map	No capacity
	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	Not applicable
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	Yes
<b>Q41</b>	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Drought, Earthquakes, Epidemics, Flooding, Landslide, Volcanic eruptions.
	Other (please specify):	Lightning
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	National Agency
	Please specify the name(s) of the agency(ies):	National Disaster Operations, Kenya Meteorological Department among other stakeholders
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National Level
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	Mapping planned
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Kenyan coastal cities along approximately 600 kilometers

<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Other
	Please specify:	Products to be developed
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Very poor
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	Essential
	Tsunami risk assessment at regional level	Essential
	Tsunami risk assessment at city level	Essential
	Tsunami risk assessment at village level	Essential
	Tsunami risk assessment at community / neighbourhood level	Essential
	What other areas of capacity in tsunami hazard assessment require improvement?	Generally all tsunami capacity requirements
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	
	Tsunami risk assessment at national level	Poor
	Tsunami risk assessment at regional level	Poor
	Tsunami risk assessment at city level	Poor
	Tsunami risk assessment at village level	Poor
	Tsunami risk assessment at community / neighbourhood level	Poor
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Policies</b>		
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Multi hazard including tsunami
	Preparedness	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami
	Rehabilitation and reconstruction	Multi hazard including tsunami
	What is the name of policy? (if available):	Disaster Management Policy

<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?
Prevention and mitigation	Multi hazard including tsunami
Preparedness	Multi hazard including tsunami
Emergency response	Multi hazard including tsunami
Rehabilitation and reconstruction	Multi hazard including tsunami
What is the name of policy? (if available):	National Disaster Management Policy

**PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines**

**Plans**

<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.		
	National level	Local level	Community level
Prevention and mitigation	Multi hazard including tsunami	Local plan is not available	Community plan is not available
Preparedness	Multi hazard including tsunami	Local plan is not available	Community plan is not available
Emergency response	Multi hazard including tsunami	Local plan is not available	Community plan is not available
Rehabilitation and reconstruction	Multi hazard including tsunami	Local plan is not available	Community plan is not available
What is the name of the plan(s) (if available):	National Disaster Response Plan		
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?		Yes

**PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines**

**Guidelines**

<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?
Prevention and mitigation	Multi hazard guidelines including tsunami
Preparedness	Multi hazard guidelines including tsunami
Emergency response	Multi hazard guidelines including tsunami
Rehabilitation and reconstruction	Multi hazard guidelines including tsunami
What is the name of guidelines? (if available):	Standard Operating Procedures

<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?	
	Prevention and mitigation	Multi hazard guidelines including tsunami
	Preparedness	Multi hazard guidelines including tsunami
	Emergency response	Multi hazard guidelines including tsunami
	Rehabilitation and reconstruction	Multi hazard guidelines including tsunami
	What is the name of guidelines? (if available):	Standard Operating Procedures

<b>PART III: Detection, Warning and Dissemination</b>		
<b>Detection and Warning</b>		
<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	Kenya Meteorological Department National Tsunami Warning Centre
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, GTS (WMO Global Telecommunication, System), UPS (Uninterruptable Power Supply)
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	Ocean-wide
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes

	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	RIMES, TSP (INDIA, AUSTRALIA AND INDONESIA)
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	No
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	
	Please indicate which stations have been decommissioned or added, including the Station Name/Location, email Contact of the Station Operator (IOTWMS Secretariat will contact for more information):	Commissioning in progress
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	National networks currently out of service but can be accessed through GTS and other satellite sources of data
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Yes
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	Currently out of service

	Please provide the Station Name/Location, email Contact of any other observing network operator (IOTWMS Secretariat will contact for more information)	Not provided
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	Yes
	Please specify the software tools used:	Not adequate
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	Yes
	Please specify the modelling tools and data used:	Not adequate
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	Earthquakes of $\geq 6.5$ on a Richter scale magnitude for Western Indian Ocean
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-sessional period?	Evaluated for any possible threat
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	National Tsunami Warning Centre/Kenya Meteorological Department
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes
	Please name the organisation(s) that participated in the exercise:	National Tsunami Warning Centre/Kenya Meteorological Department

<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	No
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc) disseminated within country? (select all that apply)	Email, SMS, Telephone, Webpage, Radio, WhatsApp / Facebook / Other social, media, Sirens, Television, Megaphone, Police/military, Public alert system, VHF radio
<b>Q79</b>	10b) How is the warning situation terminated?	Using the above mentioned communication methods
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	<a href="http://www.meteo.go.ke">www.meteo.go.ke</a>

<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>				
<b>Standard Operating Procedures</b>				
<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.			
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Yes	Yes	Yes
	Receiving information from the NTWC	Yes	Yes	Yes
	Response Criteria / decision making	Yes	Yes	Yes
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.			
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of	Is support required to develop Human Resources in	Is support required to develop infrastructure



		tsunami emergency response in your SOP?	this aspect of tsunami emergency response?	for this aspect of tsunami emergency response?
	Warning dissemination	Yes	Yes	Yes
	Evacuation call procedures	Yes	Yes	Yes
	Community evacuation procedures	Yes	Yes	Yes
	Communication with NTWC	Yes	Yes	Yes
	Communication with Local Government	Yes	Yes	Yes
	Media arrangements	Yes	Yes	Yes
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	Yes	Yes	Yes
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?	Yes		
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)			
	National DMOs	Telephone, Fax, Email, SMS, Siren		
	Local DMOs	Telephone, Email, SMS, Siren		
	General Public	Telephone, SMS, Siren		
	Coastal Communities	Telephone, SMS, Siren		
	Media	Telephone, Fax, Email, SMS, Siren, Other		
	Other communication methods (please specify)	Radio and Television		
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>				
<b>Evacuation Infrastructure</b>				
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.			
	Evacuation shelter	Yes All coastal towns use tents as evacuation shelters		
	Vertical evacuation structure	No		
	Natural or artificial hill for vertical evacuation	No		
	Evacuation signage	Yes Limited places as known or commons knowledge to the communities		
	Other (please specify)	No		

<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Tsunami Exercises</b>		
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level, Regional level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	Yes Occasionally
	Inter-organization table top exercise	Yes Occasionally
	National tsunami drill/exercise	Yes Annual
	Indian Ocean Wave exercise	Yes bi-annual IOWAVE
	Local tsunami exercise	Yes Annual
	Other (please specify)	No
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Leaflets or flyers, Posters, Booklets, Video, or other visual or oral media, Indigenous knowledge, folklore, or oral history accounts or compilations, Teaching kits on tsunamis, School curricula
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	Yes Annual

	Global Disaster Risk Reduction Day	Yes Annual
	Public tsunami preparedness outreach	Yes Annual
	School and/or children awareness	Yes
	Exhibitions	Yes Annual
	Competitions or other ways of highlighting tsunami safety	No
	Tsunami Exercise	Yes Annual/Biannual IOWAVES
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Provision of general tsunami awareness materials, Customization of general materials to country or community, Development of tsunami awareness programmes, activities or campaigns, Participation/support by international agencies or experts to your country's activities
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	Yes
	Please specify what type of support:	Skills on SOP Development, Public Awareness-Advocacy, material development
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	Yes
	Please list the names	Kilifi Blue Beach area
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	3 (Fair)
	Have designated and mapped tsunami hazard zones	4 (Good)
	Have a public display of tsunami information	3 (Fair)
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	3 (Fair)
	Develop and distribute outreach and public education materials	3 (Fair)
	Hold at least three outreach or educational activities annually	3 (Fair)
	Conduct an annual tsunami community exercise	3 (Fair)
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	4 (Good)
	Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	4 (Good)

	Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	3 (Fair)
	Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	3 (Fair)

<b>PART V: Narrative</b>		
<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.	
→	The National Tsunami Warning Centre has been collaborating with many stakeholders in IOWAVE and IOTR activities. In these events, we have raised the capacity of the stakeholders and affected communities. We have carried out Tsunami Drills in different coastal locations all of which has utilised community participation as well as key stakeholders. Majority of the stakeholders are now aware of their roles in Tsunami warning operations. We have also upscaled our communication systems to be more alert and responsive. Our staff at the NTWC are 24/7 alert.	
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements	
→	Other innovations include planned seismic and tidal gauge stations enhancement, buoys and other sea level measurements instruments and equipment	
<b>Q100</b>	Upload Documents	Respondent skipped this question

**NATIONAL REPORT OF MADAGASCAR**

<b>PART I: Basic Information</b>		
<b>Q3</b>	TNC Name:	Solofoarisoa RAKOTONIAINA
<b>Q4</b>	Position:	Director
<b>Q5</b>	Organization	Institute and Observatory of Geophysics of Antananarivo (IOGA)
<b>Q6</b>	Telephone Number:	+(261) 34 64 27704
<b>Q7</b>	E-mail Address:	solofoarisoa@gmail.com
<b>Q8</b>	Fax Number:	Respondent skipped this question
<b>Q9</b>	Postal Address:	Institute and Observatory of Geophysics of Antananarivo (IOGA), P.O. Box 3843, 101 - Antananarivo Madagascar
<b>Q10</b>	NTWC Agency Name:	Institute and Observatory of Geophysics of Antananarivo (IOGA)
<b>Q11</b>	NTWC URL (web link) for tsunami warnings:	<a href="http://www.bngrc-mid.mg/">http://www.bngrc-mid.mg/</a>
<b>Q12</b>	NTWC Agency Contact or Officer in Charge (person):	Director
<b>Q16</b>	Postal Address:	Institute and Observatory of Geophysics of Antananarivo (IOGA), P.O. Box 3843, 101 - Antananarivo Madagascar
<b>Q17</b>	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency?  <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes
<b>Q24</b>	TWFP 24x7 point of contact (office, operational unit or position, not a person):	Laboratory of Seismology and Infrasound

<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Hazard Assessment</b>		
<b>Q29</b>	4a) Has your country undertaken a hazard assessment?	Yes
<b>Q30</b>	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunami

<b>Q31</b>	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclone, Drought, Earthquakes, Epidemics, Flooding, Landslide	
<b>Q32</b>	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National Agency	
	Please specify the name(s) of the agencies:	Institute and Observatory of Geophysics of Antananarivo (IOGA), Bureau National de Gestion des Risque et des Catastrophes (BNGRC)	
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Level, Regional Level, City Level	
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	Manakara (eastern coast of Madagascar, map still in improvement) The other cities on going	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Yes	
	Seismo-tectonic model	No	No
	Topography	Yes	No
	Land Cover	Yes	No
	Infrastructure details	Yes	No
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Inundation map, Evacuation map	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Poor	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	High priority	
	Deterministic Tsunami Hazard Analysis	High priority	
	Field Studies on Tsunami Impacts	Essential	
	Hazard map	High priority	
	Inundation map	High priority	

	Evacuation map	High priority
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	Poor
	Deterministic Tsunami Hazard Analysis	Poor
	Field Studies on Tsunami Impacts	Poor
	Hazard map	Poor
	Inundation map	Poor
	Evacuation map	Poor
	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	Institute and Observatory of Geophysics of Antananarivo (IOGA) / Bureau National de Gestion des Risques et des Catastrophes (BNGRC)
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	Yes
<b>Q41</b>	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Drought, Earthquakes, Epidemics, Flooding, Landslide
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	National agency
	Please specify the name(s) of the agency(ies):	Institute and Observatory of Geophysics of Antananarivo (IOGA) / Bureau National de Gestion des Risques et des Catastrophes (BNGRC)
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National Level, Regional Level, City Level
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	Manakara (eastern coast of Madagascar, map still in improvement) The other cities on going
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Risk assessment ongoing
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Evacuation map
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Poor
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	

	Tsunami risk assessment at national level	Essential
	Tsunami risk assessment at regional level	Essential
	Tsunami risk assessment at city level	Essential
	Tsunami risk assessment at village level	Essential
	Tsunami risk assessment at community / neighbourhood level	High priority
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	
	Tsunami risk assessment at national level	Poor
	Tsunami risk assessment at regional level	Poor
	Tsunami risk assessment at city level	Poor
	Tsunami risk assessment at village level	Poor
	Tsunami risk assessment at community / neighbourhood level	Poor
	Other (specify below)	Poor
	Please give the names of any individuals / institutions in your country that could provide this training / consultancy	Bureau National de Gestion des Risques et des Catastrophes (BNGRC / NDMO)
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Policies</b>		
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Multi hazard including tsunami
	Preparedness	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami
	Rehabilitation and reconstruction	Multi hazard including tsunami
	What is the name of policy? (if available):	National Policy of Disaster and Risk Management (Law no.2015-031) taking into account of multi hazard and multirisk approach. One policy for the four disaster management phases. In addition to the policy, we also have the National Strategy of Disaster and Risk Management.
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Multi hazard including tsunami
	Preparedness	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami
	Rehabilitation and reconstruction	Multi hazard including tsunami
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		



<b>Plans</b>				
<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	Preparedness	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	Rehabilitation and reconstruction	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	What is the name of the plan(s) (if available):	1) National Contingency Plan with multihazard approach 2) Regional Contingency Plans with multihazard approach: - Vatovavy Fitovinany Regional Contingency Plan including tsunami - Atsimo Atsinanana Regional Contingency Plan including tsunami 3) Contingency Plan of Sainte Marie Island including tsunami		
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?	Yes		
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Guidelines</b>				
<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation	Multi hazard guidelines including tsunami		
	Preparedness	Multi hazard guidelines including tsunami		
	Emergency response	Multi hazard guidelines including tsunami		
	Rehabilitation and reconstruction	Multi hazard guidelines including tsunami		
		What is the name of guidelines? (if available):	National Rapid Reaction Matrix on Tsunami	
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation	Multi hazard guidelines including tsunami		
	Preparedness	Multi hazard guidelines including tsunami		
	Emergency response	Multi hazard guidelines including tsunami		
	Rehabilitation and reconstruction	Multi hazard guidelines including tsunami		
		What is the name of guidelines? (if available):	Regional / local Rapid Reaction Matrix on Tsunami	

PART III: Detection, Warning and Dissemination		
Detection and Warning		
<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data, Use own threat assessments
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	Institute and Observatory of Geophysics of Antananarivo (I.O.G.A.)
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	Ocean-wide, National
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	National seismic network, seedlink, internet
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	Yes
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	No

<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Yes
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	No other observing networks are operated by the country
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	Yes
	Please specify the software tools used:	SeisComp3
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	Yes
	Please specify the modelling tools and data used:	ComMIT
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	Magnitude of the earthquake occurred at the Makran or Indonesia (Java and Sumatra sources)
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-session period?	Send warning to the NDMO
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	Institute and Observatory of Geophysics of Antananarivo (IOGA) / Bureau National de Gestion des Risques et des Catastrophes (BNGRC)
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g.	Yes

	IOWave) conducted in the inter-sessional period?	
	Please name the organisation(s) that participated in the exercise):	Institute and Observatory of Geophysics of Antananarivo (IOGA) / Bureau National de Gestion des Risques et des Catastrophes (BNGRC)
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	No
	Please indicate below your national response to each event:	
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc.) disseminated within country? (select all that apply)	Email, SMS, Telephone, Fax, Webpage, Radio, Door-to-door, Sirens, Television, Megaphone, Police/military, Public alert system, VHF radio
<b>Q79</b>	10b) How is the warning situation terminated?	The warning will end few hours after the TSPs "all clear " message
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	<a href="http://www.bngrc-mid.mg/">http://www.bngrc-mid.mg/</a>

<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>				
<b>Standard Operating Procedures</b>				
<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.			
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Yes	Yes	Yes
	Receiving information from the NTWC	Yes	Yes	Yes
	Response Criteria / decision making	Yes	Yes	Yes

<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	Warning dissemination	Yes	Yes	Yes	Yes
	Evacuation call procedures	Yes	Yes	Yes	Yes
	Community evacuation procedures	Yes	Yes	Yes	Yes
	Communication with NTWC	Yes	Yes	Yes	Yes
	Communication with Local Government	Yes	Yes	Yes	Yes
	Media arrangements	Yes	Yes	Yes	Yes
Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	Yes	Yes	Yes	Yes	
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?		Yes		
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)				
	National DMOs	Telephone, Fax, Email, SMS			
	Local DMOs	Telephone, SMS, Siren			
	General Public	SMS, Siren			
	Coastal Communities	Telephone, SMS, Siren			
	Media	Telephone, Fax, Email, SMS			
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Evacuation Infrastructure</b>					
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.				
	Evacuation shelter	Yes Coastal Regions, especially the Eastern part of the country			
	Vertical evacuation structure	No			
	Natural or artificial hill for vertical evacuation	Yes Almost of the coastal regions			
	Evacuation signage	No			
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?		Yes		

<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Tsunami Exercises</b>		
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level, Regional level, City level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	No
	Inter-organization table top exercise	No
	National tsunami drill/exercise	No
	Indian Ocean Wave exercise	Yes 4 times
	Local tsunami exercise	No
	Other (please specify)	No
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Posters, Booklets, Teaching kits on tsunamis
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	No
	Global Disaster Risk Reduction Day	No
	Public tsunami preparedness outreach	Yes Once a year
	School and/or children awareness	Yes Once a year
	Exhibitions	No
	Competitions or other ways of highlighting tsunami safety	No
	Tsunami Exercise	Yes Once a year

<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Provision of general tsunami awareness materials, Customization of general materials to country or community, Development of tsunami awareness programmes, activities or campaigns, Participation/support by international agencies or experts to your country's activities
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	Yes
	Please specify what type of support:	Sensitization
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	Yes
	Please list the names	Institute and Observatory of Geophysics of Antananarivo (IOGA) / Bureau National de Gestion des Risques et des Catastrophes (BNGRC)
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	2 (Poor)
	Have designated and mapped tsunami hazard zones	2 (Poor)
	Have a public display of tsunami information	2 (Poor)
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	2 (Poor)
	Develop and distribute outreach and public education materials	2 (Poor)
	Hold at least three outreach or educational activities annually	2 (Poor)
	Conduct an annual tsunami community exercise	2 (Poor)
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	2 (Poor)
	Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	2 (Poor)
	Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	2 (Poor)
	Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	2 (Poor)

#### PART V: Narrative

<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.
→	We are starting to make people and authorities to be conscious of the existence of the tsunami. Not all of the communities are aware of this disaster and not all of the people know yet its existence. Most of the coastal part of the country are still vulnerable face to the tsunami. We make

	a policy to be prepared and reduce its impact for each region but it is not yet finished for all the country.	
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements	
→	Exercises are needed for the regions which are already visited and have a knowledge of tsunami Many regions don't have yet SOP and don't know yet about tsunami	
<b>Q100</b>	Upload Documents	Respondent skipped this question



NATIONAL REPORT OF MALAYSIA

PART I: Basic Information		
Q3	TNC Name:	Alui Bahari
Q4	Position:	Director General
Q5	Organization	Malaysian Meteorological Department
Q6	Telephone Number:	+603 796 780 01
Q7	E-mail Address:	alui@met.gov.my
Q8	Fax Number:	+603 795 393 72
Q9	Postal Address:	Malaysian Meteorological Department Jalan Sultan, 46667 Petaling Jaya Selangor, Malaysia
Q10	NTWC Agency Name:	Malaysian Meteorological Department
Q11	NTWC URL (web link) for tsunami warnings:	<a href="http://www.met.gov.my">http://www.met.gov.my</a>
Q12	NTWC Agency Contact or Officer in Charge (person):	Director
Q16	Postal Address:	Malaysian Meteorological Department, Jalan Sultan 46667, Petaling Jaya Selangor, Malaysia
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes
Q24	TWFP 24x7 point of contact (office, operational unit or position, not a person):	National Weather and Geophysics Operation Centre

PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines		
Hazard Assessment		
Q29	4a) Has your country undertaken a hazard assessment?	Yes
Q30	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunami

<b>Q31</b>	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Drought, Earthquakes, Epidemics, Flooding, Landslide	
<b>Q32</b>	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National Agency	
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Agency	
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	Along Malaysian coastal areas	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Yes	No
	Seismo-tectonic model	Yes	Yes
	Topography	Yes	No
	Land Cover	Yes	No
	Infrastructure details	Yes	No
	Other data used (please specify):		
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Field Studies on Tsunami Impacts, Hazard map	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Good	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Medium priority	
	Deterministic Tsunami Hazard Analysis	Medium priority	
	Field Studies on Tsunami Impacts	High priority	
	Hazard map	High priority	
	Inundation map	High priority	
	Evacuation map	Essential	

<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	Moderate
	Deterministic Tsunami Hazard Analysis	Moderate
	Field Studies on Tsunami Impacts	Good
	Hazard map	Good
	Inundation map	Good
	Evacuation map	Good
	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	Dr Chai Mui Fatt Malaysian Meteorological Department Email: chai@met.gov.my
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	No
<b>Q41</b>	5b) What type of risk assessment?	Respondent skipped this question
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Respondent skipped this question
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	Respondent skipped this question
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Respondent skipped this question
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	Respondent skipped this question
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Respondent skipped this question
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Respondent skipped this question
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Fair
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	Medium priority

	Tsunami risk assessment at regional level	Medium priority
	Tsunami risk assessment at city level	High priority
	Tsunami risk assessment at village level	High priority
	Tsunami risk assessment at community / neighbourhood level	Essential
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	
	Tsunami risk assessment at national level	Moderate
	Tsunami risk assessment at regional level	Moderate
	Tsunami risk assessment at city level	Moderate
	Tsunami risk assessment at village level	Good
	Tsunami risk assessment at community / neighbourhood level	Good
	Other (specify below)	Moderate
	Please give the names of any individuals / institutions in your country that could provide this training / consultancy	Dr Chai Mui Fatt Malaysian Meteorological Department Email: <a href="mailto:chai@met.gov.my">chai@met.gov.my</a>
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Policies</b>		
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Policy is not available
	Preparedness	Policy is not available
	Emergency response	Multi hazard including tsunami
	Rehabilitation and reconstruction	Policy is not available
	What is the name of policy? (if available):	MKN Directive 20
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Policy is not available
	Preparedness	Policy is not available
	Emergency response	Multi hazard including tsunami
	Rehabilitation and reconstruction	Policy is not available
	What is the name of policy? (if available):	MKN Directive 20

<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Plans</b>				
<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	National plan is not available	Local plan is not available	Community plan is not available
	Preparedness	National plan is not available	Local plan is not available	Community plan is not available
	Emergency response	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	Rehabilitation and reconstruction	National plan is not available	Local plan is not available	Community plan is not available
	What is the name of the plan(s) (if available):	Tsunami Emergency Response Plan		
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?	Yes		
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Guidelines</b>				
<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation	Guidelines not available		
	Preparedness	Guidelines not available		
	Emergency response	Guidelines not available		
	Rehabilitation and reconstruction	Guidelines not available		
	What is the name of guidelines? (if available):	Not provided		
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation	Guidelines not available		
	Preparedness	Guidelines not available		
	Emergency response	Multi hazard guidelines including tsunami		
	Rehabilitation and reconstruction	Guidelines not available		
	What is the name of guidelines? (if available):	Tsunami Emergency Response Plan		

<b>PART III: Detection, Warning and Dissemination</b>		
<b>Detection and Warning</b>		
<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data; Use own threat assessments
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	Malaysian Meteorological Department
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, Fax, GTS (WMO Global Telecommunication System), UPS (Uninterruptable Power Supply), VSAT
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	Seedlink, internet
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	Yes
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added	Respondent skipped this question

	broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	Global Sea Level Observing System (GLOSS)
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Yes
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	
	Please provide the Station Name/Location, email Contact of any other observing network operator (IOTWMS Secretariat will contact for more information)	Pulau Perhentian Kudat, Sabah Lahad Datu, Sabah Pulau Perak Kerachut, Penang Porto Malai, Langkawi
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	Yes
	Please specify the software tools used:	Antelope, Seiscomp3, Tide tool
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	Yes
	Please specify the modelling tools and data used:	TUNAMI, COMCOT, ComMIT
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes

<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	Advisory - sea level less than 0.5 m; Warning - sea level more than 0.5 m
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-sessional period?	Taken into account for issuing tsunami advisory or warning for the Nation.
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	Malaysian Meteorological Department
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes
	Please name the organisation(s) that participated in the exercise):	Malaysian Meteorological Department National Disaster Management Agency (NADMA) Royal Malaysia Police Malaysia Civil Defence Force Ministry of Health Social Welfare Department Department of Information United Nation Development Program (UNDP) NGOs
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	No
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc) disseminated within country? (select all that apply)	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media, Sirens, Television,
	Other:	Mobile application (myCuaca)
<b>Q79</b>	10b) How is the warning situation terminated?	When no significant wave heights is observed from the national tide gauge station.
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	<a href="http://www.met.gov.my">http://www.met.gov.my</a>



PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
Standard Operating Procedures					
<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Yes	Yes	Yes	Yes
	Receiving information from the NTWC	Yes	Yes	Yes	Yes
	Response Criteria / decision making	Yes	Yes	Yes	Yes
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	Warning dissemination	Yes	Yes	Yes	Yes
	Evacuation call procedures	Yes	Yes	Yes	Yes
	Community evacuation procedures	Yes	Yes	Yes	Yes
	Communication with NTWC	Yes	Yes	Yes	Yes
	Communication with Local Government	Yes	Yes	Yes	Yes
	Media arrangements	Yes	Yes	Yes	Yes
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	Yes	Yes	Yes	Yes
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?		Yes		

<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)	
	National DMOs	Telephone, Fax, Email, SMS, Other (please specify below)
	Local DMOs	Telephone, Fax, Email, SMS, Other (please specify below)
	General Public	Telephone, Fax, Email, Siren, Other (please specify below)
	Coastal Communities	Telephone, Fax, Email, Siren, Other (please specify below)
	Media	Telephone, Fax, Email, SMS, Other (please specify below)
	Other communication methods (please specify)	Website, mobile application (myCuaca)
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Evacuation Infrastructure</b>		
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.	
	Evacuation shelter	No
	Vertical evacuation structure	No
	Natural or artificial hill for vertical evacuation	Yes Along Malaysian Coastal Water
	Evacuation signage	No
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Tsunami Exercises</b>		
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	Village level, Community/Neighbourhood level, School level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	Yes 2
	Inter-organization table top exercise	Yes 1
	National tsunami drill/exercise	Yes 2
	Indian Ocean Wave exercise	Yes

		1
	Local tsunami exercise	Yes 2
	Other (please specify)	
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Leaflets or flyers, Posters, Booklets, Video, or other visual or oral media
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	Yes 1
	Global Disaster Risk Reduction Day	No
	Public tsunami preparedness outreach	No
	School and/or children awareness	Yes 2
	Exhibitions	Yes 3
	Competitions or other ways of highlighting tsunami safety	Yes 2
	Tsunami Exercise	Yes 2
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Provision of general tsunami awareness materials Customization of general materials to country or community, Development of tsunami awareness programmes, activities or campaigns, Participation/support by international agencies or experts to your country's activities
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	No

<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	Respondent skipped this question
	Have designated and mapped tsunami hazard zones	
	Have a public display of tsunami information	
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	
	Develop and distribute outreach and public education materials	
	Hold at least three outreach or educational activities annually	
	Conduct an annual tsunami community exercise	
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	
	Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	
	Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	
Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public		

<b>PART V: Narrative</b>		
<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.	
	<p>➔ In 2019, MMD will be conducting public awareness's campaigns and drills on the extreme weather, earthquake &amp; tsunami for the aiming as follow: -</p> <p>Preparing the publics for all hazards through awareness and education programmes;                      Communicate hazard risk assessment information to the communities, NADMA, local authorities and disaster response team;                      Educating the public with warnings, alerting system and evacuation arrangements; and                      Involvement of communities in mitigation activities (drills &amp; evacuation plan).</p>	
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements	
	<p>➔ MMD will develop Location-Based SMS alert to warn people in vulnerable areas of impending disasters. Under the system, an SMS would be sent to those living near disaster-prone areas when events like earthquake, tsunami, typhoon and heavy thunderstorm are likely to take place.</p>	
<b>Q100</b>	Upload Documents	Respondent skipped this question

NATIONAL REPORT OF MAURITIUS

PART I: Basic Information		
Q3	TNC Name:	Premchand Goolaup
Q4	Position:	Director
Q5	Organization	Mauritius Meteorological Services
Q6	Telephone Number:	+230 6861031
Q7	E-mail Address:	meteo@intnet.mu
Q8	Fax Number:	+230 6861033
Q9	Postal Address:	St Paul Road, Vacoas
Q10	NTWC Agency Name:	Mauritius Meteorological Services
Q11	NTWC URL (web link) for tsunami warnings:	<a href="http://metservice.intnet.mu">http://metservice.intnet.mu</a>
Q12	NTWC Agency Contact or Officer in Charge (person):	Director
Q16	Postal Address:	St Paul Road, Vacoas
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency?  <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes
Q24	TWFP 24x7 point of contact (office, operational unit or position, not a person):	Meteorological Services

PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines		
Hazard Assessment		
Q29	4a) Has your country undertaken a hazard assessment?	Yes
Q30	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunami
Q31	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclone, Drought, Flooding, Landslide
Q32	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National Agency National / Local University National / International Consultant
	Please specify the name(s) of the agencies:	
Q33	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Level, City Level, Village Level

<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	All around the island	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Yes	No
	Seismo-tectonic model	Don't know	Don't know
	Topography	Yes	No
	Land Cover	No	Don't know
	Infrastructure details	No	Don't know
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Hazard map, Inundation map, Evacuation map	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Good	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Medium priority	
	Deterministic Tsunami Hazard Analysis	Essential	
	Field Studies on Tsunami Impacts	Medium priority	
	Hazard map	Essential	
	Inundation map	Essential	
	Evacuation map	Essential	
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Moderate	
	Deterministic Tsunami Hazard Analysis	Moderate	
	Field Studies on Tsunami Impacts	No-capacity	
	Hazard map	Good	
	Inundation map	Good	
	Evacuation map	Good	
	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	Not provided	
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>			
<b>Risk Assessment</b>			

<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	Yes
<b>Q41</b>	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Drought, Flooding, Landslide
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	National Agency National/Local University
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National level
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	The tsunami risk mapped areas for Mauritius is kept for restricted use/application pending policy decision as to their access for general public attention.
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Six district councils (Pamplemousses, Riviere du Rempart, Flacq, Black River, Savanne, Grand Port) and one City Council (Port-Louis) are at risk from tsunami.
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Risk map, Action Plan
	Other (please specify):	A Tsunami Emergency Scheme has been put into place which elaborates the roles, responsibilities and actions of stakeholders concerned under general preparedness, issue of tsunami watch, warning and termination. This scheme is at national level.
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Poor
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	Essential
	Tsunami risk assessment at regional level	Essential
	Tsunami risk assessment at city level	Essential
	Tsunami risk assessment at village level	Essential
	Tsunami risk assessment at community / neighbourhood level	Essential
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	
	Tsunami risk assessment at national level	Good
	Tsunami risk assessment at regional level	Good
	Tsunami risk assessment at city level	No capacity

Tsunami risk assessment at village level	No capacity
Tsunami risk assessment at community / neighbourhood level	No capacity
Other (specify below)	The Mauritius Oceanography Institute has personnel who has carried out the tsunami risk assessment through modelling for the Sumatra and Makran scenarios

**PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines**

**Policies**

<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Policy is not available
	Preparedness	Policy is not available
	Emergency response	Multi hazard including tsunami
	Rehabilitation and reconstruction	Policy is not available
	What is the name of policy? (if available):	National Disaster Scheme
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Policy is not available
	Preparedness	Policy is not available
	Emergency response	Multi hazard including tsunami
	Rehabilitation and reconstruction	Policy is not available
	What is the name of policy? (if available):	Tsunami Emergency Scheme

**PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines**

**Plans**

<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	Multi hazard including tsunami	Local plan is not available	Community plan is not available
	Preparedness	Multi hazard including tsunami	Local plan is not available	Community plan is not available
	Emergency response	Multi hazard including tsunami	Local plan is not available	Community plan is not available
	Rehabilitation and	National plan is not available	Local plan is not available	Community plan is not available



	reconstruction		
	What is the name of the plan(s) (if available):	National Disaster Scheme/Tsunami Emergency Scheme	
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?	Yes	
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>			
<b>Guidelines</b>			
<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?		
	Prevention and mitigation	Guidelines not available	
	Preparedness	Guidelines not available	
	Emergency response	Guidelines not available	
	Rehabilitation and reconstruction	Multi hazard guidelines including tsunami	
	What is the name of guidelines? (if available):	Guidelines not available	
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?		
	Prevention and mitigation	Guidelines not available	
	Preparedness	Guidelines not available	
	Emergency response	Standalone tsunami guidelines	
	Rehabilitation and reconstruction	Guidelines not available	
	What is the name of guidelines? (if available):	Not provided	

<b>PART III: Detection, Warning and Dissemination</b>			
<b>Detection and Warning</b>			
<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes	
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data	
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	Director, Meteorological Services	

<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, Fax, GTS (WMO Global Telecommunication System), UPS (Uninterruptable Power Supply)
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	Internet
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	Yes
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	GTS, Internet
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Yes
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	No other observing networks are operated by the country
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	No

<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	No
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	Earthquake of magnitude >6.5 Tsunami wave >50 cm at the offshore water depth of 1 m
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-sessional period?	Analyse the messages and issue any alert in case a oceanwide tsunami was detected
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	Meteorological Services
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes
	Please name the organisation(s) that participated in the exercise):	Meteorological Services National Disaster Centre Police Force Fire Services Local Authorities Community NGOs
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	No

**PART III: Detection, Warning and Dissemination**

**Dissemination**

<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc) disseminated within country? (select all that apply)	Email, SMS, Telephone, Fax, Webpage, Radio, Sirens, Television, Police/military, VHF radio
<b>Q79</b>	10b) How is the warning situation terminated?	2 hours after the passage of last high wave and also from observation of tide gauge and visual from police
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	<a href="http://metSERVICE.intnet.mu/warning-bulletin-tsunami-warning.php">http://metSERVICE.intnet.mu/warning-bulletin-tsunami-warning.php</a>

**PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness**

**Standard Operating Procedures**



<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.
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	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Yes	No	Yes	Yes
	Receiving information from the NTWC	Yes	No	No	Yes
	Response Criteria / decision making	Yes	Yes	Yes	Yes
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	Warning dissemination	Yes	No	Yes	Yes
	Evacuation call procedures	Not provided	Not provided	Not provided	Not provided
	Community evacuation procedures	Not provided	Not provided	Not provided	Not provided
	Communication with NTWC	Not provided	Not provided	Not provided	Not provided
	Communication with Local Government	Not provided	Not provided	Not provided	Not provided
	Media arrangements	Not provided	Not provided	Not provided	Not provided
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	Not provided	Not provided	Not provided	Not provided
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?		Yes		
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)				
	National DMOs		Telephone, Fax, Email, SMS		
	Local DMOs		Not provided		

	General Public	SMS, Siren
	Coastal Communities	SMS, Siren
	Media	Telephone, Fax, Email
	Other communication methods (please specify)	
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Evacuation Infrastructure</b>		
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.	
	Evacuation shelter	Yes The existing national system of emergency shelters for Cyclones is extended for cases of tsunami as far as applicable.
	Vertical evacuation structure	Not provided
	Natural or artificial hill for vertical evacuation	No
	Evacuation signage	No
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Tsunami Exercises</b>		
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level, City level, Village level, Community/Neighbourhood level, School level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	Yes
	Inter-organization table top exercise	No
	National tsunami drill/exercise	No
	Indian Ocean Wave exercise	Yes
	Local tsunami exercise	Yes
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Tsunami Warning Centre

<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Leaflets or flyers, Posters, Video, or other visual or oral media, Teaching kits on tsunamis, School curricula
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	Yes
	Global Disaster Risk Reduction Day	Yes
	Public tsunami preparedness outreach	Yes
	School and/or children awareness	Yes
	Exhibitions	Yes
	Competitions or other ways of highlighting tsunami safety	Not provided
	Tsunami Exercise	Yes
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Customization of general materials to country or community, Development of tsunami awareness programmes, activities or campaigns, Participation/support by international agencies or experts to your country's activities
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	No
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	Respondent skipped this question
	Have designated and mapped tsunami hazard zones	
	Have a public display of tsunami information	
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	
	Develop and distribute outreach and public education materials	
	Hold at least three outreach or educational activities annually	
	Conduct an annual tsunami community exercise	
Address tsunami hazards in the community's Emergency Operations Plan (EOP)		

Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	
Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	
Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	

PART V: Narrative	
<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.
	Respondent skipped this question
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements
	Respondent skipped this question
<b>Q100</b>	Upload Documents
	Respondent skipped this question

NATIONAL REPORT OF MOZAMBIQUE

PART I: Basic Information		
Q3	TNC Name:	Mussa Mustafa
Q4	Position:	Deputy Director-General
Q5	Organization	National Institute of Meteorology
Q6	Telephone Number:	+258 82 39 44 279
Q7	E-mail Address:	mussa_m@inam.gov.mz
Q8	Fax Number:	+258 21 49 11 50
Q9	Postal Address:	Respondent skipped this question
Q10	NTWC Agency Name:	National Institute of Meteorology
Q11	NTWC URL (web link) for tsunami warnings:	www.inam.gov.mz
Q12	NTWC Agency Contact or Officer in Charge (person):	Director of Weather Forecasting Directorate
Q16	Postal Address:	Respondent skipped this question
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes
Q18	TWFP Agency Name (if different from the NTWC Agency):	Weather Forecasting Department
Q20	Position	Head of Forecasting Department
Q23	Postal Address:	Respondent skipped this question
Q24	TWFP 24x7 point of contact (office, operational unit or position, not a person):	Weather Forecasting Department

PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines		
Hazard Assessment		
Q29	4a) Has your country undertaken a hazard assessment?	Yes
Q30	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunami
Q31	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclone, Drought, Earthquakes, Epidemics, Flooding,
	Other (please specify):	Cyclone/drought/flooding/epidemics/earthquake/tsunami



<b>Q32</b>	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National Agency International Agency National / Local University	
	Please specify the name(s) of the agencies:	National Institute of Disaster Management/NMHS/Healthy/Agriculture/UN Agencies/UNESCO IOC/NGO/University Eduardo Mondlane	
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	City level	
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	Under the tsunami pilot project sponsored by UNDP tres coastal cities were mapped on tsunami inundation and evacuation routes. The cities are Beira, Nacala and Pemba.  Rimes and INCOIS have also sponsored a case study for tsunami hazard and risk assessment and evacuation planning for Beira city in September 2018.	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Respondent skipped this question	
	Seismo-tectonic model		
	Topography		
	Land Cover		
Infrastructure details			
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Hazard map, Inundation map, Evacuation map	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Fair	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Medium priority	
	Deterministic Tsunami Hazard Analysis	Medium priority	
	Field Studies on Tsunami Impacts	High priority	
	Hazard map	High priority	
	Inundation map	High priority	

	Evacuation map	High priority
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	Poor
	Deterministic Tsunami Hazard Analysis	Poor
	Field Studies on Tsunami Impacts	Poor
	Hazard map	Moderate
	Inundation map	Moderate
	Evacuation map	Moderate
	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	There is a need for capacity building on tsunami hazard but at the moment no institution in the country capable of doing it without international collaboration.
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	Yes
<b>Q41</b>	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Drought, Earthquakes, Epidemics, Flooding,
	Other (please specify):	Cyclone/drought/flooding/epidemics/earthquake/tsunami
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	National Agency International Agency National/local University
	Please specify the name(s) of the agency(ies):	RIMES and UNESCO IOC in collaboration with Disaster Management Agency, Weather Service, National Institute of Hydrography and Navigation, Institute of Geology, University of Eduardo Mondlane
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	City Level
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	Under the tsunami pilot project sponsored by UNDP tres coastal cities were mapped on tsunami inundation and evacuation routes. The cities are Beira, Nacala and Pemba. Rimes and INCOIS have also sponsored a case study for tsunami hazard and risk assessment and evacuation planning for Beira city in September 2018.
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	The results of the case studies for Beira, Nacala and Pemba showed that none of cities are at risk from tsunami. Only in case of

		tsunami from earthquake of magnitude above 8 can cause impacts but the risk is very low.
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Risk map, Evacuation map
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Fair
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	Medium priority
	Tsunami risk assessment at regional level	Medium priority
	Tsunami risk assessment at city level	High priority
	Tsunami risk assessment at village level	High priority
	Tsunami risk assessment at community / neighbourhood level	High priority
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	
	Tsunami risk assessment at national level	Moderate
	Tsunami risk assessment at regional level	Moderate
	Tsunami risk assessment at city level	Good
	Tsunami risk assessment at village level	Good
	Tsunami risk assessment at community / neighbourhood level	Good
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Policies</b>		
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?	
	Prevention and mitigation	The country has only the Policy of Natural Hazards that includes all kind of disasters that challenging the country including tsunami. But considering the low risk of tsunami hazard more priority is given to cyclones, floods, drought and epidemics.
	Preparedness	
	Emergency response	
	Rehabilitation and reconstruction	
	What is the name of policy? (if available):	
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?	
	Prevention and mitigation	The country does not have local tsunami policies
	Preparedness	
	Emergency response	
	Rehabilitation and reconstruction	

	What is the name of policy? (if available):	
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Plans</b>		
<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.	
		National level                      Local level                      Community level
	Prevention and mitigation	Respondent skipped this question
	Preparedness	
	Emergency response	
	Rehabilitation and reconstruction	
What is the name of the plan(s) (if available):		As stated above the country has risk reduction plans taking in consideration the challenging hazards
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?	Yes
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Guidelines</b>		
<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available) In what form are the guidelines?	
	Prevention and mitigation	Respondent skipped this question
	Preparedness	
	Emergency response	
	Rehabilitation and reconstruction	
	What is the name of guidelines? (if available):	
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?	
	Prevention and mitigation	Respondent skipped this question
	Preparedness	
	Emergency response	
	Rehabilitation and reconstruction	
	What is the name of guidelines? (if available):	

<b>PART III: Detection, Warning and Dissemination</b>		
<b>Detection and Warning</b>		
<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Respondent skipped this question
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	Respondent skipped this question
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Fax, GTS (WMO Global Telecommunication System, UPS (Uninterruptable Power Supply)
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	Internet
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	No
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	No
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS	Yes

	sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Some stations have been added
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	No other observing networks are operated by the country
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	No
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	No
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	Not applicable
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-sessional period?	The NTWC receives the messages and analyses it. If tsunami is not expected to affect the country internal communication is issued to disaster management authority just to acknowledge them.
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	National Institute of Meteorology
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes
	Please name the organisation(s) that participated in the exercise):	National Institute of Disaster Management/National Institute of Meteorology/National Institute of Geology/National Institute of Hydrography and Navigation/UN agencies/other relevant organizations

<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	No
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc) disseminated within country? (select all that apply)	Email, SMS, Fax, Television, Public alert, system
	Other:	Radio
<b>Q79</b>	10b) How is the warning situation terminated?	Cancellation based on the information received from tsunami warnings centres
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	<a href="http://www.inam.gov.mz">www.inam.gov.mz</a>

<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>				
<b>Standard Operating Procedures</b>				
<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.			
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Respondent skipped this question		
	Receiving information from the NTWC			
	Response Criteria / decision making			
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.			
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?

	Warning dissemination		Respondent skipped this question
	Evacuation call procedures		
	Community evacuation procedures		
	Communication with NTWC		
	Communication with Local Government		
	Media arrangements		
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.		
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?		Yes
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)		
	National DMOs	Telephone, Fax, Email	
	Local DMOs	Telephone, Fax, Email	
	General Public	Not provided	
	Coastal Communities	Telephone, Fax, Email	
	Media	Telephone, Fax, Email	
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>			
<b>Evacuation Infrastructure</b>			
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.		
	Evacuation shelter	Yes coastal areas but at low risk	
	Vertical evacuation structure	Yes coastal areas but at low risk	
	Natural or artificial hill for vertical evacuation	No	
	Evacuation signage	No	
	Other (please specify)		



<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Tsunami Exercises</b>		
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National guidelines
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	City level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	Yes During IOWAVE event
	Inter-organization table top exercise	Yes During IOWAVE event
	National tsunami drill/exercise	No
	Indian Ocean Wave exercise	Yes During IOWAVE event
	Local tsunami exercise	No
	Other (please specify)	No
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Posters, Booklets, Video, or other visual or oral media
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	No
	Global Disaster Risk Reduction Day	No
	Public tsunami preparedness outreach	No
	School and/or children awareness	Yes Not often
	Exhibitions	No
	Competitions or other ways of highlighting tsunami safety	No

	Tsunami Exercise	No
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Provision of general tsunami awareness , materials Development of tsunami awareness programmes, activities or campaigns, Participation/support by international agencies or experts to your country's activities
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	No
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	3 (Fair)
	Have designated and mapped tsunami hazard zones	4 (Good)
	Have a public display of tsunami information	2 (Poor)
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	2 (Poor)
	Develop and distribute outreach and public education materials	2 (Poor)
	Hold at least three outreach or educational activities annually	2 (Poor)
	Conduct an annual tsunami community exercise	1 (Very poor)
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	1 (Very poor)
	Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	4 (Good)
	Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	4 (Good)
Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	4 (Good)	

#### PART V: Narrative

<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.
➔	With INCOIS and RIMES in 2018 the country had opportunity to implement the pilot project on tsunami hazard risk assessment and evacuation mapping using INSPIRE and ESCAPE systems. Two technicians participated on the TEMPP-3 training in Indonesia. These were good for the country in order to strengthen the local capacity on tsunami risk assessment and evacuation mapping.

<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements	
➔	We hope to continue our collaboration and coordination with UNESCO IOC to improve many aspects related to tsunami as stated in different previous questions.	
<b>Q100</b>	Upload Documents	Respondent skipped this question

NATIONAL REPORT OF MYANMAR

PART I: Basic Information		
Q3	TNC Name:	Dr Yin Myo Min Htwe
Q4	Position:	Assistant Director
Q5	Organization	Department of Meteorology and Hydrology
Q6	Telephone Number:	+95 925 095 4653
Q7	E-mail Address:	jianyou.wu007@gmail.com
Q8	Fax Number:	+95-673411253
Q9	Postal Address:	Office No.(5), Department of Meteorology and Hydrology, Ministry of Transport and Communications, Nay Pyi Taw, Myanmar
Q10	NTWC Agency Name:	Department of Meteorology and Hydrology
Q11	NTWC URL (web link) for tsunami warnings:	<a href="https://www.moezala.gov.mm/">https://www.moezala.gov.mm/</a>
Q12	NTWC Agency Contact or Officer in Charge (person):	Assistant Director
Q16	Postal Address:	Office No. (5), Department of Meteorology and Hydrology, Ministry of Transport and Communications, Nay Pyi Taw, Myanmar
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes
Q24	TWFP 24x7 point of contact (office, operational unit or position, not a person):	Department of Meteorology and Hydrology, Staff Officer

PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines		
Hazard Assessment		
Q29	4a) Has your country undertaken a hazard assessment?	Yes
Q30	4b) What type of hazard assessment has been carried out?	Respondent skipped this question

<b>Q31</b>	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Respondent skipped this question	
<b>Q32</b>	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National Agency International Agency	
	Please specify the name(s) of the agencies:	Department of Meteorology and Hydrology was cooperated with RIMES-Regional Integrated Multi-hazard Early Warning System	
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	Village Level	
	Other (please specify):	Just one village of Tsunami Risk Assessment Map and Evacuation Map have done in Myanmar	
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	AungHlaing Village, Labutta Township, Ayeyarwady Region, Myanmar	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.	Was this data used for tsunami hazard assessment?	Is this data publicly available?
		Yes	Don't know
	Bathymetry	Yes	Don't know
	Seismo-tectonic model	Yes	Don't know
	Topography	Yes	Don't know
	Land Cover	Yes	Don't know
	Infrastructure details	Yes	Don't know
Other data used (please specify):			
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Inundation map, Evacuation map	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Poor	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Medium priority	
	Deterministic Tsunami Hazard Analysis	High priority	

	Field Studies on Tsunami Impacts	High priority
	Hazard map	High priority
	Inundation map	Essential
	Evacuation map	Essential
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	Moderate
	Deterministic Tsunami Hazard Analysis	Moderate
	Field Studies on Tsunami Impacts	Poor
	Hazard map	Moderate
	Inundation map	Moderate
	Evacuation map	Poor
	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	Not provided
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	Yes
<b>Q41</b>	5b) What type of risk assessment?	Single risk assessment only on tsunami
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Respondent skipped this question
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	National Agency International Agency
	Please specify the name(s) of the agency(ies):	Department of Meteorology and Hydrology was cooperated with Regional Integrated Multi-hazard Early Warning System-RIMES.
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Village Level
	Other (please specify):	Just one village of Tsunami Risk Map has done in Myanmar.
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	AungHlaing Village, Labutta Township, Ayeyarwady Region, Myanmar
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	All of Myanmar coastal areas have the risk from Tsunami.
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Evacuation map

<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Poor
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	Low priority
	Tsunami risk assessment at regional level	Medium priority
	Tsunami risk assessment at city level	High priority
	Tsunami risk assessment at village level	Essential
	Tsunami risk assessment at community / neighbourhood level	Essential
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	
	Tsunami risk assessment at national level	Poor
	Tsunami risk assessment at regional level	Poor
	Tsunami risk assessment at city level	Poor
	Tsunami risk assessment at village level	Poor
	Tsunami risk assessment at community / neighbourhood level	Poor
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Policies</b>		
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Multi hazard including tsunami
	Preparedness	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami
	Rehabilitation and reconstruction	Multi hazard including tsunami
	What is the name of policy? (if available):	Myanmar Action Plan of Disaster Risk Reduction
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Multi hazard including tsunami
	Preparedness	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami
	Rehabilitation and reconstruction	Multi hazard including tsunami

	What is the name of policy? (if available):	Community Based Disaster Risk Reduction		
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Plans</b>				
<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	Not provided	Not provided	Not provided
	Preparedness	Not provided	Multi hazard including tsunami	Not provided
	Emergency response	Not provided	Not provided	Not provided
	Rehabilitation and reconstruction	Not provided	Not provided	Not provided
	What is the name of the plan(s) (if available):	Not provided		
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?	Yes		
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Guidelines</b>				
<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation	Not provided		
	Preparedness	Standalone tsunami guidelines		
	Emergency response	Not provided		
	Rehabilitation and reconstruction	Not provided		
	What is the name of guidelines? (if available):	Not provided		
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available).			
	Prevention and mitigation	Respondent skipped this question		
	Preparedness			
	Emergency response			
	Rehabilitation and reconstruction			
	What is the name of guidelines? (if available):			



<b>PART III: Detection, Warning and Dissemination</b>		
<b>Detection and Warning</b>		
<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	Department of Meteorology and Hydrology Office No.(5), Department of Meteorology and Hydrology, Ministry of Transport and Communications, Nay Pyi Taw, Myanmar
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, Fax, GTS (WMO Global Telecommunication System), UPS (Uninterruptable Power Supply)
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	Local Seismic Network, Regional Seismic Network, Global Seismic Network
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	No
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	Myanmar seismic stations have not yet added

<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	GTS, Internet, Tide Tool Software
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Yes
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	
	Please provide the Station Name/Location, email Contact of any other observing network operator (IOTWMS Secretariat will contact for more information)	Sittwe, Moulmein, Haing Gyi Kyun dmh.npt@gmail.com
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	Yes
	Please specify the software tools used:	SeisComP3, Antelop, SeisAn
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	No
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	Based on the magnitude, depth and location
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued	If tsunami wave can arrive to our coastal areas, NTWC and NTWFP are prepared to issue the warning and also check the wave amplitude and the arrival time.

	by the IOTWMS TSPs during the inter-sessional period?	
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	Department of Meteorology and Hydrology was conducted Communication Test since March 2011
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes
	Please name the organisation(s) that participated in the exercise):	Department of Meteorology and Hydrology was conducted IOWave Exercise since 2009.
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	No
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc) disseminated within country? (select all that apply)	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media, Television
<b>Q79</b>	10b) How is the warning situation terminated?	When tsunami disaster is clear or cannot effect to our coastal areas, we issue the tsunami cancellation.
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	<a href="https://www.moezala.gov.mm/">https://www.moezala.gov.mm/</a>

<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>				
<b>Standard Operating Procedures</b>				
<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.			
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?

	24/7 Emergency Operation Centre (EOC)	Yes	Yes	Yes	Yes
	Receiving information from the NTWC	Yes	Yes	Yes	Yes
	Response Criteria / decision making	Yes	No	Yes	Yes
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	Warning dissemination	Yes	Yes	Yes	Yes
	Evacuation call procedures	Yes	Yes	Yes	Yes
	Community evacuation procedures	No	No	Yes	Yes
	Communication with NTWC	Yes	Yes	Yes	Yes
	Communication with Local Government	Yes	Yes	Yes	Yes
	Media arrangements	Yes	Yes	Yes	Yes
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	Yes	Yes	Yes	Yes
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?		Yes		
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)				
	National DMOs	Telephone, Fax, Email, SMS			
	Local DMOs	Telephone, Fax, Email, SMS			
	General Public	Telephone, Fax, Email, SMS			
	Coastal Communities	Telephone, Fax, Email, SMS			
	Media	Telephone, Fax, Email, SMS			
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Evacuation Infrastructure</b>					

<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.	
	Evacuation shelter	No response Just have evacuation shelter for Multi-hazard, not only for Tsunami.
	Vertical evacuation structure	Not provided
	Natural or artificial hill for vertical evacuation	Not provided
	Evacuation signage	Not provided
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Tsunami Exercises</b>		
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National guidelines
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level, Regional level, City level, Village level, Community/Neighbourhood level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	Yes 4
	Inter-organization table top exercise	Yes 3
	National tsunami drill/exercise	Yes 4
	Indian Ocean Wave exercise	Yes 4
	Local tsunami exercise	Yes 1
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Tsunami Warning Centre
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Posters, Video, or other visual or oral media, Teaching kits on tsunamis
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami	Yes

	Information Centre (IOTIC) and other countries?	
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	Yes 2
	Global Disaster Risk Reduction Day	Not provided
	Public tsunami preparedness outreach	Not provided
	School and/or children awareness	Yes 2
	Exhibitions	Not provided
	Competitions or other ways of highlighting tsunami safety	Not provided
	Tsunami Exercise	Yes 3
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Provision of general tsunami awareness, materials Customization of general materials to country or community, Development of tsunami awareness programmes, activities or campaigns, Participation/support by international agencies or experts to your country's activities
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	Yes
	Please specify what type of support:	Knowledge sharing to develop the hazard and risk assessment maps for Tsunami
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	No
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	3 (Fair)
	Have designated and mapped tsunami hazard zones	3 (Fair)
	Have a public display of tsunami information	3 (Fair)
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	3 (Fair)
	Develop and distribute outreach and public education materials	3 (Fair)
	Hold at least three outreach or educational activities annually	3 (Fair)
	Conduct an annual tsunami community exercise	3 (Fair)
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	3 (Fair)
Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	3 (Fair)	

Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	3 (Fair)
Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	3 (Fair)

<b>PART V: Narrative</b>	
<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.
→	Should do more research of tsunami and need to conduct more training and workshop for the tsunami risk reduction..
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements
→	Need to share more data and upgrade the existing communication systems.
<b>Q100</b>	Upload Documents
	Respondent skipped this question

NATIONAL REPORT OF OMAN

PART I: Basic Information		
Q3	TNC Name:	Dr Juma Said Almaskari
Q4	Position:	DG Meoterology
Q5	Organization	Public Authority For Civil Aviation
Q6	Telephone Number:	+96 824 354 555
Q7	E-mail Address:	j.almaskari@met.gov.om
Q8	Fax Number:	+96 824 354 504
Q9	Postal Address:	P.O. Box: 1, Postal Code :111, Muscat international Airport
Q10	NTWC Agency Name:	National Multi Hazard Early Warning Center
Q11	NTWC URL (web link) for tsunami warnings:	www.met.gov.om
Q12	NTWC Agency Contact or Officer in Charge (person):	Director of National Multi Hazard Early Warning Center
Q16	Postal Address:	P.O. Box: 1, Postal Code :111, Muscat international Airport
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes
Q24	TWFP 24x7 point of contact (office, operational unit or position, not a person):	National Multi Hazard Early Warning Center

PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines		
Hazard Assessment		
Q29	4a) Has your country undertaken a hazard assessment?	Yes
Q30	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunami
Q31	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclone, Earthquakes,



	Other (please specify):	Flash flooding will be done soon	
<b>Q32</b>	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National / International Consultant	
	Please specify the name(s) of the agencies:		
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Level, City Level	
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	All the coastal Line with more details for 9 cities	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Yes	No
	Seismo-tectonic model	Yes	Yes
	Topography	Yes	Don't know
	Land Cover	Yes	Don't know
	Infrastructure details	Yes	Yes
	Other data used (please specify):		
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Probabilistic Tsunami Hazard Assessment (PTHA), Deterministic Tsunami Hazard Analysis, Field Studies on Tsunami Impacts, Hazard map, Inundation map, Guidelines (please specify below)	
	Other (please specify):	Evacuation maps under process with the National Committee for Civil Defense. Guide lines are available such as SOP	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Good	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Low priority	
	Deterministic Tsunami Hazard Analysis	Low priority	
	Field Studies on Tsunami Impacts	Medium priority	
	Hazard map	Low priority	

	Inundation map	Low priority
	Evacuation map	Essential
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	Moderate
	Deterministic Tsunami Hazard Analysis	Moderate
	Field Studies on Tsunami Impacts	Poor
	Hazard map	Poor
	Inundation map	Moderate
	Evacuation map	Poor
	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	Not provided
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	Yes
<b>Q41</b>	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Earthquakes,
	Other (please specify):	Flash Flooding will be done soon
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	National/International Consultant
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National Level, City Level
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	All the coastal Line with more details for 9 cities
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	4 districts at high risk from local Tsunami
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Risk map, Guidelines, Action Plan
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Good
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	

	Tsunami risk assessment at national level	Low priority
	Tsunami risk assessment at regional level	Low priority
	Tsunami risk assessment at city level	High priority
	Tsunami risk assessment at village level	Medium priority
	Tsunami risk assessment at community / neighbourhood level	Medium priority
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	
	Tsunami risk assessment at national level	Moderate
	Tsunami risk assessment at regional level	Poor
	Tsunami risk assessment at city level	Moderate
	Tsunami risk assessment at village level	Moderate
	Tsunami risk assessment at community / neighbourhood level	Moderate
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Policies</b>		
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Multi hazard including tsunami
	Preparedness	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami
	Rehabilitation and reconstruction	Multi hazard including tsunami
	What is the name of policy? (if available):	Not provided
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Multi hazard including tsunami
	Preparedness	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami
	Rehabilitation and reconstruction	Multi hazard including tsunami
	<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>	
<b>Plans</b>		
<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.	

		National level	Local level	Community level
	Prevention and mitigation	Multi hazard including tsunami	Multi hazard including tsunami	Not provided
	Preparedness	Multi hazard including tsunami	Multi hazard including tsunami	Not provided
	Emergency response	Multi hazard including tsunami	Multi hazard including tsunami	Not provided
	Rehabilitation and reconstruction	Multi hazard including tsunami	Multi hazard including tsunami	Not provided
	What is the name of the plan(s) (if available):	Not provided		
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?	Yes		

## PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines

### Guidelines

<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?	
	Prevention and mitigation	Multi hazard guidelines including tsunami
	Preparedness	Multi hazard guidelines including tsunami
	Emergency response	Multi hazard guidelines including tsunami
	Rehabilitation and reconstruction	Multi hazard guidelines including tsunami
	What is the name of guidelines? (if available):	Not provided
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?	
	Prevention and mitigation	Multi hazard guidelines including tsunami
	Preparedness	Multi hazard guidelines including tsunami
	Emergency response	Multi hazard guidelines including tsunami
	Rehabilitation and reconstruction	Multi hazard guidelines including tsunami
	What is the name of guidelines? (if available):	Not provided

## PART III: Detection, Warning and Dissemination

### Detection and Warning

<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive	Yes
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	potential tsunami threat information and advise/warn its coastal communities?	
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data, Use own threat assessments
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	National Multi Hazard Early Warning Center (NMHEWC)
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, Fax, GTS (WMO Global Telecommunication System), UPS (Uninterruptable Power Supply), VSAT
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	Through All (national data through national communication infrastructure, seedlink, internet)
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	Yes
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure,	Both (national data through national communication infrastructure and WMO Global

	WMO Global Telecommunications System (GTS):	Telecommunications System (GTS) including IOC web sit
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Yes
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	GNSS/GPS (please specify below) Coastal radars (please specify below)
	Please provide the Station Name/Location, email Contact of any other observing network operator (IOTWMS Secretariat will contact for more information)	Not provided
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	Yes
	Please specify the software tools used:	Toast, seismcomp3/ Antlop
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	Yes
	Please specify the modelling tools and data used:	Easywave, Mhras
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	Magnitude greater than 6.5
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-sessional period?	Received the Messages and forwards to the stakeholders
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly	Yes

	communications tests conducted by the IOTWMS TSPs?	
	Please name the organisation(s) that participated:	National Multi Hazard Early Warning Center (NMHEWC)
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-session period?	Yes
	Please name the organisation(s) that participated in the exercise:	National Multi Hazard Early Warning Center (NMHEWC)
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	No
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc) disseminated within country? (select all that apply)	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media, Television, Police/military, Public alert , system, VPN
<b>Q79</b>	10b) How is the warning situation terminated?	Cancellation message
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	<a href="http://dss.met.gov.om/">http://dss.met.gov.om/</a>

<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Standard Operating Procedures</b>					
<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?	
	24/7 Emergency Operation Centre (EOC)	Yes	Yes	Yes	No
	Receiving information from the NTWC	Yes	No	No	No

	Response Criteria / decision making	Yes	Yes	Yes	No
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	Warning dissemination	Yes	Yes	Yes	Yes
	Evacuation call procedures	Yes	Yes	Yes	Yes
	Community evacuation procedures	Yes	Yes	Yes	Yes
	Communication with NTWC	Yes	Yes	Yes	Yes
	Communication with Local Government	Yes	Yes	Yes	Yes
	Media arrangements	Yes	Yes	Yes	Yes
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	Yes	Yes	Yes	Yes
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?		Yes		
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)				
	National DMOs	Telephone, Fax, Email, SMS			
	Local DMOs	Telephone, Fax, Email			
	General Public	SMS, Siren, Other			
	Coastal Communities	SMS, Siren, Other			
	Media	Telephone, Email, SMS			
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Evacuation Infrastructure</b>					
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.				
	Evacuation shelter	Yes			
	Vertical evacuation structure	No			
	Natural or artificial hill for vertical evacuation	No			
	Evacuation signage	No			



<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Tsunami Exercises</b>		
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level, Regional level, Village level, Community/Neighbourhood level, School level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	Yes One time
	Inter-organization table top exercise	Yes One time
	National tsunami drill/exercise	No
	Indian Ocean Wave exercise	Yes One time
	Local tsunami exercise	No
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Leaflets or flyers, Posters, Booklets, Video, or other visual or oral media, School curricula
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	Yes Two times
	Global Disaster Risk Reduction Day	Yes Two times
	Public tsunami preparedness outreach	Yes Two times
	School and/or children awareness	Yes Many times

	Exhibitions	Yes One time
	Competitions or other ways of highlighting tsunami safety	No
	Tsunami Exercise	Yes Two times
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Provision of general tsunami awareness materials Customization of general materials to country or community, Development of tsunami awareness programmes, activities or campaigns, Participation/support by international agencies or experts to your country's activities
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	Yes
	Please list the names	AlSawadi area
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	3 (Fair)
	Have designated and mapped tsunami hazard zones	4 (Good)
	Have a public display of tsunami information	4 (Good)
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	4 (Good)
	Develop and distribute outreach and public education materials	5 (Very good)
	Hold at least three outreach or educational activities annually	4 (Good)
	Conduct an annual tsunami community exercise	4 (Good)
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	4 (Good)
	Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	4 (Good)
	Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	5 (Very good)
	Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	5 (Very good)

#### PART V: Narrative

<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education
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	programmes or other measures taken to heighten awareness of the tsunami hazard and risk.	
→	Respondent skipped this question.	
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements	
→	Expanding observation network, improve and add Hazard and risk assessment for more cities level and implementing CBS using CAPs protocol.	
<b>Q100</b>	Upload Documents	Respondent skipped this question

NATIONAL REPORT OF PAKISTAN

PART I: Basic Information		
Q3	TNC Name:	Zahid Rafi
Q4	Position:	Director In-charge National Seismic Monitor Network and Tsunami Early Warning Center
Q5	Organization	Pakistan meteorological Department
Q6	Telephone Number:	00-92-51-9250597, cell: 00-92-3215162843
Q7	E-mail Address:	dihazrafi@gmail.com
Q8	Fax Number:	00-92-51-9250368
Q9	Postal Address:	Pakistan Meteorological Department Sector H-8/2, Faiz-Ahmad-Faiz Road, Islamabad, 44000 Pakistan
Q10	NTWC Agency Name:	Tsunami Early Warning Center, Pakistan Met Department, Karachi
Q11	NTWC URL (web link) for tsunami warnings:	<a href="http://www.pmd.gov.pk/">http://www.pmd.gov.pk/</a>
Q12	NTWC Agency Contact or Officer in Charge (person):	Meteorologist
Q16	Postal Address:	Pakistan Meteorological Department, University Road, Gulistan-e-Johar, Karachi
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes

PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines		
Hazard Assessment		
Q29	4a) Has your country undertaken a hazard assessment?	Yes
Q30	4b) What type of hazard assessment has been carried out?	Single hazard assessment only on tsunami
Q31	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Respondent skipped this question
Q32	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National Agency

	Please specify the name(s) of the agencies:	Pakistan Meteorological Department	
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	City Level	
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	Gwadar City Karachi city	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.	Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Yes	Yes
	Seismo-tectonic model	Yes	Yes
	Topography	No	No
	Land Cover	Yes	No
	Infrastructure details	No	No
	<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Probabilistic Tsunami Hazard Assessment, (PTHA), Hazard map, Inundation map
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Very good	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Medium priority	
	Deterministic Tsunami Hazard Analysis	Low priority	
	Field Studies on Tsunami Impacts	Medium priority	
	Hazard map	High priority	
	Inundation map	High priority	
	Evacuation map	High priority	
	What other areas of capacity in tsunami hazard assessment require improvement?	Risk assessment of coastal areas's cities.	
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Very good	
	Deterministic Tsunami Hazard Analysis	Not provided	
	Field Studies on Tsunami Impacts	Not provided	
	Hazard map	Very good	
	Inundation map	Very good	
	Evacuation map	Not provided	

	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	Pakistan Meteorological Department (PMD) 1- Zahid Rafi (PMD) Islamabad 2- Nasir Mahmood (PMD), Islamabad
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	No
<b>Q41</b>	5b) What type of risk assessment?	Respondent skipped this question
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Respondent skipped this question
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	Respondent skipped this question
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Respondent skipped this question
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	Respondent skipped this question
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Respondent skipped this question
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Respondent skipped this question
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Very poor
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	High priority
	Tsunami risk assessment at regional level	Medium priority
	Tsunami risk assessment at city level	Essential
	Tsunami risk assessment at village level	Essential
	Tsunami risk assessment at community / neighbourhood level	Essential
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	
	Tsunami risk assessment at national level	No capacity
	Tsunami risk assessment at regional level	No capacity
	Tsunami risk assessment at city level	No capacity
	Tsunami risk assessment at village level	No capacity
	Tsunami risk assessment at community / neighbourhood level	No capacity
	Other (specify below)	No capacity

	Please give the names of any individuals / institutions in your country that could provide this training / consultancy	Nil		
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Policies</b>				
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?			
	Prevention and mitigation	Multi hazard including tsunami		
	Preparedness	Multi hazard including tsunami		
	Emergency response	Multi hazard including tsunami		
	Rehabilitation and reconstruction	Multi hazard including tsunami		
	What is the name of policy? (if available):	National Earthquake & Tsunami Framework.		
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?			
	Prevention and mitigation	Standalone tsunami only		
	Preparedness	Standalone tsunami only		
	Emergency response	Multi hazard including tsunami		
	Rehabilitation and reconstruction	Multi hazard including tsunami		
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Plans</b>				
<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	Multi hazard including tsunami	Local plan is not available	Community plan is not available
	Preparedness	Multi hazard including tsunami	Local plan is not available	Community plan is not available
	Emergency response	Multi hazard including tsunami	Local plan is not available	Community plan is not available
	Rehabilitation and reconstruction	Multi hazard including tsunami	Local plan is not available	Community plan is not available
What is the name of the plan(s) (if available):	National Earthquake & Tsunami Framework			
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?	Yes		
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Guidelines</b>				

<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?	
	Prevention and mitigation	Guidelines not available
	Preparedness	Guidelines not available
	Emergency response	Guidelines not available
	Rehabilitation and reconstruction	Guidelines not available
	What is the name of guidelines? (if available):	Not provided
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?	
	Prevention and mitigation	Guidelines not available
	Preparedness	Guidelines not available
	Emergency response	Guidelines not available
	Rehabilitation and reconstruction	Guidelines not available
	What is the name of guidelines? (if available):	Not provided

### PART III: Detection, Warning and Dissemination

#### Detection and Warning

<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data Use own threat assessments
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	Pak Met Dept
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	No
	Please specify below the hours of operation and reason(s) why 24x7 operations are not done:	24/7
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, Fax
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes



	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	Seed link and internet
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	No
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	NIL
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	No
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	No
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	NIL
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	
	Please provide the Station Name/Location, email Contact of any other observing network operator (IOTWMS Secretariat will contact for more information)	No other observing networks are operated by the country
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	Yes
	Please specify the software tools used:	SeisCompro
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	Yes
	Please specify the modelling tools and data used:	MOST, ComMit
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	No
	Which organisation provides the tsunami products?	PMD
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	Magnitude, SeisComPro system, Simulation system (Guittar)
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning	Inform to National DMO

	Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-session period?	
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	PMD
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-session period?	No
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	No
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc.) disseminated within country? (select all that apply)	Email, SMS, Telephone, Fax, Webpage, Radio, Sirens, Television
<b>Q79</b>	10b) How is the warning situation terminated?	After confirmation of no threat by second Bulletin
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	<a href="http://www.pmd.gov.pk/">http://www.pmd.gov.pk/</a>

<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>				
<b>Standard Operating Procedures</b>				
<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.			
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Yes	Yes	Yes
	Receiving information from the NTWC	Yes	Yes	Yes
	Response Criteria / decision making	Yes	No	No
			No	Yes

<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	Warning dissemination	Yes	Yes	No	Yes
	Evacuation call procedures	Yes	Yes	No	Yes
	Community evacuation procedures	No	Yes	No	Yes
	Communication with NTWC	Yes	Yes	No	Yes
	Communication with Local Government	Yes	Yes	No	Yes
	Media arrangements	Yes	Yes	No	Yes
Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	Yes	No	No	Yes	
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?		Yes		
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)				
	National DMOs	Telephone, Fax, Email, SMS, Siren			
	Local DMOs	Telephone, Fax, SMS, Siren			
	General Public	Telephone, SMS, Siren			
	Coastal Communities	Telephone, SMS, Siren			
Media	Telephone, Fax, SMS				
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Evacuation Infrastructure</b>					
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.				
	Evacuation shelter	No			
	Vertical evacuation structure	No			
	Natural or artificial hill for vertical evacuation	Yes			
	Evacuation signage	Yes			
Other (please specify)	No response Gwadar areas				
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?		Respondent skipped this question		

<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Tsunami Exercises</b>		
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	Village level, Community/Neighbourhood level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	No
	Inter-organization table top exercise	No
	National tsunami drill/exercise	Yes Three times
	Indian Ocean Wave exercise	No
	Local tsunami exercise	Yes Three times
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Leaflets or flyers, Posters
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	Yes Every year
	Global Disaster Risk Reduction Day	No
	Public tsunami preparedness outreach	No
	School and/or children awareness	Yes Occasionally
	Exhibitions	No
	Competitions or other ways of highlighting tsunami safety	No
Tsunami Exercise	Yes Three times	
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Provision of general tsunami awareness materials Customization of general materials to country or community,

		Development of tsunami awareness programmes, activities or campaigns
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	No
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	Respondent skipped this question
	Have designated and mapped tsunami hazard zones	
	Have a public display of tsunami information	
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	
	Develop and distribute outreach and public education materials	
	Hold at least three outreach or educational activities annually	
	Conduct an annual tsunami community exercise	
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	
	Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	
	Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	
	Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	

**PART V: Narrative**

<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.	
➔	Research is needed to investigate the potential of Makran Subduction zone.	
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements	
➔	PMD is currently working installation of equipment for better understanding of the Arabian Sea. PMD is developing mechanism for data sharing with neighboring countries like OMAN and UAE for better location and fast information.	
<b>Q100</b>	Upload Documents	Respondent skipped this question

NATIONAL REPORT OF SINGAPORE

PART I: Basic Information		
Q3	TNC Name:	Patricia Ee
Q4	Position:	Director, Weather Services Department
Q5	Organization	Meteorological Service Singapore
Q6	Telephone Number:	+65 6542 2863
Q7	E-mail Address:	Patricia_ee@nea.gov.sg
Q8	Fax Number:	+65 6545 7192
Q9	Postal Address:	P O Box 8, Singapore Changi Airport Singapore South Finger PTB II, Singapore 918141
Q10	NTWC Agency Name:	Meteorological Service Singapore
Q11	NTWC URL (web link) for tsunami warnings:	<a href="http://www.weather.gov.sg/warning-regional-seismic-information/">www.weather.gov.sg/warning-regional-seismic-information/</a>
Q12	NTWC Agency Contact or Officer in Charge (person):	Principal Meteorologist
Q16	Postal Address:	P O Box 8, Singapore Changi Airport Singapore South Finger PTB II, Singapore 918141
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes
Q24	TWFP 24x7 point of contact (office, operational unit or position, not a person)	Central Forecast Office
Q25	E-mail Address	MSS_CFO_Fcsters@nea.gov.sg
Q26	Telephone Number	+65 6542 5059
Q27	Cellular Telephone Number:	+65 8222 4285
Q28	Fax	+65 6545 5026

PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines		
Hazard Assessment		
Q29	4a) Has your country undertaken a hazard assessment?	Yes

<b>Q30</b>	4b) What type of hazard assessment has been carried out?	Single hazard assessment on tsunami AND multi-hazard assessment including tsunami	
<b>Q31</b>	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Earthquakes, Flooding	
<b>Q32</b>	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National Agency National / Local University	
	Please specify the name(s) of the agencies:	Meteorological Service Singapore	
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Level	
	Other (please specify):		
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	Whole of Singapore, including offshore islands	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Yes	No
	Seismo-tectonic model	Yes	No
	Topography	Yes	Yes
	Land Cover	Yes	Yes
	Infrastructure details	No	No
Other data used (please specify):			
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Deterministic Tsunami Hazard Analysis, Inundation map	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Good	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Low priority	
	Deterministic Tsunami Hazard Analysis	High priority	
	Field Studies on Tsunami Impacts	Low priority	
	Hazard map	Low priority	
	Inundation map	Low priority	
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?		

	Probabilistic Tsunami Hazard Assessment (PTHA)	No capacity
	Deterministic Tsunami Hazard Analysis	Moderate
	Field Studies on Tsunami Impacts	No capacity
	Hazard map	Moderate
	Inundation map	Moderate
	Evacuation map	No capacity
	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	Not provided
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	Yes
<b>Q41</b>	5b) What type of risk assessment?	Single risk assessment on tsunami AND multi-hazard risk assessment including tsunami
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Flooding
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	National Agency
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National Level
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	Singapore and offshore islands
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Low risk at coastal areas
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Risk map, Action Plan
	Other (please specify):	National Tsunami Response Plan
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Good
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	Low priority
	Tsunami risk assessment at regional level	Not a priority
	Tsunami risk assessment at city level	Not a priority
	Tsunami risk assessment at village level	Not a priority
	Tsunami risk assessment at community / neighbourhood level	Not a priority
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	



Tsunami risk assessment at national level	Good
Tsunami risk assessment at regional level	No capacity
Tsunami risk assessment at city level	No capacity
Tsunami risk assessment at village level	No capacity
Tsunami risk assessment at community / neighbourhood level	No capacity
Other (specify below)	No capacity

**PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines**

**Policies**

<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?		
	Prevention and mitigation	Standalone tsunami only	
	Preparedness	Standalone tsunami only	
	Emergency response	Standalone tsunami only	
	Rehabilitation and reconstruction	Multi hazard including tsunami	
	What is the name of policy? (if available):	National tsunami response plan	
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?		
	Prevention and mitigation	Policy is not available	
	Preparedness	Policy is not available	
	Emergency response	Policy is not available	
	Rehabilitation and reconstruction	Policy is not available	
	What is the name of policy? (if available):	National policy applies locally	

**PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines**

**Plans**

<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	Standalone tsunami only	Local plan is not available	Community plan is not available
	Preparedness	Standalone tsunami only	Local plan is not available	Community plan is not available
	Emergency response	Standalone tsunami only	Local plan is not available	Community plan is not available
	Rehabilitation and reconstruction	Multi hazard including tsunami	Local plan is not available	Community plan is not available
	What is the name of the plan(s) (if available):	National policy applies at local and community levels		

<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?	Yes
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Guidelines</b>		
<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?	
	Prevention and mitigation	Standalone tsunami guidelines
	Preparedness	Standalone tsunami guidelines
	Emergency response	Standalone tsunami guidelines
	Rehabilitation and reconstruction	Multi hazard guidelines including tsunami
	What is the name of guidelines? (if available):	Not provided
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?	
	Prevention and mitigation	Guidelines not available
	Preparedness	Guidelines not available
	Emergency response	Guidelines not available
	Rehabilitation and reconstruction	Guidelines not available
	What is the name of guidelines? (if available):	National guidelines apply locally

<b>PART III: Detection, Warning and Dissemination</b>		
<b>Detection and Warning</b>		
<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data Use own threat assessments
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	Meteorological Service Singapore
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell

		Phone, Fax, GTS (WMO Global Telecommunication System), UPS (Uninterruptable Power Supply)
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	National data, internet, seedlink, GSM
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	Yes
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	National links, GTS
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Yes
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	No other observing networks are operated by the country
	Please provide the Station Name/Location, email Contact of any other observing network operator (IOTWMS Secretariat will contact for more information)	
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	Yes
	Please specify the software tools used:	OTPAS (Operational Tsunami Prediction and Assessment System)
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	Yes

	Please specify the modelling tools and data used:	OTPAS
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	Large earthquake in South China Sea or along Sunda Arc (in Andaman Sea).
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-sessional period?	Verify against own detection data and hazard analysis, and convey information to response agencies for information or action
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes
	Please name the organisation(s) that participated in the exercise):	Meteorological Service Singapore
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	No
	Please indicate below your national response to each event:	
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc) disseminated within country? (select all that apply)	Email, SMS, Telephone, Fax, Webpage, Radio, Television, Public alert system
<b>Q79</b>	10b) How is the warning situation terminated?	Via the same modes used for dissemination of alerts/warnings
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	<a href="http://www.weather.gov.sg/warning-regional-seismic-information/">www.weather.gov.sg/warning-regional-seismic-information/</a>

<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>				
<b>Standard Operating Procedures</b>				
<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.			
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami	Is support required to develop Human Resources in this aspect of	Is support required to develop infrastructure for this

		emergency response in your SOP?	tsunami emergency response?	aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Yes	No	No
	Receiving information from the NTWC	Yes	No	No
	Response Criteria / decision making	Yes	No	No
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.			
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	Warning dissemination	Yes	No	No
	Evacuation call procedures	No	No	No
	Community evacuation procedures	No	No	No
	Communication with NTWC	Yes	No	No
	Communication with Local Government	No	No	No
	Media arrangements	Yes	No	No
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	Yes	No	No
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?		No	
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)			
	National DMOs	Telephone, Fax, Email, SMS, Siren		
	Local DMOs	Telephone, Fax, Email, SMS, Siren		
	General Public	Telephone, Fax, Email, SMS, Siren		
	Coastal Communities	Telephone, Fax, Email, SMS, Siren		
	Media	Telephone, Fax, Email		
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>				
<b>Evacuation Infrastructure</b>				

<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.	
	Evacuation shelter	No
	Vertical evacuation structure	No
	Natural or artificial hill for vertical evacuation	No
	Evacuation signage	No
	Other (please specify)	No
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Tsunami Exercises</b>		
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	Yes Once every two years
	Inter-organization table top exercise	Yes Once every two years
	National tsunami drill/exercise	Yes Once every two years
	Indian Ocean Wave exercise	Yes Once every two years
	Local tsunami exercise	Yes Once every two years
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Tsunami Warning Centre
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Other
	Other (please specify):	Website
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	No
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	No
	Global Disaster Risk Reduction Day	No

	Public tsunami preparedness outreach	No
	School and/or children awareness	No
	Exhibitions	No
	Competitions or other ways of highlighting tsunami safety	No
	Tsunami Exercise	No
	Other (Please specify)	No
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Respondent skipped this question
	Other (please specify):	
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No
	Please specify what type of support:	
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	No
	Please list the names	
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	Respondent skipped this question
	Have designated and mapped tsunami hazard zones	
	Have a public display of tsunami information	
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	
	Develop and distribute outreach and public education materials	
	Hold at least three outreach or educational activities annually	
	Conduct an annual tsunami community exercise	
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	
	Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	
	Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	
	Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	

<b>PART V: Narrative</b>	
<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.
<b>→</b>	Respondent skipped this question
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements
<b>→</b>	Upgrading central monitoring and processing system for collating, integrating, and assessing seismic and tsunami data
<b>Q100</b>	Upload Documents
	Respondent skipped this question



NATIONAL REPORT OF SOUTH AFRICA<sup>1</sup>

<b>PART I: Basic Information</b>		
<b>Q3</b>	TNC Name:	Dr Mmaphaka Tau
<b>Q4</b>	Position:	Deputy Director General
<b>Q5</b>	Organization	National Disaster Management Centre
<b>Q6</b>	Telephone Number:	0128484601
<b>Q7</b>	E-mail Address:	MmaphakaT@ndmc.gov.za
<b>Q8</b>	Fax Number:	+27 123676042
<b>Q9</b>	Postal Address:	Riverside Office Park, 1290 Heuvel Rd, Centurion Central, Centurion, 0046
<b>Q10</b>	NTWC Agency Name:	South African Weather Services
<b>Q11</b>	NTWC URL (web link) for tsunami warnings:	<a href="http://www.weathersa.co.za/">http://www.weathersa.co.za/</a>
<b>Q12</b>	NTWC Agency Contact or Officer in Charge (person):	Chief Forecaster: Disaster Risk Reduction (DRR) South African Weather Service
<b>Q16</b>	Postal Address:	Eco Glades block 1b, Eco Park, Cnr Olievenhoutbosch and Ribbon Grass Streets, Centurion, 0157, Private Bag X097 Pretoria 0001
<b>Q17</b>	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	No
<b>Q18</b>	TWFP Agency Name (if different from the NTWC Agency):	Same as NTWC
<b>Q23</b>	Postal Address:	Eco Glades block 1b, Eco Park, Cnr Olievenhoutbosch and Ribbon Grass Streets, Centurion, 0157, Private Bag X097 Pretoria 0001
<b>Q24</b>	TWFP 24x7 point of contact (office, operational unit or position, not a person):	SA Weather Services

**PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines**

<sup>1</sup> The report from South Africa was submitted after the regional analysis had been completed and therefore it was not possible to include their responses in the analysis. However, their national report is included in this supplement.

<b>Hazard Assessment</b>			
<b>Q29</b>	4a) Has your country undertaken a hazard assessment?	Yes	
<b>Q30</b>	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunami	
<b>Q31</b>	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Drought, Flooding	
	Other (please specify):	Windstorms and snow	
<b>Q32</b>	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National Agency	
	Please specify the name(s) of the agencies:	SA Weather Services and Council for Geoscience	
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	Regional Level	
	Other (please specify):	Not provided	
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	Eastern Coastal from Richards Bay to port Elizabeth with a focus on the ports and harbour areas. The percentage mapped in the first iteration of the hazard assessment was between 40-90 kilometres within each of the regional centres.	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Yes	Yes
	Seismo-tectonic model	No	Don't know
	Topography	Yes	Yes
	Land Cover	No	Yes
	Infrastructure details	Yes	Yes
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Hazard map, Inundation map	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Good	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Medium priority	
	Deterministic Tsunami Hazard Analysis	High priority	

	Field Studies on Tsunami Impacts	Medium priority
	Hazard map	High priority
	Inundation map	High priority
	Evacuation map	High priority
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	Poor
	Deterministic Tsunami Hazard Analysis	Poor
	Field Studies on Tsunami Impacts	Poor
	Hazard map	Moderate
	Inundation map	Moderate
	Evacuation map	Moderate
	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	Not provided
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	No
<b>Q41</b>	5b) What type of risk assessment?	Respondent skipped this question
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Respondent skipped this question
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	Respondent skipped this question
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Respondent skipped this question
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	Respondent skipped this question
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Respondent skipped this question
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Respondent skipped this question
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Good
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	Not provided
	Tsunami risk assessment at regional level	Essential
	Tsunami risk assessment at city level	High priority
	Tsunami risk assessment at village level	High priority

	Tsunami risk assessment at community / neighbourhood level	Low priority		
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?			
	Tsunami risk assessment at national level	Poor		
	Tsunami risk assessment at regional level	Poor		
	Tsunami risk assessment at city level	Poor		
	Tsunami risk assessment at village level	Poor		
	Tsunami risk assessment at community / neighbourhood level	Poor		
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Policies</b>				
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?			
	Prevention and mitigation	Policy is not available		
	Preparedness	Policy is not available		
	Emergency response	Policy is not available		
	Rehabilitation and reconstruction	Policy is not available		
	What is the name of policy? (if available):	Not provided		
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?			
	Prevention and mitigation	Policy is not available		
	Preparedness	Policy is not available		
	Emergency response	Policy is not available		
	Rehabilitation and reconstruction	Policy is not available		
	<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>			
<b>Plans</b>				
<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	Preparedness	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami

	Rehabilitation and reconstruction	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	What is the name of the plan(s) (if available):		Seasonal Contingency Plans Seasonal hazard Forecast	
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?		Yes	
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Guidelines</b>				
<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation		Guidelines not available	
	Preparedness		Guidelines not available	
	Emergency response		Guidelines not available	
	Rehabilitation and reconstruction		Guidelines not available	
	What is the name of guidelines? (if available):		Not provided	
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation		Guidelines not available	
	Preparedness		Guidelines not available	
	Emergency response		Guidelines not available	
	Rehabilitation and reconstruction		Guidelines not available	
	What is the name of guidelines? (if available):		Not provided	

<b>PART III: Detection, Warning and Dissemination</b>				
<b>Detection and Warning</b>				
<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?		Yes	
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)		Use TSP data	
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.		SA Weather Services	
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?		Yes	

<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, Satellite Phone, Fax, GTS (WMO Global Telecommunication System), UPS (Uninterruptable Power Supply)
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	Seismic Network operated by the Council for Geoscience in collaborations with other seismic monitoring networks such as NASA
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	Yes
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	WMO GTS
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Yes
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	Coastal radars
	Please provide the Station Name/Location, email Contact of any other observing network operator (IOTWMS Secretariat will contact for more information)	SA Weather services operates a series of coastal weather radars
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	No

<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	No
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	The threshold is based on magnitude as modelled for the eastern coastline of South Africa based on the hazard zone in the Indian Ocean. This was done in 2018 as part of the hazard assessment and modelling session in India (Hyderabad)
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-session period?	The NDMC, SA Weathers services and Council for Geoscience operate according to a SOP that specifies roles and responsibilities for each organisation including the communication of warnings and advisories.
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	SA Weather Services Council for Geosciences National Disaster Management Centre
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-session period?	Yes
	Please name the organisation(s) that participated in the exercise):	SA Weather Services Council for Geosciences National Disaster Management Centre
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	No
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc) disseminated within country? (select all that apply)	Email, SMS, Telephone, Webpage, Radio
	Other:	National Television
<b>Q79</b>	10b) How is the warning situation terminated?	A media statement is produced
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	There are no national websites. The organisations

	operating via the SOP use information from the other TSP websites (India, Australia, Indonesia).
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**PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness**

**Standard Operating Procedures**

<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?	
	24/7 Emergency Operation Centre (EOC)	No	Yes	Yes	Yes
	Receiving information from the NTWC	Yes	No	No	No
	Response Criteria / decision making	Yes	Yes	Yes	Yes
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?	
	Warning dissemination	Yes	No	No	No
	Evacuation call procedures	No	Yes	Yes	Yes
	Community evacuation procedures	No	Yes	Yes	Yes
	Communication with NTWC	Yes	No	No	No
	Communication with Local Government	Yes	No	No	No
	Media arrangements	Yes	Yes	No	No



	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	No	Yes	Yes	No
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?	Yes			
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)				
	National DMOs	Telephone, Fax, Email, SMS			
	Local DMOs	Telephone, Fax, Email, SMS			
	General Public	SMS			
	Coastal Communities	Telephone, Email, SMS			
	Media	Telephone, Email, SMS			
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Evacuation Infrastructure</b>					
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.				
	Evacuation shelter	No			
	Vertical evacuation structure	Yes Many coastal towns have high rise buildings that are close to the coastal areas and can be used to evacuate people.			
	Natural or artificial hill for vertical evacuation	Yes All three coastal regions have vertical evacuation based on the national topography of South Africa although the distances to these areas could vary			
	Evacuation signage	No			
	Other (please specify)	No response There is limited signage in each of the coastal regions for tsunami related warnings/ tsunami information etc.			
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	No			
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Tsunami Exercises</b>					
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National guidelines			

<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	Yes 2018 with three of the main organisations in the SOP
	Inter-organization table top exercise	Yes Once in 2018 with Transnet harbour authority
	National tsunami drill/exercise	No
	Indian Ocean Wave exercise	Yes annually
	Local tsunami exercise	No
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	Local Disaster Management Office
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Leaflets or flyers, Indigenous knowledge, folklore, or oral history accounts or compilations
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	No
	Global Disaster Risk Reduction Day	Yes Annually
	Public tsunami preparedness outreach	No
	School and/or children awareness	No
	Exhibitions	No
	Competitions or other ways of highlighting tsunami safety	No
	Tsunami Exercise	Yes Annually as part of the TSP tests
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Provision of general tsunami awareness materials Customization of general materials to country or community
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No

<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	No
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	Respondent skipped this question
	Have designated and mapped tsunami hazard zones	
	Have a public display of tsunami information	
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	
	Develop and distribute outreach and public education materials	
	Hold at least three outreach or educational activities annually	
	Conduct an annual tsunami community exercise	
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	
	Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	
	Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	
	Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	

<b>PART V: Narrative</b>		
<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.	
	<p>→ The NDMC, SA Weather Services and Council for Geoscience held joint meetings and briefing session post each tsunami related activity to perform three main activities that include the following:</p> <ol style="list-style-type: none"> <li>1) Consider new implications for the regional impact of tsunami</li> <li>2) factor new learnings from each exercise into the SOP to allow for improvement and clearer warnings procedures</li> <li>3) Update any relevant information</li> </ol>	
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements	
	<p>→</p> <ol style="list-style-type: none"> <li>1. Complete a full hazard mapping exercise with the relevant models that have impact for South Africa.</li> <li>2. Use the hazard mapping product to compile an indicative risk assessment for the coastal regions of SA.</li> <li>3. Workshop this product with other stakeholders and regional/ Provincial Disaster Management Centres (PDMC's).</li> <li>4. Improve the SOP to include new information</li> </ol>	

<b>Q100</b>	Upload Documents	Respondent skipped this question
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PART I: Basic Information		
Q3	TNC Name:	Dr. S.Amalanathan
Q4	Position:	Director General
Q5	Organization	Disaster Management Center
Q6	Telephone Number:	+94 773957896
Q7	E-mail Address:	dg@dmc.gov.lk
Q8	Fax Number:	+94 112670071
Q9	Postal Address:	Disaster Management Center Vidya Mawataha Colombo, Colombo 07, Sri Lanka.
Q10	NTWC Agency Name:	Department of Meteorology
Q11	NTWC URL (web link) for tsunami warnings:	www.meteo.gov.lk
Q12	NTWC Agency Contact or Officer in Charge (person):	Director
Q16	Postal Address:	Department of Meteorology, 383, Baudhaloka Mawatha, Colombo -7, Sri Lanka
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency?  <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes
Q24	TWFP 24x7 point of contact (office, operational unit or position, not a person):	Director General

PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines		
Hazard Assessment		
Q29	4a) Has your country undertaken a hazard assessment?	Yes
Q30	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunami
Q31	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclone, Drought, Earthquakes, Epidemics, Flooding, Landslide,
	Other (please specify):	Tsunami, Cyclone, Drought, Landslide, coastal erosion, lightning etc.

<b>Q32</b>	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National / International Consultant, National Agency	
	Please specify the name(s) of the agencies:	DMC with all the relevant technical agencies DOM, ID, NARA, GSMB, Health Ministry, NBRO with the support of UNDP	
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Level, Village Level	
	Other (please specify):	National, District and GN level	
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	All 14 coastal districts with the scale of high, moderate and low inundation and proximity analysis	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Yes	Don't know
	Seismo-tectonic model	Not provided	Not provided
	Topography	Yes	Don't know
	Land Cover	Not provided	Not provided
	Infrastructure details	Yes	Don't know
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Probabilistic Tsunami Hazard Assessment (PTHA), Field Studies on Tsunami Impacts, Hazard map, Inundation map, Evacuation map	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Poor	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Essential	
	Deterministic Tsunami Hazard Analysis	High priority	
	Field Studies on Tsunami Impacts	High priority	
	Hazard map	Essential	
	Inundation map	Essential	
	Evacuation map	Essential	
	What other areas of capacity in tsunami hazard assessment require improvement?	Needed to develop guideline to conduct such assessments at national district and GN levels	
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Poor	

	Deterministic Tsunami Hazard Analysis	Poor
	Field Studies on Tsunami Impacts	Poor
	Hazard map	Moderate
	Inundation map	Moderate
	Evacuation map	Poor
	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	Not provided
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	No
<b>Q41</b>	5b) What type of risk assessment?	Respondent skipped this question
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Respondent skipped this question
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	Respondent skipped this question
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Respondent skipped this question
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	Respondent skipped this question
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Respondent skipped this question
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Respondent skipped this question
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Poor
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	High priority
	Tsunami risk assessment at regional level	Medium priority
	Tsunami risk assessment at city level	Essential
	Tsunami risk assessment at village level	Essential
	Tsunami risk assessment at community / neighbourhood level	Essential
	What other areas of capacity in tsunami hazard assessment require improvement?	Conduct risk assessments at National district and GN levels with a standard guideline and Format

<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?			
	Tsunami risk assessment at national level	Poor		
	Tsunami risk assessment at regional level	Poor		
	Tsunami risk assessment at city level	Poor		
	Tsunami risk assessment at village level	Poor		
	Tsunami risk assessment at community / neighbourhood level	Poor		
	Other (specify below)	Poor		
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Policies</b>				
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?			
	Prevention and mitigation	Multi hazard including tsunami		
	Preparedness	Multi hazard including tsunami		
	Emergency response	Multi hazard including tsunami		
	Rehabilitation and reconstruction	Multi hazard including tsunami		
	What is the name of policy? (if available):	Disaster Management Act No 13 of 2005 and Disaster Management policy		
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?			
	Prevention and mitigation	Multi hazard including tsunami		
	Preparedness	Multi hazard including tsunami		
	Emergency response	Multi hazard including tsunami		
	Rehabilitation and reconstruction	Multi hazard including tsunami		
	<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>			
<b>Plans</b>				
<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	National plan is not available	Local plan is not available	Community plan is not available
	Preparedness	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami



	Rehabilitation and reconstruction	National plan is not available	Local plan is not available	Community plan is not available
	What is the name of the plan(s) (if available):		What is the name of the plan(s) (if available): Disaster Management plans	
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?		Yes	
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Guidelines</b>				
<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation		Guidelines not available	
	Preparedness		Multi hazard guidelines including tsunami	
	Emergency response		Multi hazard guidelines including tsunami	
	Rehabilitation and reconstruction		Guidelines not available	
	What is the name of guidelines? (if available):		Disaster preparedness plans, response plans and guidelines	
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation		Guidelines not available	
	Preparedness		Multi hazard guidelines including tsunami	
	Emergency response		Multi hazard guidelines including tsunami	
	Rehabilitation and reconstruction		Guidelines not available	
	What is the name of guidelines? (if available):		Disaster preparedness plans, response plans and guidelines	

<b>PART III: Detection, Warning and Dissemination</b>		
<b>Detection and Warning</b>		
<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	Department of Meteorology

<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, Fax, GTS (WMO Global Telecommunication System), UPS (Uninterruptable Power Supply)
	Please specify any other infrastructure:	Not provided
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	California Integrated Seismic Network (CISN), USGS Network
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	Yes
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	NDBC DART Programme
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Yes
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	
	Please provide the Station Name/Location, email Contact of any other observing network operator (IOTWMS Secretariat will contact for more information)	No other observing networks are operated by the country

<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	Yes
	Please specify the software tools used:	SeisComP3
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	Yes
	Please specify the modelling tools and data used:	ComMIT model / local or remote databases
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	<p>&lt; 6.5M - Information          6.5 &lt; M &lt; 7.5 - Information (if it is threat - Watch)          7.0 &lt; M &lt; 7.5 - Watch / Alert / Warning          7.6 &lt; M &lt; 7.8 - Alert / Warning          7.8 &lt; M - Warning</p> <p>Color code Information - white          Watch - yellow Alert - amber          Warning - red</p>
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-sessional period?	<p>1.NTWC is able to run ComMIT model for the construction of tsunami inundation maps          2.Those information is able to provide NDMC authorities</p>
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	Department of Meteorology, Sri Lanka
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes
	Please name the organisation(s) that participated in the exercise):	Department of Meteorology, Sri Lanka Disaster Management Centre, Sri Lanka
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	
	Please indicate below your national response to each event:	No
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc) disseminated within country? (select all that apply)	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social, media, Sirens, Television, Warning towers, Megaphone,

		Police/military, Public alert system, VHF radio
<b>Q79</b>	10b) How is the warning situation terminated?	Issuing tsunami threat clear message
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	<a href="http://www.meteo.gov.lk">www.meteo.gov.lk</a> ; <a href="http://www.dmc.gov.lk">www.dmc.gov.lk</a>

**PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness**

**Standard Operating Procedures**

<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Yes	Yes	Yes	Yes
	Receiving information from the NTWC	Yes	Yes	Yes	Yes
	Response Criteria / decision making	Yes	Yes	Yes	Yes
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	Warning dissemination	Yes	Yes	Yes	Yes
	Evacuation call procedures	Yes	Yes	Yes	Yes
	Community evacuation procedures	Yes	Yes	Yes	Yes
	Communication with NTWC	Yes	Yes	Yes	Yes
	Communication with Local Government	Yes	Yes	Yes	Yes
	Media arrangements	Yes	Yes	Yes	Yes
	Communication with other stakeholder i.e. Red Cross,	Yes	Yes	Yes	Yes

	Fire Brigade, Search and Rescue, Police, Army, Navy etc.				
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?	Yes			
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)				
	National DMOs	Telephone, Fax, Email			
	Local DMOs	Telephone, Fax, Email			
	General Public	SMS, Siren, Other			
	Coastal Communities	SMS, Siren, Other			
	Media	Telephone, Fax, Email, Other			
	Other communication methods (please specify)	Via websites & Social media (Facebook)			
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Evacuation Infrastructure</b>					
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.				
	Evacuation shelter	Yes			
	Vertical evacuation structure	Yes			
	Natural or artificial hill for vertical evacuation	Yes			
	Evacuation signage	Yes			
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes			
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Tsunami Exercises</b>					
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National guidelines			
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level, Village level, Community/Neighbourhood level, School level			
	Other (please specify):	National, district, divisional and GN level also hospital and school drills			
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?				
	Organization table top exercise	Yes 1			
	Inter-organization table top exercise	Yes 1			
	National tsunami drill/exercise	Yes 1			

	Indian Ocean Wave exercise	Yes This time
	Local tsunami exercise	Yes 100 drills
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Leaflets or flyers, Posters, Booklets, Information boards, Tsunami Signage, Video, or other visual or oral media, Indigenous knowledge, folklore, or oral history accounts or compilations, Teaching kits on tsunamis, School curricula, Public Evacuation Map
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	Yes 2017
	Global Disaster Risk Reduction Day	No
	Public tsunami preparedness outreach	Yes 26 December every year
	School and/or children awareness	Yes
	Exhibitions	Yes
	Competitions or other ways of highlighting tsunami safety	Yes
	Tsunami Exercise	Yes
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Customization of general materials to country or community, Development of tsunami awareness programmes, activities or campaigns, Participation/support by international agencies or experts to your country's activities
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	Yes
	Please specify what type of support:	DMC can support
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	Respondent skipped this question

<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	2 (Poor)
	Have designated and mapped tsunami hazard zones	3 (Fair)
	Have a public display of tsunami information	3 (Fair)
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	3 (Fair)
	Develop and distribute outreach and public education materials	3 (Fair)
	Hold at least three outreach or educational activities annually	4 (Good)
	Conduct an annual tsunami community exercise	4 (Good)
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	3 (Fair)
	Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	1 (Very poor)
	Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	4 (Good)
	Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	4 (Good)

**PART V: Narrative**

<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.
➔	DMC has developed the hazard profile of Sri Lanka and established 24/7 EOC and EW system also all the districts having Disaster Management plans and operation plans
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements
➔	EOC have their own SOPs and National Emergency Operation Plan is finalized there we have all the roles and responsibilities of Stakeholder agencies before, during and after a disaster Hazard wise and scenario wise. based on the NEOP Tsunami risk assessment have to completed and also sectoral SOPs have to be developed
<b>Q100</b>	Upload Documents
	Respondent skipped this question

NATIONAL REPORT OF TANZANIA

PART I: Basic Information		
Q3	TNC Name:	Respondent skipped this question
Q4	Position:	Respondent skipped this question
Q5	Organization	Respondent skipped this question
Q6	Telephone Number:	Respondent skipped this question
Q7	E-mail Address:	Respondent skipped this question
Q8	Fax Number:	Respondent skipped this question
Q9	Postal Address:	Respondent skipped this question
Q10	NTWC Agency Name:	Respondent skipped this question
Q11	NTWC URL (web link) for tsunami warnings:	Respondent skipped this question
Q12	NTWC Agency Contact or Officer in Charge (person):	Respondent skipped this question
Q16	Postal Address:	Respondent skipped this question
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes
Q18	TWFP Agency Name (if different from the NTWC Agency):	Respondent skipped this question
Q20	Position:	Respondent skipped this question
Q23	Postal Address:	Respondent skipped this question
Q24	TWFP 24x7 point of contact (office, operational unit or position, not a person):	Respondent skipped this question

PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines		
Hazard Assessment		
Q29	4a) Has your country undertaken a hazard assessment?	Yes
Q30	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunami
Q31	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclone, Drought, Flooding
Q32	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National / Local University



	Please specify the name(s) of the agencies:	Not provided
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	Regional Level
	Other (please specify):	Not provided
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	Respondent skipped this question
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.	
		Was this data used for tsunami hazard assessment?
		Is this data publicly available?
	Bathymetry	Don't know
	Seismo-tectonic model	Yes
	Topography	Don't know
	Land Cover	Yes
	Infrastructure details	Yes
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Field Studies on Tsunami Impacts, Hazard map
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Good
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	Medium priority
	Deterministic Tsunami Hazard Analysis	Medium priority
	Field Studies on Tsunami Impacts	High priority
	Hazard map	High priority
	Inundation map	High priority
	Evacuation map	Essential
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	Moderate
	Deterministic Tsunami Hazard Analysis	Moderate
	Field Studies on Tsunami Impacts	Good
	Hazard map	Good
	Inundation map	Good
	Evacuation map	Very good

	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	Yes
<b>Q41</b>	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Drought, Flooding
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	National/local University
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Regional Level
	Other (please specify):	Not provided
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	Respondent skipped this question
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Respondent skipped this question
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Guidelines Action Plan
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Fair
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	High priority
	Tsunami risk assessment at regional level	High priority
	Tsunami risk assessment at city level	High priority
	Tsunami risk assessment at village level	High priority
	Tsunami risk assessment at community / neighbourhood level	High priority
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	
	Tsunami risk assessment at national level	Good
	Tsunami risk assessment at regional level	Good
	Tsunami risk assessment at city level	Good
	Tsunami risk assessment at village level	Moderate
	Tsunami risk assessment at community / neighbourhood level	Moderate
	Other (specify below)	

<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Policies</b>				
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?			
	Prevention and mitigation	Multi hazard including tsunami		
	Preparedness	Multi hazard including tsunami		
	Emergency response	Multi hazard including tsunami		
	Rehabilitation and reconstruction	Multi hazard including tsunami		
	What is the name of policy? (if available):	Not provided		
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?			
	Prevention and mitigation	Multi hazard including tsunami		
	Preparedness	Multi hazard including tsunami		
	Emergency response	Multi hazard including tsunami		
	Rehabilitation and reconstruction	Multi hazard including tsunami		
	<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>			
<b>Plans</b>				
<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	National plan is not available	Local plan is not available	Community plan is not available
	Preparedness	National plan is not available	Local plan is not available	Community plan is not available
	Emergency response	National plan is not available	Local plan is not available	Community plan is not available
	Rehabilitation and reconstruction	National plan is not available	Local plan is not available	Community plan is not available
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?		Yes	
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Guidelines</b>				
<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation	Multi hazard guidelines including tsunami		
	Preparedness	Multi hazard guidelines including tsunami		

	Emergency response	Multi hazard guidelines including tsunami
	Rehabilitation and reconstruction	Multi hazard guidelines including tsunami
	What is the name of guidelines? (if available):	Not provided
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?	
	Prevention and mitigation	Multi hazard guidelines including tsunami
	Preparedness	Multi hazard guidelines including tsunami
	Emergency response	Multi hazard guidelines including tsunami
	Rehabilitation and reconstruction	Multi hazard guidelines including tsunami
	What is the name of guidelines? (if available):	Not provided

<b>PART III: Detection, Warning and Dissemination</b>		
<b>Detection and Warning</b>		
<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	Respondent skipped this question
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, Fax, GTS (WMO Global Telecommunication System), UPS (Uninterruptable Power Supply)
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	Not provided
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic	Yes

	database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	Not provided
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Respondent skipped this question
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	No other observing networks are operated by the country
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	No
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	Yes
	Please specify the modelling tools and data used:	Not provided
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	Respondent skipped this question
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-sessional period?	Respondent skipped this question
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	Not provided
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes

	Please name the organisation(s) that participated in the exercise):	Not provided
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	Yes
	Please indicate below your national response to each event:	Not provided
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc) disseminated within country? (select all that apply)	Email, Telephone, Fax, Webpage, Radio, Television, Police/military, Public alert system
<b>Q79</b>	10b) How is the warning situation terminated?	Respondent skipped this question
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	Respondent skipped this question

<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>				
<b>Standard Operating Procedures</b>				
<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.			
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Yes	Yes	Yes
	Receiving information from the NTWC	Yes	Yes	Yes
	Response Criteria / decision making	Yes	Yes	Yes
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.			
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency	Is support required to develop Human Resources in this aspect of tsunami	Is support required to develop infrastructure for this aspect of tsunami

		response in your SOP?	emergency response?	emergency response?
Warning dissemination	Yes	Yes	Yes	Yes
Evacuation call procedures	Yes	Yes	Yes	Yes
Community evacuation procedures	Yes	Yes	Yes	Yes
Communication with NTWC	Yes	Yes	Yes	Yes
Communication with Local Government	Yes	Yes	Yes	Yes
Media arrangements	Yes	Yes	Yes	Yes
Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	Yes	Yes	Yes	Yes
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?		Yes	
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)			
	National DMOs		Telephone, Fax, Email	
	Local DMOs		Telephone, Fax, Email	
	General Public		Telephone, Fax, Email	
	Coastal Communities		Siren	
	Media		Telephone, Fax, Email	
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>				
<b>Evacuation Infrastructure</b>				
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.			
	Evacuation shelter		Respondent skipped this question	
	Vertical evacuation structure			
	Natural or artificial hill for vertical evacuation			
	Evacuation signage			
	Other (please specify)			
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?		Respondent skipped this question	
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>				
<b>Tsunami Exercises</b>				
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)		National policy	
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)		City level	

<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	Yes
	Inter-organization table top exercise	Yes
	National tsunami drill/exercise	No
	Indian Ocean Wave exercise	Yes
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Leaflets or flyers, Video, or other visual or oral media
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	Not provided
	Global Disaster Risk Reduction Day	Yes
	Public tsunami preparedness outreach	Not provided
	School and/or children awareness	No
	Exhibitions	Not provided
	Competitions or other ways of highlighting tsunami safety	Not provided
	Tsunami Exercise	Not provided
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Provision of general tsunami awareness materials Development of tsunami awareness programmes, activities or campaigns, Participation/support by international agencies or experts to your country's activities
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	Yes
	Please specify what type of support:	Not provided
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	No
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	3 (Fair)
	Have designated and mapped tsunami hazard zones	3 (Fair)
	Have a public display of tsunami information	3 (Fair)



Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	3 (Fair)
Develop and distribute outreach and public education materials	4 (Good)
Hold at least three outreach or educational activities annually	4 (Good)
Conduct an annual tsunami community exercise	4 (Good)
Address tsunami hazards in the community's Emergency Operations Plan (EOP)	4 (Good)
Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	Not provided
Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	Not provided
Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	Not provided

<b>PART V: Narrative</b>	
<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.
→	Not provided
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements
→	Not provided
<b>Q100</b>	Upload Documents
	Respondent skipped this question

NATIONAL REPORT OF THAILAND

PART I: Basic Information		
Q3	TNC Name:	Mr.Chayabol Thitisak
Q4	Position:	Director-General
Q5	Organization	Department of Disaster Prevention and Mitigation
Q6	Telephone Number:	662-243-5279, 662-637-366
Q7	E-mail Address:	foreign_dpm@yahoo.com
Q8	Fax Number:	662-243-5279
Q9	Postal Address:	3/12 U-Thong Nok Rd., Dusit, Bangkok, 10300, Thailand
Q10	NTWC Agency Name:	National Disaster Warning Center
Q11	NTWC URL (web link) for tsunami warnings:	<a href="http://122.155.1.141/in.ndwc-9.283/">http://122.155.1.141/in.ndwc-9.283/</a>
Q12	NTWC Agency Contact or Officer in Charge (person):	Director of National Disaster Warning Center
Q16	Postal Address:	3/12 U-Thong Nok Rd., Dusit, Bangkok, 10300, Thailand
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes

PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines		
Hazard Assessment		
Q29	4a) Has your country undertaken a hazard assessment?	Yes
Q30	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunami
Q31	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclone, Drought, Earthquakes, Flooding, Landslide
Q32	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National Agency, International Agency, National / Local University, National / International Consultant

	Please specify the name(s) of the agencies:	1. Department of Mineral Resources 2. The Thai Meteorological Department 3. Department of Marine and Coastal Resources 4. Department of Fisheries 5. Department of Disaster Prevention and Mitigation 6. Chulalongkorn University 7. Burapha university 8. Kasetsart university 9. Prince of Songkla University 10.UNISDR 11.ADPC
<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Level, City Level, Village Level
	Other (please specify):	Local Level
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	<p>Thailand Tsunami hazard</p> <p>There are 509 tsunami hazard places in 6 provinces along Andaman sea 102 sub-districts and 27 Districts.</p> <p>1.Krabi Province 5 Districts below</p> <ul style="list-style-type: none"> <li>• Ao Luk</li> <li>• Muang Krabi</li> <li>• Nuea Khlong</li> <li>• Khlong Thom</li> <li>• Muang Krabi</li> </ul> <p>2. Trang Province 5 Districts below</p> <ul style="list-style-type: none"> <li>• Yan Takhao</li> <li>• Si Kao</li> <li>• Kantang</li> <li>• Pa Lian</li> <li>• Hat Samran</li> </ul> <p>3. Phang Nga Province 7 Districts below</p> <ul style="list-style-type: none"> <li>• Khura Buri</li> <li>• Ta Kua Pa</li> <li>• Ta Kua Thung</li> <li>• Thai Muang</li> <li>• Thap Put</li> <li>• Muang Phang Nga</li> <li>• Ko Yao</li> </ul> <p>4.Phuket Province 3 Districts below</p> <ul style="list-style-type: none"> <li>• Tha Lang</li> <li>• Muang Phuket</li> <li>• Krathu</li> </ul> <p>5.Ranong Province 3 Districts below</p> <ul style="list-style-type: none"> <li>• Kapoe</li> <li>• Suk Samran</li> <li>• Muang Ranong</li> </ul> <p>6.Satun Province 4 Districts below</p> <ul style="list-style-type: none"> <li>• Tha Phae</li> <li>• Thung Wa</li> <li>• Langu</li> <li>• Muang Satun</li> </ul> <p>There are 907 tsunami hazard places (in low risk) in 16 provinces along the Gulf of Thailand (Pacific Ocean) 222 sub-districts and 70 districts.</p>

		An approximation of the percentage mapped is 100%	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Yes	No
	Seismo-tectonic model	Yes	No
	Topography	Yes	No
	Land Cover	Yes	Yes
	Infrastructure details	Yes	Yes
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Probabilistic Tsunami Hazard Assessment (PTHA), Deterministic Tsunami Hazard Analysis, Field Studies on Tsunami Impacts, Hazard map, Inundation map, Evacuation map, Guidelines (please specify below)	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Fair	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	High priority	
	Deterministic Tsunami Hazard Analysis	High priority	
	Field Studies on Tsunami Impacts	High priority	
	Hazard map	High priority	
	Inundation map	Essential	
	Evacuation map	Essential	
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Moderate	
	Deterministic Tsunami Hazard Analysis	Moderate	
	Field Studies on Tsunami Impacts	Moderate	
	Hazard map	Moderate	
	Inundation map	Moderate	
	Evacuation map	Moderate	
	Please provide the name(s) and contact detail(s) of any individuals /	1.Geoinformatics Center, Asian Institute of Technology (AIT) 2. School of Engineering & Technology, AIT 3.Civil Engineering, Chulalongkorn	

	institutions in your country that could provide this training / consultancy	University 4.Climate Change and Disaster Center,Rangsit University 5.the Andaman Coastal Research Station for Development, Kasetsart University 6.Faculty of Science, Kasetsart University, Sriracha and Bang Khen 7.Faculty of Science, Chulalongkorn University
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	Yes
<b>Q41</b>	5b) What type of risk assessment?	Single risk assessment on tsunami AND multi-hazard risk assessment including tsunami
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Drought, Earthquakes, Epidemics, Flooding, Landslide
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	National Agency, International Agency, National/local University, National/International Consultant
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National Level, Regional Level, City Level, Village Level, Community / Neighbourhood Level
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	Respondent skipped this question
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Respondent skipped this question
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Risk map, Evacuation map, Guidelines (please specify below), Action Plan (please specify below)
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	Good
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	Essential
	Tsunami risk assessment at regional level	Medium priority
	Tsunami risk assessment at city level	Essential
	Tsunami risk assessment at village level	Essential
	Tsunami risk assessment at community / neighbourhood level	Essential
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	

	Tsunami risk assessment at national level	Moderate		
	Tsunami risk assessment at regional level	Moderate		
	Tsunami risk assessment at city level	Moderate		
	Tsunami risk assessment at village level	Moderate		
	Tsunami risk assessment at community / neighbourhood level	Moderate		
	Other (specify below)	Moderate		
	Please give the names of any individuals / institutions in your country that could provide this training / consultancy	Asian Disaster Preparedness Center (ADPC) Department of Disaster Prevention and Mitigation, Ministry of Interior Thailand		
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Policies</b>				
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?			
	Prevention and mitigation	Standalone tsunami only		
	Preparedness	Standalone tsunami only		
	Emergency response	Standalone tsunami only		
	Rehabilitation and reconstruction	Multi hazard including tsunami		
	What is the name of policy? (if available):	Tsunami Prevention and Mitigation Master Plan (2015-2019)		
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?			
	Prevention and mitigation	Standalone tsunami only		
	Preparedness	Standalone tsunami only		
	Emergency response	Multi hazard including tsunami		
	Rehabilitation and reconstruction	Multi hazard including tsunami		
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Plans</b>				
<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	Standalone tsunami only	Standalone tsunami only	Standalone tsunami only

	Preparedness	Standalone tsunami only	Multi hazard including tsunami	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	Rehabilitation and reconstruction	Multi hazard including tsunami	Multi hazard including tsunami	Multi hazard including tsunami
	What is the name of the plan(s) (if available):		1.Tsunami Risk Mitigation Strategy for Thailand, 2.Disaster Risk Reduction, 3.Risk Reduction from Geo hazard : Tsunami 4. Emergency action plan and Incident Plan are in the process	
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?		Yes	
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Guidelines</b>				
<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation	Standalone tsunami guidelines		
	Preparedness	Standalone tsunami guidelines		
	Emergency response	Multi hazard guidelines including tsunami		
	Rehabilitation and reconstruction	Multi hazard guidelines including tsunami		
	What is the name of guidelines? (if available):		1. Tsunami Risk Mitigation Strategy for Thailand, 2. Disaster Risk Reduction, 3. Risk Reduction from Geo hazard: Tsunami 4. National disaster Risk Management Plan (2015) (for guideline)	
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation	Standalone tsunami guidelines		
	Preparedness	Standalone tsunami guidelines		
	Emergency response	Multi hazard guidelines including tsunami		
	Rehabilitation and reconstruction	Multi hazard guidelines including tsunami		
	What is the name of guidelines? (if available):		Guideline for Tsunami preparation	

**PART III: Detection, Warning and Dissemination**

**Detection and Warning**

<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data, Use own threat assessments
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	National Disaster Warning Center
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, Fax, GTS (WMO Global Telecommunication System), UPS (Uninterruptable Power Supply)
	Please specify any other infrastructure:	Broadcast alert system
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	Respondent skipped this question
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	Yes
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your	Some stations have been added



	country (Check all that apply and include details in the comments section below)	
	Please indicate which stations have been decommissioned or added, including the Station Name/Location, email Contact of the Station Operator (IOTWMS Secretariat will contact for more information).	The stations are private and not shared
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	Hydrographics Department, Royal Thai Navy <a href="http://www.ioc-sealevelmonitoring.org/">http://www.ioc-sealevelmonitoring.org/</a> <a href="http://www.gts.tmd.go.th">www.gts.tmd.go.th</a>
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Yes
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	Coastal radars (please specify below)
	Please provide the Station Name/Location, email Contact of any other observing network operator (IOTWMS Secretariat will contact for more information)	DART Buoys Coastal radars: Krabi Province Muang and Lanta Districts
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	No
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	Yes
	Please specify the modelling tools and data used:	WINITDB; TUNAMI, TSUCAT

<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	<p>Advisory: An Earthquake occurred in Andaman Sea Magnitude 5.0-6.5 off the Andaman coast, Thailand. A Tsunami is not EXPECTED</p> <p>WATCH: An Earthquake occurred in Andaman Sea Magnitude 6.6-7.7 off the Andaman coast of Thailand. A potential Tsunami may have been generated. Prepare to evacuate persons to higher ground &amp; follow further information.</p> <p>WARNING: An Earthquake occurred in Andaman Sea Magnitude above 7.8 off the Andaman coast of Thailand. A destructive Tsunami may have been generated and Estimate the severity of the threat. Authorities should take appropriate action in response to this possibility &amp; follow further information.</p> <p>TERMINATE: An Earthquake occurred in Andaman Sea Magnitude above 7.8 off the Andaman coast of Thailand. There is no longer A Destructive Tsunami threat to the coast, Thailand. Therefore the tsunami warning for Thailand is cancelled.</p>
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-sessional period?	Analyzing the information and updating the situation to the public and decision makers
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	Yes
	Please name the organisation(s) that participated:	National Disaster Warning Center
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes
	Please name the organisation(s) that participated in the exercise):	National Disaster Warning Center, Local Disaster Management Office :LDMO Sai Thai District, Krabi Province
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	No

	Please indicate below your national response to each event:	
<b>PART III: Detection, Warning and Dissemination</b>		
<b>Dissemination</b>		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc.) disseminated within country? (select all that apply)	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social, media, Sirens, Television, Warning towers, Public alert system, VHF radio
	Other:	Broadcast Alert System
<b>Q79</b>	10b) How is the warning situation terminated?	2 hours after the last tsunami wave pass or There is no longer A Destructive Tsunami threat to the coast, Thailand. Therefore, the tsunami warning for Thailand is cancelled
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	<a href="http://122.155.1.141/in.ndwc-9.283/">http://122.155.1.141/in.ndwc-9.283/</a>

<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>				
<b>Standard Operating Procedures</b>				
<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.			
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Yes	Yes	Yes
	Receiving information from the NTWC	Yes	Yes	Yes
	Response Criteria / decision making	Yes	Yes	Yes
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.			
	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?

	Warning dissemination	Yes	Yes	Yes	Yes
	Evacuation call procedures	Yes	Yes	Yes	Yes
	Community evacuation procedures	Yes	Yes	Yes	Yes
	Communication with NTWC	Yes	Yes	Yes	Yes
	Communication with Local Government	Yes	Yes	Yes	Yes
	Media arrangements	Yes	Yes	Yes	Yes
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	Yes	Yes	Yes	Yes
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?	Yes			
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)				
	National DMOs	Fax, Email, SMS, Siren, Other (please specify below), Telephone			
	Local DMOs	Telephone, Fax, Email, SMS, Siren, Other (please specify below)			
	General Public	Siren, Other (please specify below)			
	Coastal Communities	Siren, Other (please specify below)			
	Media	Telephone, Fax, Email, SMS, Other (please specify below)			
	Other communication methods (please specify)	Social Media, Website, Radio, Applications and Broadcast Alert System			
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Evacuation Infrastructure</b>					
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.				
	Evacuation shelter	Yes There are 233 Evacuation shelters in 6 provinces 1. Krabi Province (30) 2. Trang Province (40) 3. Phang Nga Province			
	Vertical evacuation structure	Yes 1. Krabi Province 2. Trang Province 3. Phang Nga Province 4. Phuket Province 5. Ranong Province 6. Satun Province			

	Natural or artificial hill for vertical evacuation	Yes 1. Krabi Province 2. Trang Province 3. Phang Nga Province 4. Phuket Province 5. Ranong Province 6. Satun Province
	Evacuation signage	Yes 1. Krabi Province 2. Trang Province 3. Phang Nga Province 4. Phuket Province 5. Ranong Province 6. Satun Province
	Other (please specify)	No
<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Tsunami Exercises</b>		
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level, Regional level, Community/Neighbourhood level
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	Yes, many
	Inter-organization table top exercise	No
	National tsunami drill/exercise	Yes, 1
	Indian Ocean Wave exercise	Yes, 5
	Local tsunami exercise	Yes, many
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	Many organizations such as NDMO, LDMO, NTWC and international organizations
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Leaflets or flyers, Posters, Booklets, Information boards, Tsunami Signage, Video, or other visual or oral media, Indigenous knowledge, folklore, or oral history accounts or compilations, School curricula
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	Yes, 2
	Global Disaster Risk Reduction Day	Yes, many

	Public tsunami preparedness outreach	Yes, many
	School and/or children awareness	Yes, many
	Exhibitions	Yes, many
	Competitions or other ways of highlighting tsunami safety	No
	Tsunami Exercise	Yes, many
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Provision of general tsunami awareness materials, Customization of general materials to country or community, Development of tsunami awareness programmes, activities or campaigns, Participation/support by international agencies or experts to your country's activities
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	Yes
	Please specify what type of support:	Experts, materials, training, consultant
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	No
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	
	Have a community tsunami risk reduction plan	Respondent skipped this question
	Have designated and mapped tsunami hazard zones	
	Have a public display of tsunami information	
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	
	Develop and distribute outreach and public education materials	
	Hold at least three outreach or educational activities annually	
	Conduct an annual tsunami community exercise	
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	
	Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	
	Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	
	Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	

**PART V: Narrative**

<p><b>Q98</b></p>	<p>14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.</p>
<p>→</p>	<p>Thailand Tsunami Early Warning System</p> <p>National Disaster Warning Center (NDWC), NTWC is operating 24 hours under the supervision of Department of Disaster Prevention and Mitigation (DDPM), NDMO, Ministry of Interior. NDWC has its responsibility in planning, coordinating, controlling, implementing and preparing the national warning systems and equipment for issue tsunami early warning and evacuation in the role of warning operation part under central emergency operation center that the Director General is a commander. NDWC receives earthquake information from TMD national responsible for seismic evaluations and receives Sea level information from Hydrographic Department of the Royal Thai Navy.</p> <p>Global Telecommunications System: GTS fully operational to TMD and NDWC. There is also provide the information from Indian Ocean and Pacific Ocean.</p> <p>The standard operation procedure of NDWC for earthquake in the sea will analyse situation within 5 minutes after the earthquake occurs. Then disseminate warning message in the risk area via fax, email, SMS, Line application, website and broadcast alert system (On Digital Television Channels and Radio Stations) including the warning tower.</p> <p>Earthquake Observation Division Thai Meteorological Department (TMD) is operating 24 hours to monitoring seismic network in Thailand and Outside Thailand. TMD has been developing estimate time of arrival for tsunami model including generated shake map and evaluated Focal mechanism. Moreover, TMD has also increases seismic network around the country.</p> <p>Tsunami Public and Community Awareness and Preparedness</p> <p>LDMO along Andaman Provinces have the tsunami exercised by themselves very regular with some support from NDMO.</p> <p>Tsunami evacuation maps, routes and signage have been installed along Andaman Provinces and will be upgrade for the smart signage (This project is in process)</p> <p>The education sectors have created tsunami awareness in the curriculum for schools.</p>
<p><b>Q99</b></p>	<p>15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements</p> <p>→</p> <p>NDWC and TMD are cooperating together in the SOP especially with the Tsunami Modeling and Focal mechanism analysis. NDWC are improving criteria and SOP for Tsunami Warning and also improving the Tsunami model.</p> <p>NDMO will plan to improve master plan for Tsunami Prevention and Mitigation include Emergency Response plan. NDMO will conduct the National Tsunami Exercise in 2019.</p>
<p><b>Q100</b></p>	<p>Upload Documents</p> <p>Respondent skipped this question</p>

NATIONAL REPORT OF TIMOR-LESTE

PART I: Basic Information		
Q3	TNC Name:	Agostinho Cosme Belo
Q4	Position:	Director
Q5	Organization	National Disaster Risk Management Directorate
Q6	Telephone Number:	+670 77326917
Q7	E-mail Address:	agostinhocosme.belo@gmail.com
Q8	Fax Number:	Respondent skipped this question
Q9	Postal Address:	Rua de Caicoli, Dili, Timor - Leste
Q10	NTWC Agency Name:	National Disaster Risk Management Directorate
Q11	NTWC URL (web link) for tsunami warnings:	www.mss.gov.tl
Q12	NTWC Agency Contact or Officer in Charge (person):	Chief of Department
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? <i>The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.</i>	Yes
Q24	TWFP 24x7 point of contact (office, operational unit or position, not a person):	Chief of Department National Disaster Operation Center

PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines		
Hazard Assessment		
Q29	4a) Has your country undertaken a hazard assessment?	Yes
Q30	4b) What type of hazard assessment has been carried out?	Multi-hazard assessment including tsunami
Q31	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclone, Drought, Earthquakes, Flooding, Landslide
	Other (please specify):	Strong Wind
Q32	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	International Agency
	Please specify the name(s) of the agencies:	UNDP



<b>Q33</b>	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	Regional Level, City Level	
	Other (please specify):	Sub District (Posto Administrativo)	
<b>Q34</b>	4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.	Municipalities of Ainaro, Baucau, Bobonaro, Covalima, Dili, Liquica, Lautem, Manatuto, Manufahi, Viqueque - and the Special Economic Region of Oecusse	
<b>Q35</b>	4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop down menu.		
		Was this data used for tsunami hazard assessment?	Is this data publicly available?
	Bathymetry	Yes	Yes
	Seismo-tectonic model	No	No
	Topography	Yes	Yes
	Land Cover	No	No
	Infrastructure details	No	No
	Other data used (please specify):	Tsunami Heights and impact data from past event was not available in sufficient detail.	
<b>Q36</b>	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)	Deterministic Tsunami Hazard Analysis	
<b>Q37</b>	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Fair	
<b>Q38</b>	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Medium priority	
	Deterministic Tsunami Hazard Analysis	Medium priority	
	Field Studies on Tsunami Impacts	Medium priority	
	Hazard map	High priority	
	Inundation map	High priority	
	Evacuation map	High priority	
	What other areas of capacity in tsunami hazard assessment require improvement?	Priorities higher in coastal areas of denser population	
<b>Q39</b>	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?		
	Probabilistic Tsunami Hazard Assessment (PTHA)	Poor	
	Deterministic Tsunami Hazard Analysis	Poor	

	Field Studies on Tsunami Impacts	Poor
	Hazard map	Poor
	Inundation map	Poor
	Evacuation map	Poor
	Please provide the name(s) and contact detail(s) of any individuals / institutions in your country that could provide this training / consultancy	Timor-Leste still primarily learning experience of other countries such as Indonesia.
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Risk Assessment</b>		
<b>Q40</b>	5a) Has your country undertaken a tsunami risk assessment?	Yes
<b>Q41</b>	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami
<b>Q42</b>	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Drought, Earthquakes, Flooding, Landslide
	Other (please specify):	Strong Wind
<b>Q43</b>	5d) Who did the tsunami risk assessment in your country?	International Agency
	Please specify the name(s) of the agency(ies):	UNDP
<b>Q44</b>	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National Level, Regional Level
	Other (please specify):	Sub District (Posto Administrativo)
<b>Q45</b>	5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the percentage of risk prone areas mapped.	Municipalities of Ainaro, Baucau, Bobonaro, Covalima, Dili, Liquica, Lautem, Manatuto, Manufahi, Viqueque - and the Special Economic Region of Oecusse.  Only major population centers mapped
<b>Q46</b>	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	11 municipalities have a coast line, the others not
<b>Q47</b>	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Risk map, Evacuation map
	Other (please specify):	Risk map and evacuation map are in draft form for Dili, but yet to be finalised
<b>Q48</b>	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	
	Capability to undertake tsunami risk assessment	Fair
<b>Q49</b>	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your country to improve capacity in the following areas of tsunami risk assessment?	
	Tsunami risk assessment at national level	Medium priority

	Tsunami risk assessment at regional level	Medium priority
	Tsunami risk assessment at city level	Medium priority
	Tsunami risk assessment at village level	Medium priority
	Tsunami risk assessment at community / neighbourhood level	Medium priority
	What other areas of capacity in tsunami hazard assessment require improvement?	Timor-Leste currently lacks the capacity to fully carry out full assessment at all levels
<b>Q50</b>	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?	
	Tsunami risk assessment at national level	Poor
	Tsunami risk assessment at regional level	Poor
	Tsunami risk assessment at city level	Poor
	Tsunami risk assessment at village level	Poor
	Tsunami risk assessment at community / neighbourhood level	Poor
	Other (specify below)	Poor
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>		
<b>Policies</b>		
<b>Q51</b>	6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Multi hazard including tsunami
	Preparedness	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami
	Rehabilitation and reconstruction	Multi hazard including tsunami
	What is the name of policy? (if available):	National Disaster Management Policy 2008, currently being revised
<b>Q52</b>	6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?	
	Prevention and mitigation	Not provided
	Preparedness	Not provided
	Emergency response	Not provided
	Rehabilitation and reconstruction	Not provided
	What is the name of policy? (if available):	At the Municipal level, the local tsunami policy will form part of municipal disaster management plans however these are still in development.

<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Plans</b>				
<b>Q53</b>	7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.			
		National level	Local level	Community level
	Prevention and mitigation	Standalone tsunami only	Multi hazard including tsunami	Multi hazard including tsunami
	Preparedness	Standalone tsunami only	Multi hazard including tsunami	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami	Multi hazard including tsunami	Community plan is not available
	Rehabilitation and reconstruction	Standalone tsunami only	Local plan is not available	Community plan is not available
	What is the name of the plan(s) (if available):		Comprehensive guide to tsunami exercise at national level in Timor-Leste which would form the basis for standalone plan at sub national level planning form part of municipal disaster management plan which are currently in development.	
<b>Q54</b>	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?		Yes	
<b>PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines</b>				
<b>Guidelines</b>				
<b>Q55</b>	8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation	Guidelines not available		
	Preparedness	Multi hazard guidelines including tsunami		
	Emergency response	Multi hazard guidelines including tsunami		
	Rehabilitation and reconstruction	Multi hazard guidelines including tsunami		
	What is the name of guidelines? (if available):	It is the policy, National Disaster Management Policy 2008		
<b>Q56</b>	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?			
	Prevention and mitigation	Guidelines not available		
	Preparedness	Guidelines not available		
	Emergency response	Guidelines not available		

	Rehabilitation and reconstruction	Guidelines not available
	What is the name of guidelines? (if available):	Tsunami DRR guidelines at municipal level are the responsibilities of municipalities and these currently in development as part of multi hazard planning

<b>PART III: Detection, Warning and Dissemination</b>		
<b>Detection and Warning</b>		
<b>Q57</b>	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
<b>Q58</b>	9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)	Use TSP data
<b>Q59</b>	9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information? Please provide the name and contact details.	National Disaster Risk Management Directorate
<b>Q60</b>	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
<b>Q61</b>	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, UPS (Uninterruptable Power Supply)
<b>Q62</b>	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
<b>Q63</b>	9g) Does the organisation have access to national or international seismic networks?	Yes
	Please list/describe sources of information (e.g. national data through national communication infrastructure, seedlink, internet):	Accesses to international seismic network
<b>Q64</b>	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> )?	Yes
<b>Q65</b>	9i) When compared to the IOTWMS seismic database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20796</a> ), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q66</b>	9j) Does the organisation have access to national or international sea level networks?	Yes

	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	Rimes - Thailand, BMKG Ocean Forecast, BOM - Australia
<b>Q67</b>	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> )?	Yes
<b>Q68</b>	9l) When compared to the IOTWMS sea level database ( <a href="http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833">http://www.ioc-tsunami.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=20833</a> ), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)	Respondent skipped this question
<b>Q69</b>	9m) What other observing networks are operated by your country and used for tsunami early warning?	Respondent skipped this question
<b>Q70</b>	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	Yes
	Please specify the software tools used:	JISView and Linuh
<b>Q71</b>	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	Yes
	Please specify the modelling tools and data used:	Only for a very basic level
<b>Q72</b>	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
<b>Q73</b>	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	Magnitude 6.5, Sea Level 1m
<b>Q74</b>	9r) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-sessional period?	Monitoring Only as the threat level did not warrant issued of national level alert
<b>Q75</b>	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	No
<b>Q76</b>	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	Yes
	Please name the organisation(s) that participated in the exercise):	Ministry of Interior, Ministry of Social Solidarity, Red Cross Timor-Leste, Civil Protection, Police, Dili Municipality and IOM
<b>Q77</b>	9u) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner, if public were evacuated, etc.)	No

PART III: Detection, Warning and Dissemination		
Dissemination		
<b>Q78</b>	10a) How is the tsunami information (warning, public safety action, etc.) disseminated within country? (select all that apply)	Email, SMS, Telephone, WhatsApp / Facebook / Other social, media, Sirens, Television, Warning towers, Megaphone, Police/military, Public alert system
	Other:	Traditional alert method, it like bells and Gong
<b>Q79</b>	10b) How is the warning situation terminated?	Email, sms, phone call, public alert system.
<b>Q80</b>	10c) What website is used for display of national threat status during events? Please provide the URL.	www.mss.gov.tl

PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
Standard Operating Procedures					
<b>Q81</b>	11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	24/7 Emergency Operation Centre (EOC)	Yes	Yes	Yes	Yes
	Receiving information from the NTWC	Yes	Yes	Yes	Yes
	Response Criteria / decision making	Yes	Yes	Yes	Yes
<b>Q82</b>	11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop down menus.				
	Does your SOP address this aspect of tsunami emergency response?		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
	Warning dissemination	Yes	Yes	Yes	Yes
	Evacuation call procedures	Yes	Yes	Yes	Yes

	Community evacuation procedures	Yes	Yes	Yes	Yes
	Communication with NTWC	Yes	Yes	Yes	Yes
	Communication with Local Government	Yes	Yes	Yes	Yes
	Media arrangements	Yes	Yes	Yes	Yes
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	Yes	Yes	Yes	Yes
<b>Q83</b>	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?			Yes	
<b>Q84</b>	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)				
	National DMOs	Telephone, Email, SMS, Siren			
	Local DMOs	Telephone, Email, SMS			
	General Public	Telephone, Email, SMS			
	Coastal Communities	Telephone, Email, SMS			
	Media	Telephone, Email, SMS			
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>					
<b>Evacuation Infrastructure</b>					
<b>Q85</b>	12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.				
	Evacuation shelter	Yes Two dedicated shelters completed in Viqueque and Covalima Municipalities, along the Dili - Ainaro road corridor a range of dual purposed facilities are available in Dili there is potential to utilise government and Church facilities outside the risk area			
	Vertical evacuation structure	Yes There is potential to utilise the multi-story Timor Plaza shopping center as a vertical evacuation center, however there is no formal agreement in place yet			
	Natural or artificial hill for vertical evacuation	Yes Timor-Leste, Dili, has a number of natural hills which could be formalised as evacuation point in all vulnerable municipalities.			
	Evacuation signage	Yes Limited signage is in place Viqueque and Covalima however this is an area that urgently needs to be addressed			
	Other (please specify)	No			



<b>Q86</b>	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Tsunami Exercises</b>		
<b>Q87</b>	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy
<b>Q88</b>	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level, Regional level, Community/Neighbourhood level, School level,
	Other (please specify):	UNDP coordinated and Japanese Government funded School Tsunami Exercise and the awareness program conducted in 6 school in 3 municipalities during 2018
<b>Q89</b>	12c) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?	
	Organization table top exercise	Yes 1
	Inter-organization table top exercise	Yes 1
	National tsunami drill/exercise	Yes 1
	Indian Ocean Wave exercise	Yes 1
	Local tsunami exercise	Yes 6
<b>PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness</b>		
<b>Public Awareness</b>		
<b>Q90</b>	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office
<b>Q91</b>	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Leaflets or flyers, Posters, Booklets, Video, or other visual or oral media, Indigenous knowledge, folklore, or oral history accounts or compilations, Teaching kits on tsunamis, School curricula, Public Evacuation Map
<b>Q92</b>	13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?	Yes
<b>Q93</b>	13d) Do you undertake the following tsunami awareness activities?	
	World Tsunami Awareness Day	No

	Global Disaster Risk Reduction Day	Yes, 1
	Public tsunami preparedness outreach	No
	School and/or children awareness	Yes, 6
	Exhibitions	Yes, 1
	Competitions or other ways of highlighting tsunami safety	No
	Tsunami Exercise	Yes, 1
<b>Q94</b>	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.	Provision of general tsunami awareness materials, Customization of general materials to country or community, Development of tsunami awareness programmes, activities or campaigns, Participation/support by international agencies or experts to your country's activities
<b>Q95</b>	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No
<b>Q96</b>	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	No
<b>Q97</b>	13h) For those communities that participated in the IOTR initiative, please provide a general ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)	Respondent skipped this question
	Have a community tsunami risk reduction plan	
	Have designated and mapped tsunami hazard zones	
	Have a public display of tsunami information	
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	
	Develop and distribute outreach and public education materials	
	Hold at least three outreach or educational activities annually	
	Conduct an annual tsunami community exercise	
	Address tsunami hazards in the community's Emergency Operations Plan (EOP)	
	Commit to support the Emergency Operations Centre (EOC) during a tsunami incident, if an EOC is open and activated	
	Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats / information	
	Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	

**PART V: Narrative**

<b>Q98</b>	14) Please briefly describe any innovations or modifications to National tsunami warnings procedures or operations since your last National Report. For example, this might include tsunami related research projects, tsunami mitigation activities and best practices (especially
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	in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.	
→	Some material in Bahasa Indonesia been translated to Tetun language.	
<b>Q99</b>	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements	
→	<ul style="list-style-type: none"> <li>- Integration of the Viqueque and Covalima evacuation center in to Tsunami awareness and evacuation planning.</li> <li>- Integration of the BSRP (Building Safety Resilience Pacific) Project funded Tsunami warning towers in Dili in to National Early Warning System and development of Public Awareness campaign.</li> <li>- Integration of Tsunami hazard mapping and evacuation planning and community awareness in to municipal disaster management plan and policy</li> </ul>	
<b>Q100</b>	Upload Documents	Respondent skipped this question

**IOC Technical Series**

<b>No.</b>	<b>Title</b>	<b>Languages</b>
1	Manual on International Oceanographic Data Exchange. 1965	(out of stock)
2	Intergovernmental Oceanographic Commission (Five years of work). 1966	(out of stock)
3	Radio Communication Requirements of Oceanography. 1967	(out of stock)
4	Manual on International Oceanographic Data Exchange - Second revised edition. 1967	(out of stock)
5	Legal Problems Associated with Ocean Data Acquisition Systems (ODAS). 1969	(out of stock)
6	Perspectives in Oceanography, 1968	(out of stock)
7	Comprehensive Outline of the Scope of the Long-term and Expanded Programme of Oceanic Exploration and Research. 1970	(out of stock)
8	IGOSS (Integrated Global Ocean Station System) - General Plan Implementation Programme for Phase I. 1971	(out of stock)
9	Manual on International Oceanographic Data Exchange - Third Revised Edition. 1973	(out of stock)
10	Bruun Memorial Lectures, 1971	E, F, S, R
11	Bruun Memorial Lectures, 1973	(out of stock)
12	Oceanographic Products and Methods of Analysis and Prediction. 1977	E only
13	International Decade of Ocean Exploration (IDOE), 1971-1980. 1974	(out of stock)
14	A Comprehensive Plan for the Global Investigation of Pollution in the Marine Environment and Baseline Study Guidelines. 1976	E, F, S, R
15	Bruun Memorial Lectures, 1975 - Co-operative Study of the Kuroshio and Adjacent Regions. 1976	(out of stock)
16	Integrated Ocean Global Station System (IGOSS) General Plan and Implementation Programme 1977-1982. 1977	E, F, S, R
17	Oceanographic Components of the Global Atmospheric Research Programme (GARP) . 1977	(out of stock)
18	Global Ocean Pollution: An Overview. 1977	(out of stock)
19	Bruun Memorial Lectures - The Importance and Application of Satellite and Remotely Sensed Data to Oceanography. 1977	(out of stock)
20	A Focus for Ocean Research: The Intergovernmental Oceanographic Commission - History, Functions, Achievements. 1979	(out of stock)
21	Bruun Memorial Lectures, 1979: Marine Environment and Ocean Resources. 1986	E, F, S, R
22	Scientific Report of the Interecalibration Exercise of the IOC-WMO-UNEP Pilot Project on Monitoring Background Levels of Selected Pollutants in Open Ocean Waters. 1982	(out of stock)
23	Operational Sea-Level Stations. 1983	E, F, S, R
24	Time-Series of Ocean Measurements. Vol.1. 1983	E, F, S, R
25	A Framework for the Implementation of the Comprehensive Plan for the Global Investigation of Pollution in the Marine Environment. 1984	(out of stock)
26	The Determination of Polychlorinated Biphenyls in Open-ocean Waters. 1984	E only
27	Ocean Observing System Development Programme. 1984	E, F, S, R
28	Bruun Memorial Lectures, 1982: Ocean Science for the Year 2000. 1984	E, F, S, R
29	Catalogue of Tide Gauges in the Pacific. 1985	E only
30	Time-Series of Ocean Measurements. Vol. 2. 1984	E only
31	Time-Series of Ocean Measurements. Vol. 3. 1986	E only
32	Summary of Radiometric Ages from the Pacific. 1987	E only
33	Time-Series of Ocean Measurements. Vol. 4. 1988	E only
34	Bruun Memorial Lectures, 1987: Recent Advances in Selected Areas of Ocean Sciences in the Regions of the Caribbean, Indian Ocean and the Western Pacific. 1988	Composite E, F, S
35	Global Sea-Level Observing System (GLOSS) Implementation Plan. 1990	E only

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36	Bruun Memorial Lectures 1989: Impact of New Technology on Marine Scientific Research. 1991	Composite E, F, S
37	Tsunami Glossary - A Glossary of Terms and Acronyms Used in the Tsunami Literature. 1991	E only
38	The Oceans and Climate: A Guide to Present Needs. 1991	E only
39	Bruun Memorial Lectures, 1991: Modelling and Prediction in Marine Science. 1992	E only
40	Oceanic Interdecadal Climate Variability. 1992	E only
41	Marine Debris: Solid Waste Management Action for the Wider Caribbean. 1994	E only
42	Calculation of New Depth Equations for Expendable Bathymetographs Using a Temperature-Error-Free Method (Application to Sippican/TSK T-7, T-6 and T-4 XBTS. 1994	E only
43	IGOSS Plan and Implementation Programme 1996-2003. 1996	E, F, S, R
44	Design and Implementation of some Harmful Algal Monitoring Systems. 1996	E only
45	Use of Standards and Reference Materials in the Measurement of Chlorinated Hydrocarbon Residues. 1996	E only
46	Equatorial Segment of the Mid-Atlantic Ridge. 1996	E only
47	Peace in the Oceans: Ocean Governance and the Agenda for Peace; the Proceedings of <i>Pacem in Maribus</i> XXIII, Costa Rica, 1995. 1997	E only
48	Neotectonics and fluid flow through seafloor sediments in the Eastern Mediterranean and Black Seas - Parts I and II. 1997	E only
49	Global Temperature Salinity Profile Programme: Overview and Future. 1998	E only
50	Global Sea-Level Observing System (GLOSS) Implementation Plan-1997. 1997	E only
51	L'état actuel de l'exploitation des pêcheries maritimes au Cameroun et leur gestion intégrée dans la sous-région du Golfe de Guinée ( <i>cancelled</i> )	F only
52	Cold water carbonate mounds and sediment transport on the Northeast Atlantic Margin. 1998	E only
53	The Baltic Floating University: Training Through Research in the Baltic, Barents and White Seas - 1997. 1998	E only
54	Geological Processes on the Northeast Atlantic Margin (8 <sup>th</sup> training-through-research cruise, June-August 1998). 1999	E only
55	Bruun Memorial Lectures, 1999: Ocean Predictability. 2000	E only
56	Multidisciplinary Study of Geological Processes on the North East Atlantic and Western Mediterranean Margins (9 <sup>th</sup> training-through-research cruise, June-July 1999). 2000	E only
57	Ad hoc Benthic Indicator Group - Results of Initial Planning Meeting, Paris, France, 6-9 December 1999. 2000	E only
58	Bruun Memorial Lectures, 2001: Operational Oceanography – a perspective from the private sector. 2001	E only
59	Monitoring and Management Strategies for Harmful Algal Blooms in Coastal Waters. 2001	E only
60	Interdisciplinary Approaches to Geoscience on the North East Atlantic Margin and Mid-Atlantic Ridge (10 <sup>th</sup> training-through-research cruise, July-August 2000). 2001	E only
61	Forecasting Ocean Science? Pros and Cons, Potsdam Lecture, 1999. 2002	E only
62	Geological Processes in the Mediterranean and Black Seas and North East Atlantic (11 <sup>th</sup> training-through-research cruise, July- September 2001). 2002	E only
63	Improved Global Bathymetry – Final Report of SCOR Working Group 107. 2002	E only
64	R. Revelle Memorial Lecture, 2006: Global Sea Levels, Past, Present and Future. 2007	E only
65	Bruun Memorial Lectures, 2003: Gas Hydrates – a potential source of energy from the oceans. 2003	E only
66	Bruun Memorial Lectures, 2003: Energy from the Sea: the potential and realities of Ocean Thermal Energy Conversion (OTEC). 2003	E only

67	Interdisciplinary Geoscience Research on the North East Atlantic Margin, Mediterranean Sea and Mid-Atlantic Ridge (12 <sup>th</sup> training-through-research cruise, June-August 2002). 2003	E only
68	Interdisciplinary Studies of North Atlantic and Labrador Sea Margin Architecture and Sedimentary Processes (13 <sup>th</sup> training-through-research cruise, July-September 2003). 2004	E only
69	Biodiversity and Distribution of the Megafauna / Biodiversité et distribution de la mégafaune. 2006 Vol.1 The polymetallic nodule ecosystem of the Eastern Equatorial Pacific Ocean / Ecosystème de nodules polymétalliques de l'océan Pacifique Est équatorial Vol.2 Annotated photographic Atlas of the echinoderms of the Clarion-Clipperton fracture zone / Atlas photographique annoté des échinodermes de la zone de fractures de Clarion et de Clipperton Vol.3 Options for the management and conservation of the biodiversity — The nodule ecosystem in the Clarion Clipperton fracture zone: scientific, legal and institutional aspects	E F
70	Interdisciplinary geoscience studies of the Gulf of Cadiz and Western Mediterranean Basin (14 <sup>th</sup> training-through-research cruise, July-September 2004). 2006	E only
71	Indian Ocean Tsunami Warning and Mitigation System, IOTWS. Implementation Plan, 7–9 April 2009 (2 <sup>nd</sup> Revision). 2009	E only
72	Deep-water Cold Seeps, Sedimentary Environments and Ecosystems of the Black and Tyrrhenian Seas and the Gulf of Cadiz (15 <sup>th</sup> training-through-research cruise, June–August 2005). 2007	E only
73	Implementation Plan for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (NEAMTWS), 2007–2011. 2007 ( <i>electronic only</i> )	E only
74	Bruun Memorial Lectures, 2005: The Ecology and Oceanography of Harmful Algal Blooms – Multidisciplinary approaches to research and management. 2007	E only
75	National Ocean Policy. The Basic Texts from: Australia, Brazil, Canada, China, Colombia, Japan, Norway, Portugal, Russian Federation, United States of America. (Also Law of Sea Dossier 1). 2008	E only
76	Deep-water Depositional Systems and Cold Seeps of the Western Mediterranean, Gulf of Cadiz and Norwegian Continental margins (16 <sup>th</sup> training-through-research cruise, May–July 2006). 2008	E only
77	Indian Ocean Tsunami Warning and Mitigation System (IOTWS) – 12 September 2007 Indian Ocean Tsunami Event. Post-Event Assessment of IOTWS Performance. 2008	E only
78	Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (CARIBE EWS) – Implementation Plan 2013–2017 (Version 2.0). 2013	E only
79	Filling Gaps in Large Marine Ecosystem Nitrogen Loadings Forecast for 64 LMEs – GEF/LME global project Promoting Ecosystem-based Approaches to Fisheries Conservation and Large Marine Ecosystems. 2008	E only
80	Models of the World's Large Marine Ecosystems. GEF/LME Global Project Promoting Ecosystem-based Approaches to Fisheries Conservation and Large Marine Ecosystems. 2008	E only
81	Indian Ocean Tsunami Warning and Mitigation System (IOTWS) – Implementation Plan for Regional Tsunami Watch Providers (RTWP). 2008	E only
82	Exercise Pacific Wave 08 – A Pacific-wide Tsunami Warning and Communication Exercise, 28–30 October 2008. 2008	E only
83.	<i>Cancelled</i>	
84.	Global Open Oceans and Deep Seabed (GOODS) Bio-geographic Classification. 2009	E only
85.	Tsunami Glossary	E, F, S
86	Pacific Tsunami Warning System (PTWS) Implementation Plan	<i>Electronic publication</i>

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87.	Operational Users Guide for the Pacific Tsunami Warning and Mitigation System (PTWS) – Second Edition. 2011	E only
88.	Exercise Indian Ocean Wave 2009 (IOWave09) – An Indian Ocean-wide Tsunami Warning and Communication Exercise – 14 October 2009. 2009	E only
89.	Ship-based Repeat Hydrography: A Strategy for a Sustained Global Programme. 2009	E only
90.	12 January 2010 Haiti Earthquake and Tsunami Event Post-Event Assessment of CARIBE EWS Performance. 2010	E only
91.	Compendium of Definitions and Terminology on Hazards, Disasters, Vulnerability and Risks in a coastal context	<i>Under preparation</i>
92.	27 February 2010 Chile Earthquake and Tsunami Event – Post-Event Assessment of PTWS Performance (Pacific Tsunami Warning System). 2010	E only
93.	Exercise CARIBE WAVE 11 / LANTEX 11—A Caribbean Tsunami Warning Exercise, 23 March 2011	
	Vol. 1 Participant Handbook / Exercice CARIBE WAVE 11 —Exercice d’alerte au tsunami dans les Caraïbes, 23 mars 2011. Manuel du participant / Ejercicio Caribe Wave 11. Un ejercicio de alerta de tsunami en el Caribe, 23 de marzo de 2011. Manual del participante. 2010	E/F/S
	Vol. 2 Report. 2011	E only
	Vol. 3 Supplement: Media Reports. 2011	E/F/S
94.	Cold seeps, coral mounds and deep-water depositional systems of the Alboran Sea, Gulf of Cadiz and Norwegian continental margin (17th training-through-research cruise, June–July 2008)	E only
95.	International Post-Tsunami Survey for the 25 October 2010 Mentawai, Indonesia Tsunami	E only
96.	Pacific Tsunami Warning System (PTWS) 11 March 2011 Off Pacific coast of Tohoku, Japan, Earthquake and Tsunami Event. Post-Event Assessment of PTWS Performance	E only
97.	Exercise PACIFIC WAVE 11: A Pacific-wide Tsunami Warning and Communication Exercise, 9–10 November 2011	
	Vol. 1 Exercise Manual. 2011	E only
	Vol. 2 Report. 2013	E only
98.	Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and connected seas. First Enlarged Communication Test Exercise (ECTE1). Exercise Manual and Evaluation Report. 2011	E only
99.	Exercise INDIAN OCEAN WAVE 2011 – An Indian Ocean-wide Tsunami Warning and Communication Exercise, 12 October 2011	E only
	Vol. 1 Exercise Manual. 2011	
	Supplement: Bulletins from the Regional Tsunami Service Providers	
	Vol. 2 Exercise Report. 2013	
100.	Global Sea Level Observing System (GLOSS) Implementation Plan – 2012. 2012	E only
101.	Exercise Caribe Wave/Lantex 13. A Caribbean Tsunami Warning Exercise, 20 March 2013. Volume 1: Participant Handbook. 2012	E only
102.	Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas — Second Enlarged Communication Test Exercise (CTE2), 22 May 2012.	E only
	Vol. 1 Exercise Manual. 2012	
	Vol. 2 Evaluation Report. 2014	
103.	Exercise NEAMWAVE 12. A Tsunami Warning and Communication Exercise for the North-eastern Atlantic, the Mediterranean, and Connected Seas Region, 27–28 November 2012.	E only
	Vol. 1: Exercise Manual. 2012	
	Vol. 2: Evaluation Report. 2013	
104.	Seísmo y tsunami del 27 de agosto de 2012 en la costa del Pacífico frente a El Salvador, y seísmo del 5 de septiembre de 2012 en la costa del Pacífico frente a Costa Rica. Evaluación subsiguiente sobre el funcionamiento del Sistema de Alerta contra los Tsunamis y Atenuación de sus Efectos en el Pacífico. 2012	Español solamente (resumen en inglés y francés)
105.	Users Guide for the Pacific Tsunami Warning Center Enhanced Products for the Pacific Tsunami Warning System, August 2014. Revised Edition. 2014	E, S

106.	Exercise Pacific Wave 13. A Pacific-wide Tsunami Warning and Enhanced Products Exercise, 1–14 May 2013. Vol. 1 Exercise Manual. 2013 Vol. 2 Summary Report. 2013	E only
107.	Tsunami Public Awareness and Educations Strategy for the Caribbean and Adjacent Regions. 2013	E only
108.	Pacific Tsunami Warning and Mitigation System (PTWS) Medium-Term Strategy, 2014–2021. 2013	E only
109.	Exercise Caribe Wave/Lantex 14. A Caribbean and Northwestern Atlantic Tsunami Warning Exercise, 26 March 2014. Vol. 1 Participant Handbook. 2014	E/S
110.	Directory of atmospheric, hydrographic and biological datasets for the Canary Current Large Marine Ecosystem, 3 <sup>rd</sup> edition: revised and expanded. 2017	E only
111.	Integrated Regional Assessments in support of ICZM in the Mediterranean and Black Sea Basins. 2014	E only
112.	11 April 2012 West of North Sumatra Earthquake and Tsunami Event - Post-event Assessment of IOTWS Performance	E only
113.	Exercise Indian Ocean Wave 2014: An Indian Ocean-wide Tsunami Warning and Communication Exercise. Vol.1 Manual Vol. 2 Exercise Report. 2015	E only
114.	Exercise NEAMWAVE 14. A Tsunami Warning and Communication Exercise for the North-Eastern Atlantic, the Mediterranean, and Connected Seas Region, 28–30 October 2014 Vol. 1 Manual Vol. 2 Evaluation Report – Supplement: Evaluation by Message Providers and Civil Protection Authorities	E only
115.	Oceanographic and Biological Features in the Canary Current Large Marine Ecosystem. 2015 ( <i>revised in 2016</i> )	E only
116.	Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas. Third Enlarged Communication Test Exercise (CTE3), 1st October 2013. Vol. 1 Exercise Manual Vol. 2 Evaluation Report	E only
117.	Exercise Pacific Wave 15. A Pacific-wide Tsunami Warning and Enhanced Products Exercise, 2–6 February 2015 Vol. 1: Exercise Manual; Vol. 2: Summary Report	E only
118.	Exercise Caribe Wave/Lantex 15. A Caribbean and Northwestern Atlantic Tsunami Warning Exercise, 25 March 2015 (SW Caribbean Scenario) Vol. 1: Participant Handbook	E only
119.	Transboundary Waters Assessment Programme (TWAP) Assessment of Governance Arrangements for the Ocean Vol 1: Transboundary Large Marine Ecosystems; <u>Supplement</u> : Individual Governance Architecture Assessment for Fifty Transboundary Large Marine Ecosystems Vol 2: Areas Beyond National Jurisdiction	E only
120.	Transboundary Waters Assessment Programme (TWAP) – Status and Trends in Primary Productivity and Chlorophyll from 1996 to 2014 in Large Marine Ecosystems and the Western Pacific Warm Pool, Based on Data from Satellite Ocean Colour Sensors. 2017	E only
121.	Exercise Indian Ocean Wave 14, an Indian Ocean wide Tsunami Warning and Communications Exercise, 9–10 September 2014	<i>In preparation</i>
122.	Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas. Sixth Communication Test Exercise (CTE6), 29 July 2015. Vol. 1: Exercise Manual Vol. 2: Evaluation Report	E only
123	Preparing for the next tsunami in the North-Eastern Atlantic, the Mediterranean and Connected Seas – Ten years of the Tsunami Warning System (NEAMTWS). 2017 — <i>Cancelled</i>	(see <i>IOC/INF-1340</i> )

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124	Indicadores Marino Costeros del Pacífico Sudeste / Coastal and Marine Indicators of the Southeast Pacific (SPINCAM)	E/S
125	Exercise CARIBE WAVE 2016: A Caribbean and Adjacent Regions Tsunami Warning Exercise, 17 March 2016 (Venezuela and Northern Hispaniola Scenarios) Volume 1: Participant Handbook	E only
126	Exercise Pacific Wave 16. A Pacific-wide Tsunami Warning and Enhanced Products Exercise, 1-5 February 2016. Volume 1: Exercise Manual. Volume 2: Summary Report	E only
127	How to reduce coastal hazard risk in your community – A step by step approach	E only
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