Intergovernmental Oceanographic Commission Technical Series



Capacity Assessment of Tsunami Preparedness in the Indian Ocean

Status Report, 2018

UNESCO

143

Intergovernmental Oceanographic Commission Technical Series

Capacity Assessment of Tsunami Preparedness in the Indian Ocean

Status Report, 2018

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

UNESCO 2020

143

IOC Technical Series, 143 Paris, April 2020 English only

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariats of UNESCO and IOC concerning the legal status of any country or territory, or its authorities, or concerning the delimitation of the frontiers of any country or territory.

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

© UNESCO 2020

(IOC/2020/TS/143)

TABLE OF CONTENTS

			page
Ackr	owledg	ments	(iii)
Fore	word		(iv)
Exec	utive su	ımmarv	(ix)
1		N OCEAN TSUNAMI WARNING AND MITIGATION SYSTEM	1
• 1 1			I
1.1			1
1.2	AND F	FOUNDATIONAL ELEMENTS	2
	1.2.1	Risk Assessment and Reduction	2
	1.2.2	Detection, Warning and Dissemination	2
	1.2.3	Awareness, Preparedness and Response	3
	1.2.4	Foundational Elements	3
1.3	IMPLE	EMENTATION	4
2	INDIA	N OCEAN CAPACITY ASSESSMENT OF TSUNAMI PREPAR	EDNESS4
2.1	BACK	GROUND	4
2.2	PROG FOR F	GRESS TO DATE AND FRAMEWORK FUTURE DEVELOPMENT OF IOTWMS	6
2.2	METH	IODOLOGY	8
3.	CURF	RENT STATUS	9
3.1	POLIC	CIES, PLANS AND GUIDELINES	9
	3.1.1	Policies	9
	3.1.2	Plans	10
	3.1.3	Guidelines	13
3.2	RISK	ASSESSMENT AND REDUCTION	14
	3.2.1	Hazard Assessment	14
	3.2.2	Risk Assessment	20
3.3	DETE	CTION, WARNING AND DISSEMINATION	25
	3.3.1	Detection and Warning	25
	3.3.2	Dissemination	28
3.4	AWAF	RENESS, PREPAREDNESS AND RESPONSE	29
	3.4.1	Standard Operating Procedures	29
	3.4.2	Evacuation Infrastructure	31
	3.4.3	Tsunami Exercises	32
	3.4.4	Public Awareness	33

4.	REGIONAL OVERVIEW OF IOTWMS STATUS AND CAPACITY SUPPORT REQUIREMENTS	36
4.1	POLICIES, PLANS AND GUIDELINES	37
4.2	RISK ASSESSMENT AND REDUCTION	37
	4.2.1 Hazard Assessment	37
	4.2.2 Risk Assessment	
4.3	DETECTION, WARNING AND DISSEMINATION	
	4.3.1 Detection and Warning	
	4.3.2 Dissemination	40
4.4	AWARENESS, PREPAREDNESS AND RESPONSE	40
	4.4.1 Standard Operating Procedures	40
	4.4.2 Evacuation Infrastructure	40
	4.4.3 Tsunami Exercises	41
	4.4.4 Public Awareness	41
5.	RECOMMENDATIONS TO ADDRESS CAPACITY GAPS AND SUPPORT REQUIREMENTS	45
6	CONCLUSIONS	46

ANNEXES

I	CONTRIBUTORS TO THE 2018 STATUS REPORT
••	

- II. COMPARATIVE LIST OF COUNTRIES SURVEYED IN THE 2005 AND 2018 ASSESSMENTS
- III. TABLES OF SURVEY RESPONSES
- IV. COUNTRY SUMMARY REPORTS
- V. ACRONYMS

ACKNOWLEDGMENTS

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 Vicechair 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

In response to the destructive tsunami of 26 December 2004 in the Indian Ocean, which almost 228,000 killed 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 aware-ness, 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.

20 ICG/IOTWMS Member With 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 nearfield 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 dissemi-nation; 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 collabo-rations and activities that will pursue 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.

EXECUTIVE SUMMARY

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 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

IOC Technical Series, 143 page (viii)

Factsheet¹ 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 <u>emergency phase</u> of disaster management. While the <u>rehabilitation and reconstruction phase</u> 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,

¹ 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 causalities 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 Strategy² 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 <u>detection</u> 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.

<u>Warning</u> 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.

<u>Dissemination</u> 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.

² 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.

<u>National tsunami warning systems</u> 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 <u>response</u> 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 guidelines³ 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:

³ *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 States⁴ affected by the tsunami. The resulting 2005 Indian Ocean capacity assessment⁵ provided a regional overview of existing capacity as well as important support requirements of Indian Ocean Member States to build regional capacity in tsunami

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

⁵ 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 postdisaster 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 Guidelines⁶ 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 ⁷)

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.

⁶ 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.)

⁷ 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)

<u>Advances in Tsunami Warning to Enhance Community Response</u> (Paris, France, 12–14 February 2018⁸)

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.

<u>Scientific Tsunami Hazard Assessment of the Makran Subduction Zone</u> (Kish Island, Islamic Republic of Iran, 8 March 2019⁹)

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.

<u>Strengthening Tsunami Early Warning in the North West Indian Ocean Region</u> <u>through Regional Cooperation (Muscat, Oman, 1–6 September 2019¹⁰)</u>

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

⁸IOC/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)

⁹ 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.)

¹⁰ICG/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 2019¹¹)

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 active¹² 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.

¹¹ 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)

¹² 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.

IOC Technical Series, 143 page 9

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 2019¹³. 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.

¹³ 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 <u>during prevention and mitigation phase</u>



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



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



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

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 fivepoint 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 countries¹⁴, 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

14

$$RII = \frac{\sum W}{AxN} \quad (0 \le R \le 1)$$

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 ³	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

<u>Table 1</u>. 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.





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 countries¹⁵, city level risk assessment was ranked as the highest priority for capacity improvement, followed by village and community levels (Table 2).

Priority level	RII ¹⁵	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.

 $_{15} RH = \frac{\sum W}{AxN} (0 \le R \le 1)$

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


<u>Figure 27</u>. 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.



<u>Figure 30</u>: 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-todoor 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-sessional 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 ofof 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 <u>not</u> 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 sealevel 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	 Legal framework in place for disaster warning formulation, dissemination and response National platform or other mechanism in place for guiding disaster risk reduction in general National Tsunami Warning and Mitigation and Coordination Committee or some other coordination mechanism in place Disaster coordination mechanisms at community level established Tsunami emergency plans, tsunami evacuation plans and/or signage exist indicating routes to safety or higher ground 	59% 94% 59% 75% 19%	 National tsunami policy in place Local tsunami policy in place National tsunami disaster risk reduction plan in place Local tsunami disaster risk reduction plan in place Community tsunami disaster risk reduction in place National tsunami guidelines established Local tsunami guidelines established 	90% 60% 75% 55% 40% 70% 60%
Risk Assessment and Reduction	 Tsunami hazard evaluation conducted prior to 26 December 2004 Historical record of past earthquakes and tsunamis documented Tsunami vulnerability assessment conducted Numerical modelling studies conducted to calculate inundation from tsunamis Accurate bathymetry and topography data exist for the coastlines 	44% 37% 22% 22% 25%	 Tsunami hazard assessment conducted Tsunami risk assessment conducted Numerical modelling conducted for hazard assessment (PTHA and/or DTHA) Bathymetry used for tsunami hazard assessment Topography used for hazard assessment 	100% 75% 35% 85% 80%
Detection, Warning and Dissemination	 International tsunami warnings received for teletsunamis from PTWC and/or JMA Agency receiving warnings staffed 24x7 National or regional tsunami warning centre to monitor and warn of regionally or locally generated tsunami in operation Warning centre staffed 24x7 Real-time seismic data received 	94% 94% 28% 31% 41%	 National capability to assess and/or receive potential tsunami threat information and advise and/or warn coastal communities Warning centre staffed 24x7 Access to national or international seismic networks 	100% 90% 90%

	Sea level data available real-time to the central monitoring site, or available in near real-time	41% • Access to national or international sea level networks	85%
Standard Operating Procedures	 Local government disaster preparedness and emergency response assessed Community and ordinary citizen disaster preparedness and emergency response assessed Response procedures for regional or locally 	 59% Warning dissemination SOPs in place Evacuation call SOPs in place 25% Community evacuation SOPs in place 19% 	90% 80% 60%
Tsunami Exercises	 generated tsunami in place Response procedures have been tested or exercised Public is aware of what a tsunami is and how to respond to both locally generated and distant tsunamis 	 19% 19% 37% Tsunami exercises conducted at national level Tsunami exercises conducted at regional level Tsunami exercises conducted at city level Tsunami exercises conducted at village level Tsunami exercises conducted at community level Tsunami exercises conducted at school level 	70% 55% 35% 50% 50% 30%
Awareness, Preparedness and Response	 Community level education and preparedness programmes for national hazards or tsunami exist Tsunami education and public outreach programme in place Earthquake and tsunami hazards and preparedness is incorporated into educational curricula for school children 	 47% Tsunami related education and awareness material Leaflets or flyers Posters Booklets Information Boards Tsunami signage Video or other visual/oral media Indigenous knowledge Teaching kits School curricula Public evacuation maps 	65% 70% 60% 30% 25% 65% 35% 50% 45% 25%
	 Training programmes for the media on tsunami hazards, mitigation, warning and preparedness exist 	• Media arrangement SOPs in place	80%

<u>Table 3.</u> 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 sealevel 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 NTWCs. 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

Members of Task Team on Capacity Assessment of Tsunami Preparedness (2017–2019)

- Dr Harkunti Pertiwi Rahayu, Indonesia (ICG/IOTMWS Chair)
- Ms Vijaya Sunanda Manneela, India (ICG/IOTMWS Vice Chair and Rep. of WG-NWIO)
- Mr Ardito Kodijat (Representative of IOTIC)
- Dr Yuelong Miao (ICG/IOTMWS Representative of WG-2 and Nominee of Australia)
- Mr Budiarta, BMKG, Indonesia
- Ms Eny Supartini, BNPB, Indonesia
- Mr Saw Bun Liong, Meteorological Department, Malaysia
- Mr Al-Yaqdan Al-Siyabi, NCCD, Oman
- Dr Richard Haigh, University of Huddersfield, Invited Expert
- Dr Dilanthi Amaratunga, University of Huddersfield, Invited Expert

Other Contributing Experts

- Mr Tony Elliott, Consultant, Devon, United Kingdom
- Mr Peter Coburn, Chair of WG-2 (2015–2019)
- Dr Pournima Sridarran, Lecturer, University of Moratuwa, Sri Lanka

UNESCO/IOC

- Ms Nora Gale, Programme Specialist at ICG/IOTMWS Secretariat, Perth Australia
- Dr Srinivasa Kumar Tummala, Head of ICG/IOTMWS Secretariat, Perth, Australia

IOC Technical Series, 143 Annex II

ANNEX III

COMPARATIVE LISTS OF COUNTRIES SURVEYED IN THE 2005 AND 2018 ASSESSMENTS

(by alphabetical order)

2005 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	2018 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	
	South Africa ¹⁶
Sri Lanka	Sri Lanka
Tanzania	Tanzania
Thailand	Thailand
	Timor-Leste

¹⁶ 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	СОМ	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	MM	ОМ	РК	SIN	SA	SLK	TAN	THA	TL
	4a)	Has your country undertaken a hazard assessment?	•	•	•	•	•	•	•	•	•	•	•	•	•	•	٠	•	•	•	•	•	•
	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	т	MH+T	т	T, MH+T	MH+T	MH+T	MH+T	MH+T	MH+T
	4c)	What type of multi-hazard assessment has been	carried	l out? (s	electal	that a	pply)			•													
	-	Tsunami	٠	•	•	•	•	•	•	•	•	•	•	•	•	•	٠	•	•	•	•	•	•
		Cyclone	٠	•	•	•	•	0	•	•	•	0	•	•	0	•	0	0	0	•	•	٠	•
		Drought	0	•	0	0	0	0	•	•	•	•	•	•	0	0	0	0	•	•	•	•	•
		Earthquakes	•	•	0	•	0	•	•	•	•	•	0	•	0	•	0	•	0	•	0	•	•
		Epidemics	0	0	0	0	0	•	•	•	•	•	0	•	0	0	0	0	0	•	0	0	0
		Flooding	•	•	•	•	•	•	•	•	•	•	•	•	0	0	0	•	•	•	•	•	•
		Landslide	0	•	0	•	0	•	•	•	•	•	•	0	0	0	0	0	0	•	0	•	•
		Volcanic eruptions	0	0	•	•	0	•	0	•	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	•	0	•	0	0	0	•	0	•	0	0	0	•	0	0	•
	4d)	Who did the tsunami hazard assessment in your	country	y? (sele	ct all th	at apply	()																
EN		National Agency	•	•	0	0	•	•	•	•	•	•	•	•	•	0	٠	•	•	•	0	•	0
SM		International Agency	0	0	0	0	0	•	0	0	0	0	0	•	•	0	0	0	0	0	0	•	•
SES		National / Local University	•	0	0	•	0	•	•	0	0	0	•	•	0	0	0	•	0	0	•	•	0
AS		National / International Consultant	•	•	•	0	0	•	0	0	0	0	•	0	0	•	0	0	0	•	0	•	0
RD	4e)	At what level was the tsunami hazard assessme	nt carrie	ed out?	(select	all that	apply)																
٨Z٨		National Level	٠	•	•	0	•	•	0	•	•	•	•	0	0	•	0	•	0	•	0	•	0
H		Regional Level	•	0	0	•	•	•	•	0	•	0	0	0	0	0	0	0	•	0	•	0	•
		City Level	•	0	0	0	0	•	0	0	•	0	•	•	0	•	٠	0	0	0	0	•	•
		Village Level	•	o	0	•	o	•	•	o	o	o	•	o	•	o	0	•	o	•	0	•	o
	4g)	Data used for hazard assessment and whether it	is publ	icly ava	ilable?																		
		Bathymetry - Used for hazard assessment	•	•	?	•	•	•	•	•	•	•	•		•	•	٠	•	•	•	?	•	•
		Bathymetry - Publicly available	•	•	?	•	o	0	•	•	0	o	0		?	o	٠	0	•	?	0	0	•
		Seismo-tectonic model - Used for hazard assessment	•	?	?	?	•	•	•	•	े	•	?		•	•	٠	•	o		•	•	o
		Seismo-tectonic model - Publicaly available	•	?	?	0	0	0	•	•	0	•	?		?	•	٠	0	?		•	0	0
		Topography - Used for hazard assessment	•	•	?	•	•	•	•	•	•	•	•		•	•	0	•	•	•	?	•	•
		Topography - Publically available	•	•	?	•	0	0	•	•	0	0	0		?	?	0	•	•	?	0	0	•
		Land Cover -Used for hazard assessment	•	•	?	•	•	•	0	0	•	•	0		•	•	٠	•	0		•	•	0
		Land Cover - Publicly available	•	•	?	0	•	•		0	0	0	?		?	?	0	•	•		•	•	0
		Infrastructure details - Used for hazard assessment	٠	?	?	٠	٠	٠	0	0	•	٠	0		•	•	О	0	٠	•	٠	•	0
		Infrastructure details - Publicly available	0	?	?	0	0	0		0	0	0	?		?	•	0	0	٠	?	•	•	0

			AUS	BAN	сом	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	ММ	ОМ	РК	SIN	SA	SLK	TAN	THA	TL
	4h)	What products do you have from the tsunami ha	zard as	sessme	nt? (sel	ect all t	hat appl	y)															
		Probabilistic tsunami hazard assessment	•	•	0	0	0	•	0	0	0	0	0	0	0	0	•	0	0	•	0	•	0
		Deterministic tsunami hazard analysis	0	•	0	0	٠	0	•	0	0	0	0	0	0	•	0	•	0	0	0	•	•
		Field studies on tsunami impacts	•	0	0	0	٠	•	0	0	0	•	0	0	0	•	0	0	0	•	•	•	0
		Hazard map	•	•	•	0	٠	•	•	0	0	•	•	•	0	•	•	0	•	•	•	•	0
		Inundation map	•	•	•	•	٠	•	•	0	•	0	٠	•	•	•	٠	•	•	•	0	٠	0
		Evacuation map	0	0	•	0	0	•	•	0	•	0	٠	•	•	0	0	О	0	•	0	٠	0
		Guidelines	•	0	•	0	0	•	•	•	0	0	0	0	0	•	0	О	0	0	0	٠	0
	4i)	On a scale of 1 (Very poor) to 5 (Very good), plea	ase rate	your co	ountry's	capabi	lity to u	ndertak	e tsuna	mi haza	rd asse	ssment											
E		Rating	4	2	3	3	5	3	4	3	2	4	4	3	2	4	5	4	4	2	4	3	3
SSM	4j)	On a scale of 1 (Not a priority) to 5 (Essential), w	hat is th	ne priori	ty level	in your	country	/ to imp	rove ca	apacity i	n the fo	llowing	areaso	of tsuna	mi haza	rd asse	ssment	?					
SE		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
A C		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
ARI		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
ĮΑΖ		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), w	hat cap	acity do	es your	countr	y have t	o give t	raining	and/or	consult	ancy on	tsunan	ni hazaı	dasses	sment t	o other	countrie	es?				
		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
	5a)	Has your country undertaken a tsunami risk assessment?	•	•	•	•	•	•	•	•	•	o	•	•	•	•	o	•	o	o	•	•	•
	5b)	What type of risk assessment?	ΜΔ+Τ	ΜΔ+Τ	Т,	ΜΔ+Τ	ΜΔ+Τ	MA+T		ΜΔ+Τ	ΜΔ+Τ		MA+T	ΜΔ+Τ	т	ΜΔ+Τ		Т,			ΜΔ+Τ	Т,	MA+T
				100 (11	MA+T	100 (11)	10000	10001		100.001	10.0 (1)		10000	100011	·			MA+T				MA+T	10001
Ł	5c)	What hazards have been considered in your mu	Iti-haza	rd risk a	a sse ssm	ent? (se	elect all	that ap	ply)	-				-	-								
B		Tsunami	•	•	•	•	•	•		•	•		•	•	•	•		•			•	•	•
ESS		Cyclone	•	•	•	•	•	0		•	•		•	•	0	•		o			0	•	•
ASS		Drought	0	•	o	0	0	•		•	•		•	•	o	0		O			•	•	•
SK /		Earthquakes	•	•	•	0	0	•		•	•		0	•	o	•		o			0	•	•
R		Epidemics	•	0	•	0	0	0		•	•		O	•	o	0		O			0	•	0
		Flooding	•	•	•	•	•	•		•	•		•	•	0	0		•			•	•	•
		Landslide	•	•	0	•	0	•		•	•		•	O	0	0		o			0	•	•
		Volcanic eruptions	0	0	0	•	0	•		•	0		0	0	0	0		o			0	0	O
		Other	0	0	0	0	0	•		•	0		0	•	0	•		0			0	0	•

			AUS	BAN	СОМ	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	MM	ОМ	РК	SIN	SA	SLK	TAN	THA	TL
5	5d)	Who did the tsunami risk assessment in your cou	untry? (selecta	ll that a	pply)																	
		National Agency	•	•	o	•	•	•		•	•		•	•	•	o		•			o	•	0
		International Agency	0	0	0	0	0	0		0	0		0	•	•	0		0			0	•	•
		National/local University	0	0	0	0	0	•		0	0		•	•	0	0		0			•	•	0
		National/International Consultant	0	•	•	0	0	•		0	0		0	0	0	•		0			0	•	0
		Other	•	0	0	0	0	•		0	0		0	0	0	0		0			0	0	0
5	5e)	At what level was the tsunami risk assessment c	arried o	out? (sel	lect all t	hat app	oly)																
		National	0	•	•	0	•	•		•	•		•	0	0	•		•			0	•	•
		Regional	•	0	0	•	•	•		0	•		0	0	0	0		0			•	•	•
		City	0	0	0	0	•	•		0	•		0	٠	0	•		0			0	•	0
		Village	0	0	0	0	0	•		0	0		0	0	•	0		0			0	•	0
		Community / Neighbourhood	0	0	0	0	0	0		0	0		0	0	0	0		0			0	•	0
5	5h)	What products do you have from the tsunami ris	kasses	sment?	(select a	all that	apply)																
누		Risk map	0	•	•	•	•	•			0		•	•	0	•		•			0	•	•
M		Evacuation map	0	0	•	0	0	•			•		0	٠	•	0		0			0	•	•
SSI		Guidelines	•	0	•	0	•	0			0		0	0	0	•		0			•	•	0
SSI		Action Plan	0	0	0	0	0	•			0		٠	O	0	•		•			•	٠	0
KA		Other	0	0	0	0	•	0			0		0	0	0	0		0			0	0	0
RIS	5i)	On a scale of 1 (Very poor) to 5 (Very good), plea	ase rate	your co	ountry's	capabi	lity to u	ndertak	e tsunai	mirisk a	a sse ssm	ent											
		Rating	4	2	3	4	5	4		1	2	3	2	3	2	4	1	4	4	2	2	4	3
5	5j)	On a scale of 1 (Not a priority) to 5 (Essential), w	hat is th	ne priori	ty level	of your	countr	y to imp	rove ca	pacity i	n the fo	llowing	areaso	of tsuna	mirisk a	a sse ssm	nent?						
		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
5	5k)	On a scale of 1 (No capacity) to 5 (Very good) wh	nat capa	acity do	es your	country	/ have t	o give ti	aining	and/or	consulta	ncy on	tsunam	iriskas	ssessme	nt to oth	her cou	ntries?					
		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	сом	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	ММ	ОМ	РК	SIN	SA	SLK	TAN	THA	TL
	6a)	Does your country have a national tsunami polic	y? For	each of	the fou	r disaste	er mana	igemen	tphase:	slisted	below,	select s	tandalo	ne poli	cy / mul	ti hazaı	d policy	/ polic	y not av	/ailable			
		Prevention and mitigation	MH+T	MH+T	MH+T	MH+T	Т	MH+T		MH+T	MH+T	N/A	N/A		MH+T	MH+T	MH+T	Т	N/A	MH+T	MH+T	Т	MH+T
		Preparedness	MH+T	MH+T	MH+T	MH+T	Т	MH+T		MH+T	MH+T	N/A	N/A		MH+T	MH+T	MH+T	Т	N/A	MH+T	MH+T	Т	MH+T
s		Emergency response	MH+T	MH+T	MH+T	MH+T	Т	MH+T		MH+T	MH+T	MH+T	MH+T		MH+T	MH+T	MH+T	Т	N/A	MH+T	MH+T	Т	MH+T
G		Rehabilitation and reconstruction	MH+T	MH+T	MH+T	MH+T	Т	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
OLI	6b)	Does your country have local tsunami policies?	For eac	h of the	disaste	r manag	gement	phases	listed b	below, s	electst	andalor	ne polic	y/mult	i hazaro	d policy	/ policy	/ not av	ailable.				
۵.	-	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	Т	N/A	N/A	MH+T	MH+T	Т	
		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	Т	N/A	N/A	MH+T	MH+T	Т	
		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	
	7a)	Does your country have national, local and com	munity	level tsu	inami d	isasteri	risk red	uction p	lans? F	or each	of the	four dis	aster m	anagen	nent pha	aseslist	ed belo	w, sele	ct stand	alone p	lan / m	ulti haza	ard
		National - Prevention and mitigation	MH+T	MH+T		MH+T	Т	Т		MH+T	MH+T	N/A	MH+T			MH+T	MH+T	Т	MH+T	N/A	N/A	Т	Т
		Local - Prevention and mitigation	Т	MH+T		N/A	MH+T	Т		N/A	MH+T	N/A	N/A			MH+T	N/A	N/A	MH+T	N/A	N/A	Т	MH+T
		Community / Neighbourhood Level - Prevention and	MH+T	MH+T		N/A	MH+T	Т		N/A	MH+T	N/A	N/A				N/A	N/A	MH+T	N/A	N/A	Т	MH+T
		mitigation																					
		National - Preparedness	MH+T	MH+T		MH+T	Т	Т		MH+T	MH+T	N/A	MH+T			MH+T	MH+T	Т	MH+T	MH+T	N/A	Т	Т
		Local - Preparedness	Т	MH+T		N/A	MH+T	Т		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
NS		Community / Neighbourhood Level - Preparedness	MH+T	MH+T		N/A	MH+T	Т		N/A	MH+T	N/A	N/A				N/A	N/A	MH+T	MH+T	N/A	MH+T	MH+T
Ā		National - Emergency response	MH+T	MH+T		MH+T	Т	MH+T		MH+T	MH+T	MH+T	MH+T			MH+T	MH+T	Т	MH+T	MH+T	N/A	MH+T	MH+T
-		Local - Emergency response	Т	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	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
		response																					
		National - Renabilitation 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 - Renabilitation 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
	71-)	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
	70)	reduction plans based on bazards and risk	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	8a)	Does your country have national tsunami DRR gu	uideline	s? For	each of	the four	lifecyc	le phas	es,sele	ct stand	lalone g	quidelin	es/mu	lti haza	rd guide	elines/	guideli	nes not	availab	le.			
		Prevention and mitigation	Т	MH+T	N/A		Т	Т		MH+T	MH+T	N/A	N/A			MH+T	N/A	Т	N/A	N/A	MH+T	Т	N/A
		Preparedness	Т	MH+T	N/A		Т	Т		MH+T	MH+T	N/A	N/A		Т	MH+T	N/A	Т	N/A	MH+T	MH+T	Т	MH+T
ES		Emergency response	Т	MH+T	N/A		Т	MH+T		MH+T	MH+T	N/A	MH+T			MH+T	N/A	Т	N/A	MH+T	MH+T	MH+T	MH+T
IIN		Rehabilitation and reconstruction	N/A	MH+T	N/A		Т	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
ä	8b)	Does your country have local tsunami DRR guide	elines?	For eac	h of the	four life	ecycle j	ohases,	selects	standalo	ne guio	lelines/	/ multi-h	nazard g	guidelin	es/gui	delines	not ava	ilable.				
GU		Prevention and mitigation	Т	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	Т	N/A
		Preparedness	Т	MH+T	N/A		MH+T	N/A		MH+T	MH+T	N/A	N/A			MH+T	N/A	N/A	N/A	MH+T	MH+T	Т	N/A
		Emergency response	Т	MH+T	N/A		MH+T	N/A		MH+T	MH+T	MH+T	Т			MH+T	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	СОМ	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	ММ	ОМ	PK	SIN	SA	SLK	TAN	THA	TL
		9a)	Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
		9b)	Does your country utilise the data provided by th undertake its own threat assessments? (select all	e IOTW that a	/MS Tsu pply)	unami S	ervice I	Provide	rs (TSPs	s) for the	Coasta	al Forec	ast Zon	es (CFZ)	of your	r countr	y's coas	tline to	determ	ine nati	ional th	reats or	does it	
			Use TSP data	0	•	•	•	•	•	•	•	•	•	•	0	•	•	•	•	•	•	•	•	•
			Use own threat assessments	•	0	0	0	•	•	•	0	•	•	0	0	0	•	•	•	0	0	0	•	0
		9d)	Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	•	•	o	•	•	•	0	•	•	•	•	•	•	•	•	•	•	•	•	•	•
		9e)	What / which infrastructure is available to enable	e 24x7 (operati	ons? (se	lect all	that ap	ply)						-	_	•				_			
S			Computers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
E			Internet	٠	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
NI NI			Landline Phone	•	٠	•	•	•	0	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SIL	6		Mobile Phone or Cell Phone	٠	0	•	•	•	•	•	•	•	•	•	0	•	•	•	•	•	•	•	•	•
DES	ž		Satellite Phone	•	0	0	•	0	0	•	0	0	0	0	0	0	0	0	•	•	0	•	0	0
8	RN N		Fax	•	•	•	•	•	•	•	0	0	•	•	•	•	•	•	•	•	•	•	•	0
DS N	Ň		GTS (WMO Global Telecommunication System)	٠	0	0	•	•	•	0	•	0	•	•	•	•	•	0	•	•	•	•	•	0
R ^N	₽.		UPS (Uninterruptable Power Supply)	•	•	0	•	•	•	•	•	0	•	•	•	•	•	0	•	•	•	•	•	•
N	A		VSAT	•	•	0	o	•	•	o	0	0	•	0	0	0	•	O	0	o	0	o	0	0
ź	S	9f)	Which level of tsunami threat forecast information is pro	oduced l	by the re	sponsibl	e organi	sation? (select all	that app	ly)													
2	Ē		Ocean-wide	•	•	0	•	•	•	0	•	•	0	o	0	0	0	0	0	0	0	0	0	0
E	E		National	•	٠	•	0	•	•	•	0	•	•	•	•	•	•	•	•	•	•	•	•	•
E			Local	٠	•	•	0	•	•	•	0	0	•	0	0	•	•	•	•	0	•	•	•	•
R 2 -		9g)	Does the organisation have access to national or international seismic networks?	٠	٠	o	0	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PILLA		9h)	Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database?	٠	•	o	•	•	o	o	o	•	•	•	o	o	•	0	•		•	•	•	•
		9j)	Does the organisation have access to national or international sea level networks?	•	•	•	•	•	•	•	•	o	•	•	o	•	•	o	•	•	•	•	•	•
		9k)	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database?	٠	•	•	•	•	0	•	•	•	•	•	•	•	•	0	•	•	•		٠	•
		9m)	What other observing networks are operated by	your co	untry a	nd used	for tsu	nami ea	arly war	ning?														
			No other observing networks are operated by the country	0	•	o	•	0	•	•	o	•	o	•	•	0	o	•	•	o	•	•	0	о
			GNSS/GPS	٠	0	0	0	٠	0	0	0	0	О	0	0	0	•	О	0	О	0	0	0	0
			Coastal radars	О	0	0	0	٠	0	0	0	0	о	0	0	0	٠	о	0	•	0	0	٠	0
			Other	0	0	0	0	0	0	0	0	0	•	0	0	•	0	0	0	0	0	0	•	0

			AUS	BAN	сом	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	ММ	ОМ	РК	SIN	SA	SLK	TAN	THA	TL
	9n)	Does the organisation have the capability of																					
		analysing real-time seismic and sea-level	•	•	•	•	•	•	0	•	•	•	0	•	•	•	•	•	•	•	•	0	•
	<u> </u>	data for potential tsunami threat?																					
N S	90)	tsunami modelling to support generation of	•	•	0	0	•	•	٠	•	•	•	0	0	•	•	•	•	0	•	•	•	•
R.	9n)	Does the organisation responsible for																					
٨A	561	identifying a potential tsunami threat also issue												-			~						
6		national tsunami watches, advisories, alerts	•	•	0		•	0	•	•	•	•	•	•	•	•	0	•	•	•	•	•	•
AN		and/or warnings?																					
z	9s)	Did your country's NTWC and/or TWFP																					
P		participate in the 6-monthly communications	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0
E	a.)	tests conducted by the IOTWMS TSPs?																					
	9t)	Did your country's NIWC and/or IWFP	•			•	•	•	•	•		•		•		•	0		•	•		•	•
		conducted in the inter-sessional period?	•				•	•	•			•	Ū	•		•		•				•	•
	911)	After the December 26 2004 tsunami and until																					
	54,	now, was your country impacted by any	•	0	•	•	•	•	0	•	•	•	0	0	•	0	0	0	•	•	•	0	0
	10a)	How is the tsunami information (warning, public	safety a	action,	etc) diss	eminat	ed withi	in count	ry? (sel	ect all 1	hat app	ly)											
	-	Email	•	•	•	•	•	•	٠	•	•	•	•	•	•	•	•	•	•	•	•	•	•
		SMS	•	•	•	•	•	•	•	•	•	•	•	•	•	•	٠	•	•	•	0	٠	•
		Telephone	•	•	•	0	•	0	٠	•	•	•	•	0	•	•	٠	٠	•	•	•	•	٠
		Fax	٠	•	•	0	•	•	٠	0	•	٠	•	•	•	•	٠	•	0	•	•	٠	0
		Webpage	•	•	•	0	•	•	٠	•	•	•	•	0	•	٠	•	•	•	•	•	•	0
z		Radio	•	•	•	•	•	•	0	•	•	•	•	0	•	•	•	•	•	•	•	•	0
Ê		WhatsApp / Facebook / Other social media	•	•	•	0	•	•	•	•	0	•	0	0	•	•	0	0	0	•	0	٠	•
AN		Door-to-door	•	o	0	0	•	0	0	0	•	0	0	0	0	0	0	0	0	0	0	0	0
Σ		Sirens	•	•	0	0	•	•	•	•	•	•	•	0	0	0	•	0	0	•	0	•	•
SSE		Television	•	•	•	٠	•	•	0	•	•	•	•	٠	•	٠	•	٠	•	٠	•	٠	•
⊡		Warning towers	•	0	0	0	•	0	0	0	0	0	0	0	0	0	0	0	0	•	0	•	٠
		Megaphone	•	0	•	٠	•	0	0	•	•	O	0	0	0	0	0	0	0	•	0	0	٠
		Police/military	٠	0	0	0	٠	•	О	•	•	О	•	0	0	٠	О	0	0	٠	٠	О	٠
		Public alert system	٠	О	0	0	•	0	0	•	•	0	О	•	0	•	0	•	0	•	•	•	٠
		VHF radio	•	•	0	0	•	0	0	•	•	0	•	0	0	0	О	0	0	•	0	٠	0
		VPN	٠	0	0	0	•	0	0	0	0	0	0	0	0	٠	0	0	0	0	0	0	0
		Other	•	0	0	0	0	•	0	0	0	•	0	•	0	0	0	0	•	0	0	•	•

		AUS	BAN	сом	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	ММ	ОМ	РК	SIN	SA	SLK	TAN	THA	TL
11a	For each of the (upstream) emergency response	issues	listed be	low (in	rows),	conside	r the fo	ur ques	tions (in	colum	ns). Sel	ectaye	s/no res	sponse	using th	e drop	down m	ienus.				
	24/7 EOC - Does your SOP address this aspect of																					
	tsunami emergency response?	•	•	•	•	•	•		•	•	•	•		•	•	•	•	0	•	•	•	•
	24/7 EOC - Is support required to develop/improve																					
	this aspect of tsunami emergency response in	0	•	•	0	0	•		•	•	•	0		•	•	•	0	•	•	•	•	•
	your SOP?																					
	24/7 EOC - Is support required to develop Human																					
	Resources in this aspect of tsunami emergency	0	•	0	0	•	•		•	•	•	•		•	•	•	0	•	•	•	•	•
	response?			-	_																	
	24/7 EOC - Is support required to develop																					
	infrastructure for this aspect of tsunami emergency	0	•	•	•	•	•		•	•	•	•		•	0	•	0	•	•	•	•	•
	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 tsupport	0		•	0	0	•		•	•	•	0		•	0	•	0	0	•	•	•	•
	emergency response in your SOP?	Ŭ	-	-	Ŭ		•		-	-	•					•		Ĵ		-	•	-
IRES	Receiving information from the NTWC - Is support																					
Ē	required to develop Human Resources in this aspect	0	•	0	0	0	•		•	•	•	0		•	0	٠	0	0	•	•	•	•
ROC	Receiving information from the NTWC - Is support																					
E C	required to develop infrastructure for this aspect of	0	•	•	•	0	•		•	•	•	•		•	0	•	0	0	•	•	•	•
LING	Does your SOP address this aspect of tsupami																					
RA	emergency response?	•	•	•	•	•	•		•	•	•	•		•	•	•	•	•	•	•	•	•
P	Response Criteria / decision making - Is support																					
8	required to develop/improve this aspect of tsupami			•	•	0	•		•	•	•	•		0	•	0	0	•	•	•	•	•
ADI	emergency response in your SOP?	-	-		•		•		-	-	•	-		l i	•		J	•		-	•	-
TAN	Response Criteria / decision making - Is support																					
S	required to develop Human Resources in this aspect	0	•	•	•	0	•		•	•	•	•		•	•	0	0	•	•	•	•	•
	Response Criteria / decision making - Is support														_		-					
	required to develop infrastructure for this aspect of	0	•	•	•	0	•		•	•	•	•		•	0	•	0	•	•	•	•	•
11b	For each of the (downstream) emergency response	nse issu	es listed	below	(in row	s), cons	ider the	four qu	estions	in colu	umns). S	Select a	yes/no	respon	se using	the dr	op dowi	n menu	S.			
	Warning dissemination - Does your SOP address		1								-		<u> </u>	· ·			·			1		
	this aspect of tsunami emergency response?	•	•	•	•	•	•		•	•	•	•		•	•	•	•	•	•	•	•	•
	Warning dissemination - Is support required to																					
	develop/improve this aspect of tsupami emergency	•	•	•	•	0	•		•	•	•	0		•	٠	٠	0	0	•	•	•	•
	Warning dissemination - Is support required to																					
	develop Human Resources in this aspect of tsunami	•	•	•	0	0	•		•	•	•	•		•	٠	0	0	0	•	•	•	•
	Warning dissemination - Is support required to																					
	develop infrastructure for this aspect of tsunami	0	•	•	•	0	•		•	•	•	•		•	•	•	0	0	•	•	•	•
	Evacuation call procedures - Does your SOP	1	1	1															1			
	address this aspect of tsunami emergency	•	•	•	•	•	•		•	•	•			•	•	•	0	0	•	•	•	•
	Evacuation call procedures - Is support required to		1	<u> </u>															<u> </u>			
	develop/improve this aspect of tsunami emergency	•	•	•	•	0	•		•	•	•			•	•	•	0	•	•	•	•	•
	Evacuation call procedures - Is support required to	1	1		-	1	1	1			1	1	1			-		1		1	1	1
	develop Human Resources in this aspect of tsunami	•	•	•	0	•	•		•	•	•			•	•	O	0	•	•	•	•	•

		AUS	BAN	сом	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	ММ	ОМ	PK	SIN	SA	SLK	TAN	THA	TL
11b) For each of the (downstream) emergency respor	nse issu	eslisteo	d below	(in row	s), cons	ider the	four qu	uestions	(in col	umns). S	Select a	yes/no	respon	se using	g the dr	op dow	n menu	s.			
	Evacuation call procedures - Is support required to	0	•	0	•	•	•		•	•	•			•	•	•	0	•	•	•	•	•
	develop infrastructure for this aspect of tsunami		•	, j	· ·	•	•			•	•			· ·	•	•					•	•
	Community evacuation procedures - Does your SOP																					
	address this aspect of tsunami emergency	•	•	•	•	•	•		•	•	•			•	•	0	0	0	•	•	•	•
	response?																					
	Community evacuation procedures - Is support																					
	required to develop/improve this aspect of tsunami	•	•	•	•	0	•		•	•	•			•	•	•	0	•	•	•	•	•
	emergency response in your SOP?																					
	Community evacuation procedures - Is support	•	•	•	0	•	•		•	•	•			•	•	0	0	•	•	•	•	•
	required to develop Human Resources in this aspect											-										
	Community evacuation procedures - Is support	0	•	0	•	•	•		•	•	•			•	•	•	0	•	•	•	•	•
	required to develop infrastructure for this aspect of																					
	Communication with NTWC - Does your SOP	•	•	•	•	•	•		•	•	•			•	•	•	•	•	•	•	•	•
	address this aspect of tsunami emergency																					
	Communication with NTWC - Is support required to	•				0	•				•					•	0	0			•	•
ង	develop/improve this aspect of tsunami emergency	•	•	•	•	9	•		•	•	•			•	•	•	9		•	•	•	•
DUR	Communication with NTWC - Is support required to					0										0	0	0				
CEL	develop Human Resources in this aspect of tsunami	•	•	•	•	0	•		•	•	•			•	•	0	0	0	•	•	•	•
PRO	Communication with NTWC - Is support required to				_																	
g	develop infrastructure for this aspect of tsunami	•	•	•	0	0	•		•	•	•			•	•	•	0	0	•	•	•	•
ATII	Communication with Local Government -															•	0					
PER	Does your SOP address this aspect of tsunami	•	•	•	•	•	•			•	•			•	•	•	0	•	•	•	•	•
0 0	Communication with Local Government - Is support																					
ARI	required to develop/improve this aspect of tsunami	•	•	0	0	0	•		•	•	•			•	•	٠	0	0	•	•	•	•
N A	emergency response in your SOP?																					
SI	Communication with Local Government - Is support																					
	required to develop Human Resources in this aspect	•	•	0	0	0	•		•	•	•			•	•	0	0	0	•	•	•	٠
	of tsunami emergency response?																					
	Communication with Local Government - Is support	0				0	•			•	•				•	•	0	0			•	•
	required to develop infrastructure for this aspect of	· ·	•	•	<u> </u>		•		•	•	•			•	•	•		<u> </u>	•	•	•	•
	Media arrangements - Does your SOP address this	•	•	0	•	•	•		•	•	•			•	•	•	•	0		•	•	•
	aspect of tsunami emergency response?	-	-	Ľ		-	-			-	-				-	-	-	<u> </u>			-	-
	Media arrangements - Is support required to																					
	develop/improve this aspect of tsunami emergency	•	•	•	•	0	•		•	•	•			•	•	٠	0	•	•	•	•	•
	response in your SOP?																					
	Media arrangements - Is support required to develop																					
	Human Resources in this aspect of tsunami	•	•	•	•	0	•		•	•	•			•	•	0	0	•	•	•	•	•
	emergency response?																					
	Media arrangements - Is support required to develop	0	•	0	0	0	•		•	•	•			•	•	•	0	0	•	•	•	•
	infrastructure for this aspect of tsunami emergency				L							<u> </u>		L					ļ			
	Communication with other stakeholder i.e. Red																					
	Cross, Fire Brigade, Search and Rescue, Police,	•	•	•	•	•	•		•	•	•			•	•	•	•	•	•	•	•	•
	Army, Navy etc Does your SOP address this					l	l				l	1										

				_																			
			AUS	BAN	СОМ	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	MM	OM	PK	SIN	SA	SLK	TAN	THA	TL
	11b)	For each of the (downstream) emergency respon	nse issu	ies liste	dbelow	(in row	s), cons	ider the	e four qu	uestions	in col	umns). S	Select a	yes/no	respon	se using	g the dr	op dow	n menu	s.			
		Communication with other stakeholder i.e. Red																					
		Cross, Fire Brigade, Search and Rescue, Police,					~					_										-	
		Army, Navy etc Is support required to	•	•	•	0	0	•		•	•	•			•	•	0	0	•	•	•	•	•
		develop/improve this aspect of tsunami emergency																					
		Communication with other stokeholder i.e. Red																					
		Cross Fire Brigade Search and Rescue Police																					
		Army Naw etc. Is support required to develop	•			0	0	•				•				•	0	0	•	•		•	•
		Human Resources in this aspect of tsunami	•			Ŭ		-				-				-	J		-	-		•	-
		emergency response?																					
		Communication with other stakeholder i.e. Red																					
		Cross, Fire Brigade, Search and Rescue, Police,																					
		Army, Navy etc Is support required to develop	0	•	•	0	O	•		•	•	•			•	•	•	0	o	•	•	•	•
s		infrastructure for this aspect of tsunami emergency																					
URE		response?																					
E	11c)	Would your country be willing to share	•		•	•	•	•		•	•	•	•	•	•	•	•	0	•	•	•	•	•
PRO		your SOPs with the IOTIC and other countries?	_	_	_	_	_	_		_	_	_	_	_	-	-	_		_	_	_	_	_
g	11d)	For each emergency response organisation liste	d belov	w, whicl	h comm	unicatio	on meth	ods for	emerge	ency res	ponse a	re avai	ilable? ((select a	all that a	pply)		-	-				
RATI		National DMOs - Telephone	•	0	•	•	•	0		•	•	•	•	•	•	•	•	•	•	•	•	٠	•
Be		National DMOs - Fax	•	•	•	•	٠	٠		•	•	٠	•	•	•	•	•	٠	٠	•	•	•	0
8		National DMOs - Email	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	٠	•
NDA		National DMOs - SMS	•	0	•	•	•	•		•	•	٠	•	0	•	•	•	•	•	o	0	•	•
STA		National DMOs - Siren	0	O	0	•	•	•		•	0	0	0	0	0	0	•	•	0	0	0	•	•
		National DMOs - Other	•	0	0	•	•	0		0	0	•	0	0	0	•	0	0	0	0	0	•	0
		Local DMOs - Telephone	•	0	•	•	•	0		•	•	•	0	•	•	•	•	•	•	•	•	•	•
		Local DMOs - Fax	•	•	•	•	•	•		o	o	•	o	•	•	•	•	•	•	•	•	•	0
		Local DMOs - Email	•	•	•	•	•	•		•	o	•	o	•	•	•	0	•	•	•	•	•	•
		Local DMOs - SMS	•	o	•	•	•	•		•	•	•	o	•	•	•	•	•	•	0	o	•	•
		Local DMOs - Siren	•	O	0	0	•	•		•	•	0	o	0	o	0	•	•	o	o	o	•	0
		Local DMOs - Other	•	0	0	0	•	•		o	o	•	o	o	o	0	0	o	o	o	0	٠	0
		General public - Telephone	•	0	0	0	•	0		•	O	•	0	0	•	0	•	•	o	o	•	0	•
		General public - Fax	•	0	0	0	0	0		O	O	•	o	0	•	0	O	•	O	o	•	0	0
		General public - Email	•	0	0	0	•	0		0	0	•	0	0	•	0	0	•	0	0	•	0	•
		General public - SMS	•	•	•	0	•	0		•	•	0	•	0	•	•	•	•	•	•	0	0	•
		General public - Siren	•	•	0	0	0	0		•	•	•	•	0	0	•	•	•	0	•	0	•	0
		General public - Other	•	0	•	•	•	•		0	0	•	0	0	0	•	0	0	0	•	0	•	0

			AUS	BAN	сом	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	ММ	ОМ	РК	SIN	SA	SLK	TAN	THA	TL
	11b)	For each of the (downstream) emergency respor	nse issu	es listeo	d below	(in row	s), cons	ider the	four q	uestions	in colu	umns). S	Select a	yes/no	respon	se using	the dro	op dow	n menu	s.			
		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?	•	•	•	0	0	•		•	•	•			•	•	o	0	•	•	•	•	•
		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?	•	•	•	o	0	•		•	•	•			•	•	o	0	•	•	•	•	•
		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?	o	•	•	o	0	•		•	•	•			•	•	•	0	0	•	•	•	•
	11c)	Would your country be willing to share your SOPs with the IOTIC and other countries?	•	•	•	•	٠	•		•	•	•	•	•	•	•	•	0	•	•	•	•	•
JRES	11d)	For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)																					
ED		National DMOs - Telephone	•	0	•	•	•	0		•	•	•	•	•	•	•	•	•	•	•	•	•	•
PROC		National DMOs - Fax	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	0
5		National DMOs - Email	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•
MIII		National DMOs - SMS	•	0	•	•	٠	•		•	•	•	•	0	•	•	•	٠	•	0	0	•	•
DPEF		National DMOs - Siren	o	0	0	•	•	0		•	0	0	0	o	0	0	•	•	0	0	0	•	•
8		National DMOs - Other	•	0	0	0	•	0		0	0	•	0	0	0	0	0	0	0	0	0	•	0
IDAI		Local DMOs - Telephone	•	0	•	•	•	0		•	•	•	0	•	•	•	•	•	•	•	•	•	•
STAI		Local DMOs - Fax	•	•	•	•	•	•		0	0	•	0	•	•	•	•	•	•	•	•	•	0
		Local DMOs - Email	•	•	•	•	٠	•		•	0	•	0	•	•	•	0	٠	•	•	•	•	•
		Local DMOs - SMS	•	0	•	•	٠	•		•	•	•	0	0	•	0	•	٠	•	0	0	•	•
		Local DMOs - Siren	•	0	0	0	•	٠		•	•	O	0	O	0	0	•	•	0	0	0	•	0
		Local DMOs - Other	•	0	0	0	٠	•		0	0	•	0	0	0	0	0	0	0	0	0	•	0
		General public - Telephone	٠	0	0	0	٠	0		•	0	•	0	0	•	0	٠	٠	0	0	•	0	•
		General public - Fax	•	0	0	0	0	0		0	0	•	0	0	•	0	0	٠	0	0	•	0	0
		General public - Email	•	0	0	0	٠	0		0	0	•	0	0	•	0	0	٠	0	0	•	0	•
		General public - SMS	•	•	•	0	٠	0		•	•	0	•	0	•	•	•	٠	•	•	0	0	•
		General public - Siren	•	•	0	0	0	0		•	•	•	•	0	0	•	•	٠	o	•	0	•	0
		General public - Other	•	0	•	•	٠	•		0	0	•	0	0	0	•	0	0	0	•	0	•	0
		Coastal communities - Telephone	•	0	•	•	٠	o		•	•	•	o	•	•	0	•	٠	•	0	•	О	•
		Coastal communities - Fax	•	0	0	•	0	0		0	0	•	0	•	•	0	0	٠	0	0	0	0	0
		Coastal communities - Email	•	0	0	•	٠	0		0	0	•	0	•	•	0	0	٠	•	0	0	0	•
		Coastal communities - SMS	•	•	•	•	٠	0	1	•	•	0	•	0	•	•	•	٠	•	•	0	0	•
		Coastal communities - Siren	•	•	0	0	0	0	1	•	•	•	•	0	0	•	٠	٠	0	•	•	•	0
		Coastal communities - Other	0	0	•	0	•	•		0	0	•	0	0	0	•	0	0	0	•	0	•	0

			AUS	BAN	сом	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	MM	ОМ	PK	SIN	SA	SLK	TAN	THA	TL
	11d)	For each emergency response organisation liste	d belov	v, whicl	h comm	unicatio	on meth	ods for	emerge	ency res	sponse a	ire ava	ilable?	(select a	Il that a	apply)							
g		Coastal communities - Other	0	0	•	0	•	•		0	0	•	0	0	0	•	0	0	0	•	0	•	0
RAT 8	3	Media - Telephone	•	•	•	•	•	0		•	•	•	•	•	•	•	•	•	•	•	•	•	٠
He He		Media - Fax	•	•	•	0	•	0		•	•	•	•	•	•	0	•	•	0	•	•	•	0
8 2		Media - Email	•	0	•	•	•	•		•	•	•	•	•	•	•	0	•	•	•	•	•	•
DND4	Ē	Media - SMS	•	•	0	•	•	0		•	•	0	0	0	•	•	٠	0	٠	0	0	•	•
STA		Media - Siren	0	0	0	0	0	0		•	0	0	0	0	0	0	0	0	0	0	0	0	0
		Media - Other	•	0	0	0	•	•		•	0	٠	0	0	0	0	0	0	0	•	0	•	0
	12a)	Does your country have the following evacuation	n infras	tructure	? (seled	t all that	at apply	and de	tail spe	cific are	as).												
		Evacuation shelter	0	•	0	0	•	•	0	•	•	0	•	•	0	•	0	0	0	•	0	•	•
		Vertical evacuation structure	0	•	0	0	•	•	0	0	0	0	0	•	0	0	0	0	•	•	0	•	•
		Natural or artifical hill for vertical evacuation	•	•	•	•	•	•	•	0	•	•	0	0	0	0	•	0	•	•	0	•	•
		Evacuation signage	•	•	0	0	•	•	0	•	0	0	0	0	0	0	•	0	О	•	0	•	•
		Other	0	0	0	0	0	•	0	0	0	0	0	0	0	0	0	0	О	0	0	0	0
	12b)	Is your evacuation infrastructure integrated in the evacuation plan?	o	•	o	o	•	•	•	•	•	•	•	•	•	•		o	o	•		•	•
	12a)	Are tsunami exercises incorporated within natio	nal pol	icies an	d guide	lines? (select a	II that a	pply)														
S		National policy	0	O	•	O	•	•	0	•	•	•	•	0	o	•	•	•	0	o	•	•	•
CIS		National guidelines	•	•	0	•	•	•	0	•	•	•	•	•	•	•	•	•	•	•	O	•	0
Ê	12b)	At what levels were the exercises conducted du	ring the	inter-s	essiona	l (betwe	en ICG	Meeting	gs) peri	od? (se	ect all t	hat app	oly)		-					-			
<u> </u>		National level	•	•	•	0	•	•	0	•	•	0	•	0	•	•	0	•	•	•	0	•	•
A		Regional level	•	0	•	•	•	•	0	•	•	0	0	0	•	•	0	0	0	0	0	•	•
N ²		City level	•	0	0	0	•	0	0	0	•	0	•	•	•	0	0	0	0	0	•	0	0
TSI		Village level	•	0	•	0	•	0	•	0	0	•	•	O	•	•	•	O	O	•	O	0	0
		Community/Neighbourhood level	0	0	•	0	•	0	0	0	0	•	•	O	•	•	•	O	O	•	O	•	•
		School level	0	0	0	0	•	0	0	0	0	•	•	0	O	•	0	0	0	•	0	0	•
	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?																					
		Organisation table top exercises	•	•	•	0	•	•	•	•	•	•	•	•	•	•	0	•	•	•	•	•	•
		Inter-organisation table top exercises	•	•	•	0	•	•	•	•	•	•	0	•	•	•	0	•	•	•	•	0	•
		National.tsunami drill/exercise	•	•	0	0	•	•	•	•	•	•	0	0	•	0	•	0	0	•	0	•	•
		Indian Ocean Wave exercise	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0	•	•	•	•	•	•
		Local tsunami exercise		•	0	O	•	•	0	•	0	•	•	0	•	0	•	•	0	•		•	•
		Other	•		•	O		•	0	0	0			0								0	
S	13a)	Who is responsible for tsunami public awareness programmes in your country?	LDMO	NDMO	NDMO	NDMO	NDMO	NTWC	NTWC	NDMO	NDMO	NDMO	NTWC	NDMO	NTWC	NDMO	NDMO	NTWC	NDMO	NDMO	NDMO	MO	NDMO
I Z	13b)	What tsunami related education and awareness	materi	alsdoy	ou have	e? (sele	ct all th	at apply	r)					-		-		-			-		
ARI		Leaflets or flyers	•	O	•	O	•	•	0	•	0	•	•	0	o	•	•	0	•	•	•	•	•
AV		Posters	•	0	0	0	•	•	•	•	•	•	•	•	•	•	٠	0	0	•	0	•	•
2		Booklets	•	0	•	0	•	•	•	•	•	•	0	•	0	•	0	0	0	•	0	•	•
JBL		Information boards	•	•	0	•	0	•	0	0	0	0	0	0	0	0	0	0	0	•	0	•	0
P		Tsunami Signage	•	0	0	0	•	•	0	0	0	0	0	0	0	0	0	0	0	•	0	•	0
		Video, or other visual or oral media	•	0	0	0	•	•	0	•	0	•	•	•	•	•	0	O	0	•	•	•	•
IOC Technical Series, 143 Annex III – page 12

			AUS	BAN	СОМ	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	ММ	ОМ	РК	SIN	SA	SLK	TAN	THA	TL
	13b)	What tsunami related education and awareness	materia	alsdoy	ou have	? (sele	ct all th	at apply	r)										-				
		Leaflets or flyers	٠	0	•	0	•	•	0	•	0	•	•	0	0	•	•	0	•	•	•	•	٠
		Posters	•	0	o	o	•	•	•	•	•	•	•	•	•	•	•	0	0	•	0	•	•
		Booklets	٠	0	•	0	•	•	•	•	•	•	0	•	0	•	0	0	0	•	0	•	•
		Information boards	٠	•	0	•	0	•	0	0	0	0	0	0	0	0	0	0	0	•	0	•	0
		Tsunami Signage	٠	0	0	0	•	•	0	0	0	0	0	0	0	0	0	0	0	•	0	•	0
		Video, or other visual or oral media	٠	0	0	0	•	•	0	•	0	•	•	•	•	•	0	0	0	•	•	•	•
		Indigenous knowledge, folklore, or oral history accounts or compilations	o	o	o	o	•	•	0	•	o	o	o	o	o	o	0	o	•	•	o	•	•
		Teaching kits on tsunamis	٠	0	•	o	•	•	o	•	•	0	•	0	•	o	0	•	0	•	0		•
		School curricula	•	•	•	0	0	O	•	•	o	•	•	0	o	•	0	•	•	•	0	•	•
		Public evacuation map	٠	0	0	0	•	•	0	0	0	0	0	0	0	0	0	0	0	•	0	0	•
	13c)	Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0	•	•	•	•	•
S	13d)	Do you undertake the following tsunami awaren	essacti	vities?																			
NES		World Tsunami Awareness Day	٠	•	•	0	٠	0	•	•	0	•	•	0	•	•	٠	0	0	•		•	0
NE		Global Disaster Risk Reduction Day	٠	•	•	0	0	0		•	0	0	•	O		•	0	0	•	0	•	٠	•
Ň		Public tsunami preparedness outreach	•	•	0	0	٠	٠	•	•	•	0	•	0		•	0	0	0	•		•	0
ح د		School.and/or children's awareness		•	•	0	•	•	•	•	•	•	•	•	•	•	•	0	0	•	0	•	•
BLI		Exhibitions	0	•	•	0	•	•	0	•	0	•	•	0		•	0	0	0	•		•	•
PU		Competitions or other ways of highlighting tsunami safety	о	•	o	o	•	o	o	0	o	•		о		o	o	o	0	•		o	o
		Tsunami exercise	٠	•	0	0	•	•	•	•	•	•	•	0	•	•	•	0	•	•		•	•
		Other			0	0		0	0	0								0				0	
	13e)	Use the boxes below to indicate any areas in wh	ich you	ı requir	e suppo	rt from	the IOT	IC to de	velop o	r enhar	ice pub	lic awaı	renessi	n your o	country.	lf you o	do not r	equire	support,	please	leave b	olank.	
		Provision of general tsunami awareness materials	0	•	0	•	•	•	•	•	•	•	0	•	•	•	•	0	•	0	•	•	•
		Customization of general materials to country or community	o	•	•	o	•	o	•	•	•	•	•	o	•	•	•	o	•	•	o	•	•
		Development of tsunami awareness programmes, activities or campaigns	•	•	•	o	•	o	•	•	•	•	•	•	•	•	•	o	o	•	•	•	•
		Participation/support by international agencies or experts to your country's activities	•	•	•	0	•	•	•	•	•	•	•	•	•	•	0	0	0	•	•	•	•
	13f)	Can your country offer support to other Member States to develop or enhance public awareness in their country?	•	•	0	0	•	•	0	•	•	0	o	0	•	0	o	o	o	•	•	•	o
	13g)	Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	•	•	0	0	•	•	0	•	•	0	o	0	0	•	o	0	0		0	0	o

IOC Technical Series, 143 Annex III – page 13

			AUS	BAN	сом	FR	IN	IND	IR	KN	MAD	MAL	MAU	MZ	MM	ОМ	PK	SIN	SA	SLK	TAN	THA	TL
	13h)	For those communities that participated in the IC	OTR init	iative, p	olease p	rovide a	a gener	al ranki	ng of th	neir per	formand	e agaiı	nst the l	OTR inc	licators,	using f	the scal	e 1 (ver	y poor)	to 5 (vei	ry 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		
ES		Develop and distribute outreach and public education	3	4			5	4		3	2			2	3	5				3	4		
ARENE		Hold at least three outreach or educational activities annually	2	4			5	5		3	2			2	3	4				4	4		
AV		Conduct an annual tsunami community exercise	2	4			5	5		3	2			1	3	4				4	4		
BLIC		Address tsunami hazards in the community's Emergency Operations Plan (EOP)	3	5			5	4		4	2			1	3	4				3	4		
Ρd		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									
		Notes/Requirements							
	Phase	National			Local	Notes:			
	Prevention & Mitigation	Multi-hazard inc.Tsuna	imi	No	ot available	National Strategy for Disaster Resilience (Feb 2011);			
Delicios	Preparedness	Multi-hazard inc.Tsuna	imi	No	ot available	National Disaster Risk Reduction Framework (draft);			
Policies	Emergency Response	Multi-hazard inc.Tsuna	ımi	No	ot available	Australian Emergency Management Arrangements			
	Rehabilitation & Reconstruction	Multi-hazard inc.Tsuna	ımi	No	ot available	Handbook			
	Phase	National	Local		Community	Notes:			
	Prevention & Mitigation	Multi-hazard	Sta	ndalone	Multi-hazard	Australian Government Disaster Response Plan			
		inc.Tsunami	inc.Tsunami tsun		inc.Tsunami	stipulates when and how to seek Federal Government			
	Preparedness	inc Tsunami	Sta ts	ndalone Unami	inc Tsunami	assistance in a major disaster; Tsunami subplan in			
Plans	Emergency Response	Multi-hazard	Sta	ndalone	Multi-hazard	 each State/Territory Emergency Service; Multi-hazard plan in each State/Territory and local government area 			
	Rehabilitation &	Not available	Mult	i-hazard	Multi-hazard	,			
	Country's tsunami disaster risk Yes	reduction plans based o	sk assessment:						
	Phase National Local					Notes:			
	Prevention & Mitigation	Standalone tsunami		Standalone tsunami		Tsunami Emergency Planning in Australia Handbook.			
Guidalinas	Preparedness	Standalone tsunami		Stand	alone tsunami				
Guidennes	Emergency Response	Standalone tsunami		Stand	alone tsunami				
	Rehabilitation &	Not available		Nc	at available				
	Reconstruction	NOL AVAIIADIC		INC					
	Single hazard assessment	on tsunami undertaken:	No			Notes:			
	 Multi-hazard assessment in 	ncluding tsunami, cyclo	ne, eai	thquakes	and flooding.	Tsunami Hazard Modelling Guidelines available. Most			
	Tsunami hazard assessme	nt at national, regional	and ci	ty levels		mapping used the 2008 PTHA since updated with the			
Hazard	 Products available: PTHA, 	field studies on tsuna	mi imp	act, hazar	d maps and	2018 PTHA. State governments to assess need to			
Assessment	inundation maps, guidelii	nes on tsunami hazard	mode	lling		Update mapping given the significant changes to the			
	 Capacity to undertake tsuna 	ami hazard assessment	Good						
	Capacity to train other cour	ntries: Good (PTHA, DT	⁻ HA, ha	zard, inun	dation and				
	evacuation maps) to Mode	rate (field studies)							

		AUSTRALIA	
		Status	Notes/Requirements
Risk Assessment	 Single risk assessment o Multi-hazard risk assessment pidemics, flooding and Tsunami risk assessmen Products available: Nation Capacity to undertake tsu Capacity to provide training countries: Good 	n tsunami undertaken: No nent including tsunami, cyclone, earthquakes, I landslides t at regional level nal Emergency Risk Assessment Guidelines (NERAG) Inami risk assessment: Very Good ng and/or consultancy on tsunami risk assessment to other	Notes : 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.
Detection and Warning	 National capability to ass advise/warn coastal com Name of organisation wit tsunami threat informatio Use IOTWMS TSP data ta assessments 24x7 operations? Yes (s Level of tsunami threat for local Access to national or inte Access to national or inte Other national observing Capability to analyse real threat: Yes Capability for tsunami mode Does organisation for ide watches, advisories, alert 	ess and/or receive potential tsunami threat information and munities: Yes n responsibility for assessing and/or receiving potential n: Joint Australian Tsunami Warning Centre (JATWC) o determine national threats? Use own threat ee notes) recast information produced: Ocean-wide, national and rnational seismic networks: Yes (see notes) rnational sea level networks: Yes (see notes) networks used for tsunami early warning: GNSS/GPS -time seismic and sea-level data for potential tsunami delling to support threat forecasts: Yes ntifying potential tsunami threat issue national tsunami is and/or warnings? Yes	 Notes: 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. 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. Real-time data from Australian operated 43 coastal sea level stations and Australian network of 6 tsunameters.
Dissemination	How is tsunami information disseminated within country? How is warning terminated?	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. 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	Notes: Other: Emergency Alert; Phone trees; 1300 TSUNAMI telephone servicesNotes: 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.

AUSTRALIA									
	Statu	IS	1	lotes/ Requirem	ents				
			Supp	oort Required to	Develop				
Standard Operating Procedures	 SOPs for <u>upstream</u> emergency response: 24/7 Emergency Response Centre: Yes Receiving information from NTWC: Yes Response criteria/decision making: Yes SOPs for <u>downstream</u> emergency response: Warning dissemination: Yes Evacuation call procedures: Yes Communication with NTWC: Yes Communication with local government: Yes Media arrangements: Yes 	2S	SOPs X X V V V V V V V V V V	Human Resources X X X X V V V V	Infrastructure X X X X X X X X X X X X X X				
Evacuation Infrastructure	 Evacuation shelters: No Vertical evacuation shelter: No Natural or artificial hill for vertical evacuation Evacuation signage: Yes Evacuation infrastructure integrated in evaluation 	Notes: Shelters available but not specifically for tsunami. Evacuation signage is limited to some coastal cities such as Manly Beach							
Tsunami Exercises	 Tsunami exercises incorporated in nationa Tsunami exercises incorporated in nationa Tsunami exercises are conducted: National: Yes Regional: Yes City: Yes Village: Yes Community/neighbourhood: No School: No 	Il guidelines Yes	Notes: • Organisation • Inter-organisa • National tsun IOWave18 ar • Indian Ocean	table top (5-10) ation table top (5- ami drill/exercise nd PacWave18) Wave Exercise (10) (2, leveraging 1?)				
Public Awareness	 Responsibility for tsunami public awareness Tsunami related education and awareness material available: Leaflets or flyers: Yes 	s programmes: LDMO Tsunami awareness activities undertaken: • World Tsunami Awareness Day: Yes	Notes: A tailored-to-Australia online tsunami education s resource called "Tsunami: The Ultimate Guide" at						

			AUSTRALIA	
		Statu	S	Notes/ Requirements
	 Posters: Yes Booklets: Ye Information be Tsunami sign Video or othe Indigenous kr Teaching kits Schools currie Public evacuation 	s pards: Yes age: Yes r visual or oral media: Yes nowledge, folklore etc: No : Yes cula: Yes ation maps: Yes	 Global Disaster Risk Reduction Day: Yes Public tsunami preparedness outreach: Yes School and/or children's awareness: No Exhibitions: No Competitions/other ways of highlighting tsunami safety: No 	https://knowledge.aidr.org.au/resources/the-ultimate- guide- tsunami/# Keen to work with IOTIC to enhance tsunami preparedness
	Support from IOTIC required to develop or enhance public awareness: • Willing to sup	 Provision of general tsuna Customization of general Development of tsunami a or campaigns Participation/support by ir your country's activities port other countries to develo 	ami awareness materials X materials to country or community X awareness programmes, activities ✓ nternational agencies or experts to ✓ p or enhance public awareness: Yes	Notes : IOTR pilot communities: Christmas Island and
General Comments and Future Plans	 Communities General Comme Australian Ts Tsunami Haz Geoscience A GA released GA have prov GA has traine source PacSA Bureau of Me IOWave18 ex University of 	involved in Indian Ocean Tsu nts: unami Advisory Group (ATAG ard Modelling Guidelines. Bot Australia (GA) upgraded the N a new version of the PTHA or rided options to the IOTWMS ed scientists in the Pacific to d AFE software tool. eteorology performed a major eteorology published a real-tim cercise Newcastle completed a study	anami Ready (IOTR) initiative: Yes b) has updated the national Tsunami Emerge th documents were released on World Tsuna lational Earthquake Alert Centre in June 20 ^o in World Tsunami Awareness Day. Reviewed to leverage the PTHA for Indian Ocean nati levelop tsunami inundation maps and to inter upgrade to its tsunami Decision Support Too ne tsunami warning status page for the India into the potential for submarine landslide in	Cocos (Keeling) Islands ency Planning Handbook and developed national ami Awareness Day on 5 Nov 2018. 18 which is a key component of the JATWC d at EGU and journal publications are progressing) ons egrate into disaster management plans using the open- ol. on Ocean which was successfully tested during the undation off the NSW coast

AUSTRALIA										
	Status	Notes/ Requirements								
	 Future Plans Develop local tsunami hazard information using the 2018 PTHA and the Tsunami Haza Collect elevation data in priority areas and support national initiatives in this regard Develop nationally consistent storm surge services Continue to collaborate on science improvements to the warning system (e.g. upgrade in the PTHA18) Develop and/or refine tsunami evacuation maps More inundation modelling and mapping Increase tsunami awareness for coastal communities and marine users 	ard Modelling Guidelines the JATWC T2 scenario database based on new data								

BANGLADESH											
		Status			Notes/Requirements						
	Phase	National		Local							
	Prevention & Mitigation	Multi-hazard +Tsunam	i Mu	lti-hazard +Tsunami							
Policios	Preparedness	Multi-hazard +Tsunam	i Mu	lti-hazard +Tsunami							
FUICIES	Emergency Response	Multi-hazard +Tsunam	i Mu	lti-hazard +Tsunami							
	Rehabilitation & Reconstruction	Multi-hazard +Tsunam	i Mu	lti-hazard +Tsunami							
	Phase	National	Local	Community							
	Prevention & Mitigation Multi-haza		Multi-hazard +Tsunami	Multi-hazard +Tsunami							
	Preparedness	Multi-hazard +Tsunami	Multi-hazard +Tsunami	Multi-hazard +Tsunami							
Plans	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 i Yes	risk reduction plans b									
	Phase	National		Local							
	Prevention & Mitigation	Multi-hazard +Tsuna	imi l	/lulti-hazard +Tsunami							
Guidalinas	Preparedness	Multi-hazard +Tsuna	imi l	/lulti-hazard +Tsunami							
Guidennes	Emergency Response	Multi-hazard +Tsuna	imi l	/lulti-hazard +Tsunami							
	Rehabilitation &	Multi-hazard +Tsuna	imi l	/lulti-hazard +Tsunami							
	Reconstruction										
Hazard	 Single hazard assessme Multi-hazard assessmer earthquakes, flooding 	ent on tsunami under nt undertaken includir , landslides	taken: No ng tsunami, cy	clone, droughts,	Notes: 0.5% coastal areas of total Khulna, Barishal, Chattogram division have been mapped for tsunami						
Assessment	Isunami nazard assess Bradueta available: DTI		ational level	lation mana	Requirements:						
	Consoity to undertake to	na, DINA, Hazaru m	aps and mun	lation maps.	Priority to improve capacity in all areas of tsunami						
	 Capacity to undertake is Capacity to train other c 	ountries: Poor (all ca	ategories)		hazard assessment is rated as Essential .						

IOC Technical Series, 143 Annex IV – page 7

		BANGLADESH				
		Status		Notes/Requirer	nents	
Risk Assessment	 Single risk assessment or Multi-hazard risk assessm earthquakes, flooding a Tsunami risk assessment Products available: risk n Capacity to undertake tsu Capacity to provide trainir countries: Poor (all categ 	n tsunami undertaken: No nent undertaken including tsunami, cyclone, drought, nd landslides undertaken at national level nap nami risk assessment: Poor ng and/or consultancy on tsunami risk assessment to other ories)	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. Requirements: Priority to improve capacity in all areas of tsunami risk assessment is rated as Essential.			
Detection and Warning	 National capability to asse advise/warn coastal comr Name of organisation with tsunami threat information Use IOTWMS TSP data to 24x7 operations? Yes Level of tsunami threat fo Access to national or inter Other national observing Capability to analyse real- threat: Yes Capability for tsunami mo Does organisation for ider watches, advisories, alert 	ess and/or receive potential tsunami threat information and nunities: Yes n responsibility for assessing and/or receiving potential n: Bangladesh Meteorological Department o determine national threats? Use TSP data recast information produced: national rnational seismic networks: Yes networks used for tsunami early warning: None time seismic and sea-level data for potential tsunami delling to support threat forecasts: No ntifying potential tsunami threat issue national tsunami s and/or warnings? Yes	Notes: National seismi infrastructure, n	c data through na nobile telecommu	ational communication inications etc)	
Dissemination	How is tsunami information disseminated within country? How is warning terminated?	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social, media, Sirens, Television, VHF radio Based on the updated information on tsunami warning from IOTWMS TSPs the warning situation in terminated				
Standard Operating Procedures	SOPs for <u>upstream</u> emergen • 24/7 Emergency Respons • Receiving information fror • Response criteria/decision	cy response: se Centre: Yes n NTWC: Yes n making: Yes	SOPs	oport Required t Human Resources ✓ ✓ ✓	o Develop Infrastructure ✓ ✓ ✓	

	BANGLADESH										
	Statu	IS		Notes/Requirer	nents						
	 SOPs for <u>downstream</u> emergency response: Warning dissemination: Yes Evacuation call procedures: Yes Community evacuation procedures: No Communication with NTWC: Yes Communication with local government: Yes Media arrangements: Yes Communication with other stakeholders: Yes 	es	~ ~ ~ ~ ~ ~ ~ ~								
Evacuation Infrastructure	 Evacuation shelters: Yes Vertical evacuation shelter: Yes Natural or artificial hill for vertical evacuatio Evacuation signage: Yes Evacuation infrastructure integrated in evacuation 	Notes: Evacuation infrastructure and signage is considered insufficient									
Tsunami Exercises	 Tsunami exercises incorporated in nationa Tsunami exercises incorporated in nationa Level at which exercises are conducted: National: Yes Regional: No City: No Village: No Community/neighbourhood: No School: No 	l policy No I guidelines Yes	Notes: • Organisation • Inter-organis • National tsur • Indian Ocear • Local tsunam • DREE by Arr	tabletop (10 time ation tabletop (10 nami drill/exercise n Wave Exercise ni exercise (3-4 ti med Forces Divis	es)) times) e (once) (3 times) mes) ion (for earthquakes)						
Public Awareness	 Responsibility for tsunami public awareness Tsunami related education and awareness material available: Leaflets or flyers: No Posters: No Booklets: No Information boards: Yes Tsunami signage: No Video or other visual or oral media: No Indigenous knowledge, folklore etc: No Teaching kits: No Schools curricula: No 	 s programmes: NDMO Tsunami awareness activities undertaken: World Tsunami Awareness Day: Yes (annually) Global Disaster Risk Reduction Day: Yes (annually) Public tsunami preparedness outreach: Yes (1 day per year) School and/or children's awareness: Yes (1 day per year) Exhibitions: Yes (3 days per year) Competitions/other ways of highlighting tsunami safety: Yes (1 day per year) 	Notes: Departm	nent of Disaster N	<i>A</i> anagement						

			BANGLADESH		
		Sta	tus		Notes/Requirements
	Public evacua	ation maps: No			
	Support from IOTIC required to develop or enhance public awareness • Willing to sup • Communities	 Provision of general tsu Customization of general Development of tsunam or campaigns Participation/support by your country's activities port other countries to development of the countries to development 	al materials to country or community ni awareness programmes, activities r international agencies or experts to elop or enhance public awareness: Yes sunami Ready (IOTR) initiative: Yes		
General Comments and Future Plans	General Comme Bangladesh Mete tsunami risk asse Future Plans Bangladesh Mete with evacuation r part for future tsu	ents: eorological Department, Dh essment documentation. eorological Department has route, training the emergenc unami warning and mitigatio	aka is involved with tsunami exercise. Bu an interest on developing the computed by personnel, supporting to build sufficient n system improvements.	tsuna tevad	have lack of knowledge of tsunami modelling and mi modeling system as well as tsunami inundation map cuation centers, coastal wall of particular height as a

COMOROS										
		Status		Notes/Requirements						
	Phase	National			Local					
	Prevention & Mitigation	Multi-hazard inc. Tsu	unami		Not available					
Policios	Preparedness	Multi-hazard inc. Tsu	unami		Not available					
Folicies	Emergency Response	Standalone Tsunami only			Not available					
	Rehabilitation &	Multi-bazard inc. Tei	Inami		Not available					
	Reconstruction									
	Phase	National		Local	Community					
	Prevention & Mitigation	-		-	-					
	Preparedness	-	-		-					
Plans	Emergency Response -			-	-					
	Rehabilitation &	_		_						
	Reconstruction	-		-	_					
	Country's tsunami disaster ri	sk reduction plans ba	ised on I	hazards and	risk assessment: Yes					
	Phase	Phase National			Local					
	Prevention & Mitigation	Not available			Not available					
Guidelines	Preparedness	Not available			Not available					
Culdolliloo	Emergency Response	Not available			Not available					
	Rehabilitation &	Not available			Not available					
	Reconstruction	Hot a failable								
	 Single hazard assessme 	nt on tsunami underta	aken: Y	es						
	 Multi-hazard assessmen 	t undertaken including	g tsuna r	mi, cyclone,	flooding, volcanic					
	eruptions									
Hazard	 Tsunami hazard assessr 	nent undertaken at n a	ational I	evel						
Assessment	Products available: Haz	ard map, inundation	map, e	vacuation n	nap, guidelines (SOP)					
	for national level stake	holders.								
	 Capacity to undertake ts 	unami hazard assess	ment: Fa	air						
	 Capacity to train other co 	ountries: Poor								

COMOROS					
		Status	No	tes/Requirements	S
Risk Assessment	 Single risk assessment or Multi-hazard risk assessment epidemics and flooding Tsunami risk assessment Products available: risk n Capacity to undertake tsu Capacity to provide training countries: Poor 	n tsunami undertaken: Yes nent undertaken including tsunami, cyclone, earthquakes, undertaken at national level nap, evacuation map, guidelines nami risk assessment: Fair ng and/or consultancy on tsunami risk assessment to other			
Detection and Warning	 National capability to asse advise/warn coastal comr Name of organisation with threat information: Agene Direction Technique de Use IOTWMS TSP data to 24x7 operations? No Level of tsunami threat fo Access to national or inter Access to national or inter Other national observing Capability to analyse real- Capability for tsunami mo Does organisation for ider advisories, alerts and/or W 	ess and/or receive potential tsunami threat information and nunities: Yes n responsibility for assessing and/or receiving potential tsunami ce National de l'Aviation Civile et de la Météorologie la Météorologie o determine national threats? Use TSP data recast information produced: National, local rnational seismic networks: No rnational sea level networks: Yes networks used for tsunami early warning: Buoy -time seismic and sea-level data for potential tsunami threat: No delling to support threat forecasts: No ntifying potential tsunami threat issue national tsunami watches, varnings? No	Note: Not comple 12x7 depending of loc-sealevelmonito	tely 24x7. Operati n weekend days pring.org pvide tsunami proc	ons are 15 or Jucts
Dissemination	How is tsunami information disseminated within country? How is warning terminated?	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media, Television, Megaphone By a message confirm the no threat in our coastal area			
	~	· · ·	Suppor	rt Required to Dev	velop
Standard Operating Procedures	 SOPs for <u>upstream</u> emergen 24/7 Emergency Response Receiving information from Response criteria/decision 	SOPs	Human Resources X X ✓	Infrastructure	

COMOROS						
	Status	No	tes/Requirements			
	 SOPs for <u>downstream</u> emergency response: Warning dissemination: Yes Evacuation call procedures: Yes Community evacuation procedures: No Communication with NTWC: Yes Communication with local government: Yes Media arrangements: No Communication with other stakeholders: Yes 	√ √ √ √ √	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ × × ✓ ×		
Evacuation Infrastructure	 Evacuation shelters: No Vertical evacuation shelter: No Natural or artificial hill for vertical evacuation: Yes Evacuation signage: No Evacuation infrastructure integrated in evacuation plan: No 					
Tsunami Exercises	 Tsunami exercises incorporated in national policies: No Tsunami exercises incorporated in national guidelines: Yes Level at which exercises are conducted: National: Yes Regional: Yes City: No Village: Yes Community/neighbourhood: Yes School: No 					
Public Awareness	 Responsibility for tsunami public awareness programmes: NDMO Tsunami related education and awareness material available: Leaflets or flyers: Yes Posters: No Booklets: Yes Information boards: No Tsunami signage: No Video or other visual or oral media: No Indigenous knowledge, folklore etc: No Teaching kits: Yes Schools curricula: Yes Public evacuation maps: No 					

COMOROS					
		Status		Notes/Requirements	
	Support from IOTIC required to develop or enhance public awareness • Willing to suppo	 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 Development of the countries to develop or enhance public awareness: No 	× × ✓		
General Comments and Future Plans	Communities in <u>General Commen</u> <u>Future Plans:</u> No	tsunami Ready (IOTR) initiative: No			

FRANCE INDIAN OCEAN TERRITORIES						
	Status					Notes/Requirements
	Phase	National		L	ocal	
	Prevention & Mitigation	Multi-hazard inc. Tsur	nami	Not	available	
Policios	Preparedness	Multi-hazard inc. Tsur	nami	Not	available	
Folicies	Emergency Response	Multi-hazard inc. Tsur	nami	Not	available	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsur	nami	Not available		
	Phase	National	L	ocal	Community	
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Not	available	Not available	
	Preparedness	Multi-hazard inc. Tsunami	Not	available	Not available	
Plans	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: Yes					
	Phase	National		L	ocal	
	Prevention & Mitigation	No response		No i	esponse	
Guidalinas	Preparedness	No response		No i	esponse	
Guideimes	Emergency Response	No response		No response		
	Rehabilitation & Reconstruction	No response	No response			
Hazard Assessment	 Reconstruction Single hazard assessment on tsunami undertaken: No Multi-hazard assessment undertaken including: Tsunami, cyclone, earthquakes, flooding, landslide, volcanic eruptions Tsunami hazard assessment undertaken at regional level Products available: inundation map Capacity to undertake tsunami hazard assessment: Fair Capacity to train other countries: Poor (PTHA, DTHA, field studies) to Moderate (bazard isundation map) 					Notes: Eastern and northern costs (Saint Benoit - Saint André - Sainte Suzanne - Sainte Marie - Saint Denis - Saint Paul) mapped for tsunami hazard

	FRANCE INDIAN OCEAN TERRITORIES						
		Status	Notes/Requirements				
Risk Assessment	 Single risk assessment of Multi-hazard risk assessment landslides and volcanic Tsunami risk assessment Products available: risk m Capacity to undertake tsu Capacity to provide training countries: Poor (city, villar level) 	n tsunami undertaken: No nent undertaken including tsunami, cyclone, flooding, : eruptions t undertaken at regional level map unami risk assessment: Good ng and/or consultancy on tsunami risk assessment to other age, community level) to moderate (national to regional					
Detection and Warning	 National capability to asse advise/warn coastal comm Name of organisation with tsunami threat information Use IOTWMS TSP data or TSP data 24x7 operations? Yes Level of tsunami threat fo Access to national or inte Access to national or inte Other national observing Capability to analyse real threat: No Capability for tsunami mo Does organisation for ide watches, advisories, alert Has the NTWC and/or TW 	ess and/or receive potential tsunami threat information and munities: Yes h responsibility for assessing and/or receiving potential n: Météo-France or own assessments to determine national threats: Use precast information produced: Ocean-wide ernational seismic networks: No ernational sea level networks: Yes networks used for tsunami early warning: None I-time seismic and sea-level data for potential tsunami odelling to support threat forecasts: No entifying potential tsunami threat issue national tsunami ts and/or warnings? (<i>No response</i>) <i>NFP</i> participated in tsunami drills? Yes					
Dissemination	How is tsunami information disseminated within country? How is warning terminated?	Email, SMS, Radio, Television, Megaphone Media info and official communication (email - sms)					

FRANCE INDIAN OCEAN TERRITORIES							
	Status		Not	es/Requirements	5		
				Support Required to Develop			
	 SOPs for <u>upstream</u> emergency response: 24/7 Emergency Response Centre: Yes Receiving information from NTWC: Yes Response criteria/decision making: Yes 	SOPs X X	Human Resources X X	Infrastructure			
Standard Operating Procedures	 SOPs for <u>downstream</u> emergency response: Warning dissemination: Yes Evacuation call procedures: Yes Community evacuation procedures: No Communication with NTWC: Yes Communication with local government: Yes Media arrangements: Yes Communication with other stakeholders: Yes 	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ × × ×	✓ ✓ × × × ×			
Evacuation Infrastructure	 Evacuation shelters: No Vertical evacuation shelter: No Natural or artificial hill for vertical evacuation Evacuation signage: No Evacuation infrastructure integrated in evacuation 						
Tsunami Exercises	 Tsunami exercises incorporated in national p Tsunami exercises incorporated in national g Level at which exercises are conducted: National: No Regional: Yes City: No Village: No Community/neighbourhood: No School: No 						
Public Awareness	 Responsibility for tsunami public awareness Tsunami related education and awareness material available: Leaflets or flyers: No Posters: No 						

	FRANCE INDIAN OCEAN TERRITORIES						
		Status			Notes/Requirements		
	 Booklets: No Information boards: Yes Tsunami signage: No Video or other visual or oral media: No Indigenous knowledge, folklore etc: No Teaching kits: No Schools curricula: No Public evacuation maps: No Support from IOTIC required to develop or enhance public awareness Participation/support by i 		No • Public tsunami preparedness outreach: No • School and/or children's awareness: No • Exhibitions: No • Competitions/other ways of highlighting tsunami safety: No nami awareness materials I materials to country or community awareness programmes, activities				
General Comments	Willing to support of the suppo	ling to support other countries to develop or enhance public awareness: No mmunities involved in Indian Ocean Tsunami Ready (IOTR) initiative: No <u>al Comments:</u> None provided					
and Future Plans	Future Plans: No	ne provided					

INDIA						
		Status				Notes/Requirements
	Phase	National		Local		Notes: National Disaster Management Guidelines-
	Prevention & Mitigation	Standalone tsunami		Multi-hazard inc. Tsunami		Management of Tsunamis by National Disaster
Policies	Preparedness	Standalone tsunami		Multi-hazar	d inc. Tsunami	Management Authority (NDMA)
	Emergency Response	Standalone tsunami		Multi-hazar	d inc. Tsunami	
	Rehabilitation &	Standalone tsunami		Multi-hazar	d inc. Tsunami	Multi Hazard Policies are available at Provinces level
	Reconstruction					
	Phase	National	Lo	ocal	Community	
	Prevention & Mitigation	Standalone tsunami	Multi-ha Tsu	Multi-hazard inc. Multi-hazard i Tsunami Tsunami		
	Preparedness	Standalone tsunami	Multi-ha Tsu	azard inc. nami	Multi-hazard inc. Tsunami	
Plans	Emergency Response	Standalone tsunami	Multi-hazard inc. Tsunami		Multi-hazard inc. Tsunami	
	Rehabilitation &	Standalone tsunami	Multi-ha	zard inc.	Multi-hazard inc.	
	Reconstruction					
	Yes	eduction plans based				
	Phase	National		Local		Notes: National Disaster Management Guidelines-
	Prevention & Mitigation	Standalone tsuna	imi	Multi-ha	azard inc. Tsunami	Management of Tsunamis by National Disaster
Guidelines	Preparedness	Standalone tsuna	imi	Multi-h	azard inc. Tsunami	Management Authority (NDMA)
Culdennes	Emergency Response	Standalone tsuna	imi	Multi-ha	azard inc. Tsunami	
	Rehabilitation &	Standalone tsuna	imi	Multi-h	azard inc. Tsunami	Multi Hazard Policies are available at Provinces level
	Reconstruction					
	 Single hazard assessment o 	n tsunami undertaken: No				Notes : Ministry of Environment and Forest (MoEF),
	Multi-hazard assessment un	dertaken including: T	sunami,	cyclone,	flooding	Government of India is the hodal agency to
Hazard	Isunami hazard assessment	t undertaken at natio	nal and	regional	level	As part of patienal policy MoEE is apparating the
Assessment	Products available: DIHA, fi	eld studies, hazard	and inu	ndation n	nap	As part of flational policy MOEF is generating the
	Capacity to undertake tsunai	mi hazard assessmei	nt: Very g	good		Research (NCCR) and INCOIS are also involved in
	Capacity to train other count	ries: Good (PTHA, fi	eld studi	es, evacu	ation maps) to	deneration of coastal bazard mans
	very good (DTHA, hazard a	nd inundation maps)	generation of coastal hazaru maps.			

INDIA					
		Status	Notes/Requirements		
Risk Assessment	 Single risk assessment of Multi-hazard risk assessing Tsunami risk assessmen Products available: risk is Capacity to undertake tsi Capacity to provide training countries: Good (at all let) 	n tsunami undertaken: No ment undertaken including tsunami, cyclone, flooding t undertaken at national, regional and city levels map, guidelines unami risk assessment: Very good ng and/or consultancy on tsunami risk assessment to other vels)	Notes: 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		
Detection and Warning	 countries: Good (at all levels) National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: Yes Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: Indian Tsunami Early Warning Centre (ITEWC) at INCOIS Use IOTWMS TSP data or own assessment to determine national threats? Use TSP data and own threat assessment 24x7 operations? Yes Level of tsunami threat forecast information produced: Ocean-wide, national and local Access to national or international seismic networks: Yes (see notes) Atcess to national or international sea level networks: Yes (see notes) Other national observing networks used for tsunami early warning: GNSS/GPS, Coastal radars (see notes) Capability to ranalyse real-time seismic and sea-level data for potential tsunami threat: Yes Capability for tsunami modelling to support threat forecasts: Yes (see notes) Does organisation for identifying potential tsunami threat issue national tsunami watches advisories and/or warnings? Yes 		Notes: National Seismic Network (RTSMN & ISGN) through VSAT connectivity 2. International seismic data from GSN & IRIS servers through Internet (seedlink) National sea level data through INSAT, GPRS & Iridium connectivity. International sea level data from NOAA- NDBC & IOC sea level station monitoring facility servers through internet. 35 Nos of GNSS stations & 10 Nos of HF Radars operated by INCOIS In-house developed application which uses TUNAMI- N2 and ADCIRC models		
Dissemination	• Has the NTWC and/or TWFP participated in tsunarin dnils? Tes 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 cerminated? After receiving the final bulletin from INCOIS, local DMOs are taking decision on termination of warning situation.				
Standard		1	Support Required to: Develop		

INDIA						
Status		Notes/Requirements				
SOPs for <u>upstream</u> emergency response:		SOPs	Human Resources	Infrastructure		
24/7 Emergency Response Centre: Yes Beacitying information from NTWC: Yes			v	v		
Receiving information from NTWC. Tes Response criteria/decision making: Yes			X	X		
SOPs for downstroam emergency response:		√	X	X		
Warning dissemination: Yes		×	Y	¥		
 Evacuation call procedures: Yes 		×				
Community evacuation procedures: No		×	1	\$		
Communication with NTWC: Yes		X	x	x		
Communication with local government: Yes		X	X	X		
Media arrangements: Yes		X	X	X		
Communication with other stakeholders: Yes			X	×		
 Evacuation shelters: Yes Vertical evacuation shelter: Yes Natural or artificial hill for vertical evacuation: Yes Evacuation signage: Yes Evacuation infrastructure integrated in evacuation plan: Yes 			nelters are available of risk prone areas c re available in few c gnage is available in	at Province Level. overed oastal provinces few places		
 Tsunami exercises incorporated in national policies: Yes Tsunami exercises incorporated in national guidelines: Yes 						
Level at which exercises are conducted: • National: Yes • Regional: Yes • City: Yes • Village: Yes • Community/neighbourhood: Yes • School: Yes						
Responsibility for tsunami public awareness						
Tsunami related education and awareness Tsunami awareness activities						
material available:	undertaken:					
Leatiets of flyers: Yes Destore: Yes	 vvoria I sunami Awareness Day: Vas (2 times) 					
Booklets: Yes	Global Disaster Risk Reduction Day:					
	SOPs for <u>upstream</u> emergency response: 24/7 Emergency Response Centre: Yes Receiving information from NTWC: Yes Response criteria/decision making: Yes SOPs for <u>downstream</u> emergency response: Warning dissemination: Yes Evacuation call procedures: Yes Community evacuation procedures: No Communication with NTWC: Yes Communication with local government: Yes Media arrangements: Yes Communication with other stakeholders: Yes Vertical evacuation shelter: Yes Natural or artificial hill for vertical evacuation: Evacuation signage: Yes Evacuation signage: Yes Evacuation infrastructure integrated in evacua Tsunami exercises incorporated in national p Tsunami exercises are conducted: National: Yes City: Yes City: Yes Community/neighbourhood: Yes School: Yes Responsibility for tsunami public awareness material available: Leaflets or flyers: Yes Booklets: Yes	INDIA Status SOPs for <u>upstream</u> emergency response: 24/7 Emergency Response Centre: Yes Receiving information from NTWC: Yes Response criteria/decision making: Yes SOPs for <u>downstream</u> emergency response: Warning dissemination: Yes Evacuation call procedures: Yes Communication with NTWC: Yes Communication with NTWC: Yes Communication with NTWC: Yes Communication with local government: Yes Media arrangements: Yes Communication with other stakeholders: Yes Vertical evacuation shelter: Yes Natural or artificial hill for vertical evacuation: Yes Evacuation signage: Yes Evacuation infrastructure integrated in evacuation plan: Yes Tsunami exercises incorporated in national policies: Yes Tsunami exercises are conducted: National: Yes Regional: Yes Othy: Yes Village: Yes Community/neighbourhood: Yes School: Yes Responsibility for tsunami public awareness programmes: NDMO Tsunami related education and awareness material available: Leaflets or flyers: Yes	INDIA Status SOPs SOPs for <u>upstream</u> emergency response: 24/7 Emergency Response Centre: Yes ✓ Receiving information from NTWC: Yes ✓ Response criteria/decision making: Yes ✓ SOPs for <u>downstream</u> emergency response: ✓ Warning dissemination: Yes ✓ Evacuation call procedures: Yes × Communication with NTWC: Yes × Communication with other stakeholders: Yes × Vertical evacuation shelters: Yes × Vertical evacuation shelter: Yes × Nottes: Evacuation signage: Yes × Evacuation signage: Yes Vestical evacuation signage: Yes Evacuation plan: Yes Tsunami exercises incorporated in national guidelines: Yes Evacuation signage: Yes Evacuation signage: Yes City: Yes Village: Yes School: Yes School: Yes School: Yes School: Yes School: Yes School: Yes Posters: Yes World Tsunami awareness Day: Yes (2 times) Village	INDIA Status Notes/Requirem SOPs for unstream emergency response: SOPs Human 24/7 Emergency Response centre: Yes ✓<		

	INDIA					
		Status		Notes/Requirements		
	 Information boards: No Tsunami signage: Yes Video or other visual or oral media: Yes Indigenous knowledge, folklore etc: Yes Teaching kits: Yes Schools curricula: No Public evacuation maps: Yes 		 No Public tsunami preparedness outreach: Yes (4 times) School and/or children's awareness: Yes (>50 times)) Exhibitions: Yes (4 times) Competitions/other ways of highlighting tsunami safety: Yes (1 time) Tsunami exercise: Yes (3 times) 			
	 Provision of general tsunami awareness materials Customization of general materials to country or community Customization of general materials to country or community Development of tsunami awareness programmes, activities Development of tsunami awareness programmes, activities Participation/support by international agencies or experts to 					
	 Willing to support other countries to develop or enhance public awareness: Yes Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: Yes 			Notes: Training on preparing SOPs, GIS maps, tsunami modelling, Seismic & Sea level analysis, preparation of education material etc 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		
General Comments	General Comments: 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.					
and Future Plans	Future Plans: • Enhance observa • Enhancements ir • Utilization of real • Implementation of • Development of	nic earthquakes				

INDIA					
	Status	Notes/Requirements			
	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 				

INDONESIA						
		Status				Notes/Requirements
	Phase	National			Local	Notes:
	Prevention & Mitigation	Multi-hazard inc. Ts	unami	Multi-haz	ard inc. Tsunami	UU No. 24 tahun 2007 (for general policy)
Policios	Preparedness	Multi-hazard inc. Ts	unami	Multi-haz	ard inc. Tsunami	
Folicies	Emergency Response	Multi-hazard inc. Ts	unami	Multi-haz	ard inc. Tsunami	
	Rehabilitation & Reconstruction	Multi-hazard inc. Ts	unami	Multi-haz	ard inc. Tsunami	
	Phase	National	Lo	ocal	Community	Notes:
	Prevention & Mitigation	Standalone Tsunami only	Standalo	ne Tsunami	Standalone Tsunami	NDMO (BNPB) and UNDP
	Preparedness	Standalone Tsunami only	Standalone Tsunami		Standalone Tsunami	
Plans	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		Multi-hazard inc. Tsunami	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami	Multi-hazard inc. Multi-hazard inc. Tsunami Tsunami		Multi-hazard inc. Tsunami	
	Country's tsunami disaster r Yes	isk reduction plans ba				
	Phase	National			Local	Notes:
	Prevention & Mitigation	Standalone Tsun	ami	Not available		SNI rambu evakuasi Tsunami (sign evacuation), SNI Jalur
Guidelines	Preparedness	Standalone Tsun	ami	Not available		Evakuasi Tsunami (Evacuation route), SNI Sirine
Culdennes	Emergency Response	Multi-hazard inc. Ts	unami	No	ot available	Peringatan Dini Tsunami (Siren of Early Warning System),
	Rehabilitation & Reconstruction	Multi-hazard inc. Ts	unami	Not available		(Manajemen Training for Tsunami Disaster)
Hazard Assessment	 Reconstruction Single hazard assessment on tsunami undertaken: No Multi-hazard assessment undertaken including: Tsunami, flooding, earthquakes, epidemics, landslide, volcanic eruptions, forest and land fires Tsunami hazard assessment undertaken at national, regional, city and village levels Products available: PTHA, field studies, hazard, inundation map and evacuation maps, guidelines Capacity to undertake tsunami hazard assessment: Fair Capacity to train other countries: No response 					Notes: 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	 Single risk assessme Multi-hazard risk asse flooding, landslide Tsunami risk assess Products available: I signs, information Capacity to undertak Capacity to provide to countries: Good (na levels) 	ent on tsunami undertaken: No sessment undertaken including tsunami , drought , earthquake , s , volcanic eruptions ment undertaken at national , regional , city and village levels risk map and evacuation maps , action plan , evacuation boards te tsunami risk assessment: Good training and/or consultancy on tsunami risk assessment to other tional level) to Moderate (regional, city, village, community	Notes: 26 provinces are included in the tsunami risk areas			
Detection and Warning	 National capability to advise/warn coastal Name of organisatio tsunami threat inform Use IOTWMS TSP of data and own threat 24x7 operations? Y Level of tsunami threat Access to national of Access to national obser Capability to analyse threat: Yes Capability for tsunami Does organisation for watches, advisories, Has the NTWC and/ 	 assess and/or receive potential tsunami threat information and communities: Yes n with responsibility for assessing and/or receiving potential nation: BMKG, BNPB, BPBD, BASARNAS data or own assessment to determine national threats? Use TSP at assessment es eat forecast information produced: Ocean-wide, national and r international seismic networks: Yes (see notes) r international sea level networks: Yes (see notes) ving networks used for tsunami early warning: None e real-time seismic and sea-level data for potential tsunami ni modelling to support threat forecasts: Yes (see notes) or identifying potential tsunami threat issue national tsunami alerts and/or warnings? No or TWFP participated in tsunami drills? Yes 	Notes: BMKG = NTWC BNPB = NDMO BPBD = LDMO BASARNAS = National Search and Rescue Agency 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. BMKG is the agency responsible for providing tsunami products			
Dissemination	How is tsunami information disseminated within country? How is warning terminated?	Email, SMS, Fax, Webpage, Radio, WhatsApp / Facebook / Other social, media, Sirens, Television, Police/military, DVB- WRS Based on: sea level observation and monitoring; Modelling Tsunami on the last ETA +2 hours				

IOC Technical Series, 143 Annex IV – page 25

INDONESIA						
	Statı	Not	es/Requirements			
			Support Required to Develop			
	 SOPs for <u>upstream</u> emergency response: 24/7 Emergency Response Centre: Yes Receiving information from NTWC: Yes Response criteria/decision making: Yes 	SOPs ✓ ✓	Human Resources ✓ ✓	Infrastructure		
Standard SOPs for downstream emergency response: • Warning dissemination: Yes • Evacuation call procedures: Yes • Communication with NTWC: Yes • Communication with local government: Yes • Media arrangements: Yes • Communication with other stakeholders: Yes						
Evacuation Infrastructure	 Evacuation shelters: Yes Vertical evacuation shelter: Yes Natural or artificial hill for vertical evacuatio Evacuation signage: Yes Evacuation infrastructure integrated in eva 	Notes: Many areas such a Many areas Due to limit area, w All evacuation area	as at Padang, Pacita ve had explored for as given the signage	an, Bali Pandeglang e		
Tsunami Exercises	 Tsunami exercises incorporated in nationa Tsunami exercises incorporated in nationa Level at which exercises are conducted: National: Yes Regional: Yes City: No Village: No Community/neighbourhood: No School: No 					
	Responsibility for tsunami public awarenes	ss programmes: NTWC				
Public Awareness	 I sunami related education and awareness material available: Leaflets or flyers: Yes Posters: Yes 					

			INDONESIA			
		Statu	IS	Notes/Requirements		
	 Booklets: Yes Information boa Tsunami signag Video or other Indigenous kno Teaching kits: Schools curricu Public evacuati 	ards: Yes ge: Yes visual or oral media: Yes wledge, folklore etc: Yes Yes Ila: No ion maps: Yes	 No Public tsunami preparedness outreach: Yes (1 time) School and/or children's awareness: Yes (>5 times)) Exhibitions: Yes (>3 times/year) Competitions/other ways of highlighting tsunami safety: No Tsunami exercise: Yes (2 times/year) 			
	Support from IOTIC required to develop or enhance public awareness	 Provision of general tsu Customization of general Development of tsunamor campaigns Participation/support by your country's activities 	anami awareness materials al materials to country or community ni awareness programmes, activities y international agencies or experts to			
	 Willing to support Communities in 	ort other countries to develo	Notes: BMKG has cooperated with IOTIC for 5 (five) consecutive years since 2017 until 2021 NDMO (BNPB) has developed Destana (Disaster Resllience Village) at several villages spreading in Indonesia			
General Comments and Future Plans	Indonesia General Comments: 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. Future Plans: BMKG and many stakeholders make some cooperation for preparing the Standard Operating Procedure for each institute in order to make synergy					

	Status					Notes/Requirements
	Phase	National		Local		Notes:
	Prevention & Mitigation	No response		N	lo response	National and local tsunami policies are undergoing
Policios	Preparedness	No response		N	lo response	preparation
Policies	Emergency Response	No response		N	lo response	
	Rehabilitation &	No response			la response	
	Reconstruction	No response		11	o response	
	Phase	National	L	.ocal	Community	Notes:
	Prevention & Mitigation	No response	No r	response	No response	Plans are under development
	Preparedness	No response	No r	response	No response	
Plans	Emergency Response	No response	No r	response	No response	
i iuno	Rehabilitation &	No response No re		response	No response	
	Reconstruction	Noresponse	1101	caponac	No response	
	Country's tsunami disaster r	isk reduction plans base				
-	Yes					
	Phase	National			Local	4
	Prevention & Mitigation	No response		No response		_
Guidelines	Preparedness	No response		No response		_
	Emergency Response	No response		No response		_
	Rehabilitation &	No response		No response		
	Reconstruction					
	 Single hazard assessme 	ent on tsunami undertak	en: No			Notes:
	 Multi-hazard assessmen 	t undertaken including:	Tsunan	ni, cyclone,	, drought,	100% of Chabahar and 20% of Jask region have been
	earthquakes, epidemic	s, flooding, landslides	5			mapped for tsunami hazard.
Hazard	 Tsunami hazard assessr 	ment undertaken at reg	ional an	d village le	evels	
Assessment	 Products available: DTH 	A, tsunami hazard ana	alysis, h	azard map	, inundation	Guidelines provided in Educational Brochure
	map, evacuation map,	guidelines				
	 Capacity to undertake ts 	unami hazard assessm	ent: Goo	bd		
	Capacity to train other co	ountries: Moderate (IP	THA and	l field studie	es) to Very Good	
	(hazard, inundation and	evacuation mapping)				

IRAN					
		Status	Notes/	Requirements	
Risk Assessment	 Single risk assessment or Multi-hazard risk assessment Tsunami risk assessment Products available: No res Capacity to undertake tsu Capacity to provide training countries: No response 	n tsunami undertaken: No lent undertaken including <i>No response</i> undertaken at [level]: <i>No response</i> sponse nami risk assessment: <i>No response</i> lig and/or consultancy on tsunami risk assessment to other			
Detection and Warning	 National capability to asse advise/warn coastal comm Name of organisation with tsunami threat information Atmospheric Science Use IOTWMS TSP data o data and own threat ass 24x7 operations? No Level of tsunami threat for Access to national or inter Access to national or inter Other national observing r Capability to analyse real- threat: No Capability for tsunami mode Does organisation for ider watches, advisories, alerts 	ess and/or receive potential tsunami threat information and hunities: Yes responsibility for assessing and/or receiving potential : Iranian National Institute for Oceanography and r own assessment to determine national threats? Use TSP essment recast information produced: National and local level national seismic networks: Yes (see notes) mational sea level networks: Yes (see notes) networks used for tsunami early warning: None time seismic and sea-level data for potential tsunami delling to support threat forecasts: Yes (see notes) http://gotential.tsunami threat issue national tsunami s and/or warnings? Yes	 Notes: Institute of Geophysics loc-sealevelmonitoring. Use ComMIT 	University of Tehr org	an (IGUT)
Dissemination	How is tsunami information disseminated within country? How is warning terminated?	Email, SMS, Telephone, Fax, Webpage, WhatsApp / Facebook / Other social media, Sirens When sea level would be less than 0.5 meters according to observation and model results			
			Support Re	quired to Develo	р
Standard Operating Procedures	 SOPs for <u>upstream</u> emergen 24/7 Emergency Respons Receiving information fror Response criteria/decision 	SOPs No response	Human Resources No response	Infrastructure No response	

IRAN					
	Statu	IS	Notes/	Requirements	
	 SOPs for <u>downstream</u> emergency response: Warning dissemination: <i>No response</i> Evacuation call procedures: <i>No response</i> Community evacuation procedures: <i>No response</i> Communication with NTWC: <i>No response</i> Communication with local government: <i>No</i> Media arrangements: <i>No response</i> Communication with other stakeholders: <i>N</i> 	No response	No response	No response	
Evacuation Infrastructure	 Evacuation shelters: No Vertical evacuation shelter: No Natural or artificial hill for vertical evacuatio Evacuation signage: No Evacuation infrastructure integrated in eva 				
Tsunami Exercises	 Tsunami exercises incorporated in nationa Tsunami exercises incorporated in nationa Level at which exercises are conducted: National: No Regional: No City: No Village: Yes Community/neighbourhood: No School: No 				
Public Awareness	 Responsibility for tsunami public awareness Tsunami related education and awareness material available: Leaflets or flyers: No Posters: Yes Booklets: Yes Information boards: No Tsunami signage: No Video or other visual or oral media: No Indigenous knowledge, folklore etc: No Teaching kits: No Schools curricula: Yes Public evacuation maps: No 	 ss programmes: NTWC Tsunami awareness activities undertaken: World Tsunami Awareness Day: Yes (1 time – 2018) Global Disaster Risk Reduction Day: <i>No response</i> Public tsunami preparedness outreach: Yes School and/or children's awareness: Yes Exhibitions: No Competitions/other ways of 			

IRAN							
		Status	Notes/Requirements				
		highlighting tsunami safety: NoTsunami exercise: Yes					
	Current and finance	 Provision of general tsunami awareness materials 					
	Support from	 Customization of general materials to country or community 					
	develop or enhance public awareness	 Development of tsunami awareness programmes, activities or campaigns 					
		 Participation/support by international agencies or experts to your country's activities 					
	 Willing to support other countries to develop or enhance public awareness: No Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: No 						
	General Comments: Developing inundation and evacuation maps for Chabahar and Jask Building a dedicated website for tsunami warnings and bulletins Setting up SMS and Eax papels for issuing warnings and bulletins						
General Comments	Future Plans: Iranian National Center for Ocean Hazards has planned its future improvements as follows:						
and Future	 Make the warning 	ng dissemination process automated.					
Plans	 Develop and in involvement in 	tegrate NTWC, NDMO, and LDMO tsunami Standard Operating Proced tsunami exercises.	lures. Cooperate with more organizations to improve their				
	Continue nume	rical Modeling for different parts of Iranian coastline. Produce inundation	n and evacuation maps.				
	 Set up inter-org 	anizational tsunami exercises. Improve education and public awarenes	S.				

				KENYA		
		Sta	Notes/Requirements			
	Phase	National		Local		Notes:
	Prevention & Mitigation	Multi-hazard inc. Tsunami		Multi-hazard inc. 1	ſsunami	National Disaster Management Policy
Policies	Preparedness	Multi-hazard inc. Tsunami		Multi-hazard inc. T	ſsunami	
	Emergency Response	Multi-hazard inc. Tsunami		Multi-hazard inc. T	ſsunami	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami		Multi-hazard inc. 1	ſsunami	
	Phase	Nationa		Local	Community	Notes:
	Prevention & Mitigation	Multi-hazard i Tsunami	inc.	Not Available	Not Available	National Disaster Response Plan
	Preparedness	Multi-hazard i Tsunami	inc.	Not Available	Not Available	
Plans	Emergency Response	Multi-hazard inc. Tsunami		Not Available	Not Available	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami		Not Available	Not Available	
	Country's tsunami disaster risl	< reduction plans				
	Phase	National		Local		Notes:
	Prevention & Mitigation	Multi-hazard inc. Tsunami		Multi-hazard inc. 1	ſsunami	Standard Operating Procedures
Guidelines	Preparedness	Multi-hazard inc. Tsunami		Multi-hazard inc.	Tsunami	
	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		ſsunami	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami		Multi-hazard inc. Tsunami		
	 Single hazard assessment 	on tsunami und	dertaker	ו: No		
	• Multi-hazard assessment u	undertaken inclu	uding: T	sunami, cyclone, d	rought,	
Llaword	earthquakes, epidemics,	flooding, lands	slides, ^v	volcanic eruptions.	, lightning	
	 Tsunami hazard assessme 	ent undertaken a	at natio	nal level		
Assessmell	Products available: Guide	lines, historic c	data			
	Capacity to undertake tsur	nami hazard ass	sessmer	nt: Fair		
	Capacity to train other cou	ntries: No capa	acity			

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

IOC Technical Series, 143 Annex IV – page 33

KENYA					
	Status	No	otes/ <mark>Requiremen</mark>	ts	
		Suppo	rt Required to De	evelop	
	 SOPs for <u>upstream</u> emergency response: 24/7 Emergency Response Centre: Yes Receiving information from NTWC: Yes Response criteria/decision making: Yes 	SOPs ✓ ✓ ✓	Human Resources ✓ ✓ ✓	Infrastructure	
Standard Operating Procedures	 SOPs for <u>downstream</u> emergency response: Warning dissemination: Yes Evacuation call procedures: Yes Community evacuation procedures: No Communication with NTWC: Yes Communication with local government: Yes Media arrangements: Yes Communication with other stakeholders: Yes 				
Evacuation Infrastructure	 Evacuation shelters: Yes Vertical evacuation shelter: No Natural or artificial hill for vertical evacuation: No Evacuation signage: Yes Evacuation infrastructure integrated in evacuation plan: Yes 	 Notes: All coastal towr Signage in limit knowledge to th 	ns use tents as ev ted places where l ne communities	acuation shelters known or common	
Tsunami Exercises	 Tsunami exercises incorporated in national policies: Yes Tsunami exercises incorporated in national guidelines: Yes Level at which exercises are conducted: National: Yes Regional: Yes City: No Village: No Community/neighbourhood: No School: No 				
Public Awareness	 Responsibility for tsunami public awareness programmes: NDMO Tsunami related education and awareness material available: Leaflets or flyers: Yes Posters: Yes Global Disaster Risk Reduction Day: Yes 				

KENYA						
		S	itatus	Notes/Requirements		
	 Booklets: Yes Information boards: No Tsunami signage: Yes Video or other visual or oral media: Yes Video or other visual or oral media: Yes Indigenous knowledge, folklore etc: Yes Teaching kits: Yes Schools curricula: Yes Schools curricula: Yes Public evacuation maps: Yes 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 					
	Willing to support	ort other countries to deve	 Notes: Skills on SOP development, public awareness, advocacy, material development Kilifi Blue Beach area 			
General Comments and Future Plans	Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: Yes Kilifi Blue Beach area <u>General Comments:</u> 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. <u>Future Plans:</u> Other innovations include planned seismic and tidal gauge stations enhancement, buoys and other sea level measurements instruments and					
MADAGASCAR						
------------	---	------------------------------	-------------	---------------------------	------------------------------	---
		Status				Notes/Requirements
	Phase	National	l		Local	Notes:
	Prevention & Mitigation	Multi-hazard inc. Tsu	nami	Multi-hazard inc. Tsunami		National Policy of Disaster and Risk Management (Law
Policios	Preparedness	Multi-hazard inc. Tsu	nami	Multi-hazard inc. Tsunami		no.2015-031) taking into account of multi hazard and multi-
PUILles	Emergency Response	Multi-hazard inc. Tsu	nami	Multi-ha	azard inc. Tsunami	risk approach. One policy for the four disaster management
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsu	nami	Multi-ha	azard inc. Tsunami	phases. In addition to the policy, we also have the National Strategy of Disaster and Risk Management
	Phase	National		Local	Community	Notes:
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi- T	-hazard inc. sunami	Multi-hazard inc. Tsunami	1) National Contingency Plan with multi-hazard approach
	Preparedness	Multi-hazard inc. Tsunami	Multi- T	-hazard inc. sunami	Multi-hazard inc. Tsunami	- Vatovavy Fitovinany Regional Contingency Plan including
Plans	Emergency Response	Multi-hazard inc. Tsunami	Multi- T	-hazard inc. sunami	Multi-hazard inc. Tsunami	 including tsunami
	Rehabilitation &	Multi-hazard inc.	Multi-	-hazard inc.	Multi-hazard inc.	3) Contingency Plan of Sainte Marie Island including
	Reconstruction	Tsunami	Т	sunami Tsunami		tsunami
	Country's tsunami disaster ris Yes	k reduction plans base				
	Phase	National			Local	Notes:
	Prevention & Mitigation	Multi-hazard inc. Tsu	nami	Multi-ha	azard inc. Tsunami	National Rapid Reaction Matrix on Tsunami
Guidelines	Preparedness	Multi-hazard inc. Tsu	ınami	Multi-ha	azard inc. Tsunami	
Guidennes	Emergency Response	Multi-hazard inc. Tsur	nami	Multi-hazard inc. Tsunami		Regional / local Rapid Reaction Matrix on Tsunami
	Rehabilitation &	Multi-hazard inc. Tsu	nami	Multi-ha	azard inc. Tsunami	
	Reconstruction		nam			
	 Single hazard assessment 	t on tsunami undertak	(en: No	2		Notes:
	 Multi-hazard assessment 	undertaken including:	Tsuna	imi, cyclone	e, drought,	Conducted by Institute and Observatory of Geophysics of
Hazard	earthquakes, epidemics,	flooding, landslides	S			Antananarivo (IOGA), Bureau National de Gestion des
Assessment	Isunami hazard assessme	ent undertaken at nat	tional, r	regional an	d city levels	Risque et des Catastrophes (BNGRC)
	Products available: Inund	ation and evacuation	n maps	5		Manakara (eastern coast of Madagascar, man still in
	Capacity to undertake tsui	hami hazard assessm	ient: Pc	or		improvement) The other cities on going
	 Capacity to train other cou 	ntries: Poor				

MADAGASCAR					
		Status	Notes/Requirements		
Risk Assessment	 Single risk assessment Multi-hazard risk assess earthquakes, epidemic Tsunami risk assessme Products available: Eva Capacity to undertake ts Capacity to provide train countries: Poor (at all let 	on tsunami undertaken: No sment undertaken including tsunami, cyclone, drought, cs, flooding, landslides nt undertaken at national, regional and city levels cuation map sunami risk assessment: Poor ning and/or consultancy on tsunami risk assessment to other evels)	Notes: Conducted by Institute and Observatory of Geophysics of Antananarivo (IOGA) / Bureau National de Gestion des Risques et des Catastrophes (BNGRC) Manakara (eastern coast of Madagascar, map still in improvement) The other cities on going		
Detection and Warning	 National capability to as advise/warn coastal cor Name of organisation w tsunami threat informati Antananarivo (I.O.G.A Use IOTWMS TSP data data and own assessment 24x7 operations? Yes Level of tsunami threat Access to national or in Other national observing Capability to analyse re threat: Yes (see notes) Capability for tsunami n Does organisation for id watches, advisories, ale Has the NTWC and/or T 	 sess and/or receive potential tsunami threat information and nmunities: Yes ith responsibility for assessing and/or receiving potential on: Institute and Observatory of Geophysics of .) a or own assessment to determine national threats? Use TSP nent forecast information produced: Ocean-wide and national ternational seismic networks: Yes (see notes) ternational sea level networks: No g networks used for tsunami early warning: None al-time seismic and sea-level data for potential tsunami nodelling to support threat forecasts: Yes (see notes) lentifying potential tsunami threat issue national tsunami erts and/or warnings? Yes FWFP participated in tsunami drills? Yes 	 Notes: National seismic network, seedlink, internet Use SeisComp3 Use ComMIT 		
Dissemination	How is tsunami information disseminated within country? How is warning terminated?	Email, SMS, Telephone, Fax, Webpage, Radio, Door-to- door, Sirens, Television, Megaphone, Police/military, Public alert , system, VHF radio The warning will end few hours after the TSPs "all clear " message			

MADAGASCAR						
	Sta	itus		Notes/Requiremen	ts	
		Su	Support Required to Develop			
	SOPs for <u>upstream</u> emergency response: • 24/7 Emergency Response Centre: Yes • Receiving information from NTWC: Yes	SOPs	Human Resources ✓	Infrastructure		
	Response criteria/decision making: Yes				v	
Standard Operating Procedures	 SOPs for <u>downstream</u> emergency response Warning dissemination: Yes Evacuation call procedures: Yes Community evacuation procedures: No Communication with NTWC: Yes 					
	Communication with local government: `					
 Media arrangements: Yes Communication with other stakeholders: Yes 			↓ ↓ ↓		↓ ↓ ↓	
Evacuation Infrastructure	 Evacuation shelters: Yes Vertical evacuation shelter: No Natural or artificial hill for vertical evacua Evacuation signage: No Evacuation infrastructure integrated in evacuation 	 Notes: Coastal regio Almost all of the second second	ns, especially in easte the coastal regions	rn part of country		
	 Tsunami exercises incorporated in nation Tsunami exercises incorporated in nation 	nal policies: Yes nal guidelines: Yes				
Tsunami Exercises	Level at which exercises are conducted: • National: Yes • Regional: Yes • City: Yes • Village: No • Community/neighbourhood: No • School: No					
	Responsibility for tsunami public awaren	ess programmes: NDMO				
Public Awareness	Tsunami related education and awareness material available: • Leaflets or flyers: No • Posters: Yes					

MADAGASCAR						
	St	Notes/Requirements				
	 Booklets: Yes Information boards: No Tsunami signage: No Video or other visual or oral media: No Indigenous knowledge, folklore etc: No Teaching kits: Yes Schools curricula: No Public evacuation maps: No Support from IOTIC required to develop or enhance public awareness Participation/support b your country's activitie 	 Public tsunami preparedness outre Yes (1 time/year) School and/or children's awarenes Yes (1 time/year) Exhibitions: No Competitions/other ways of highlig tsunami safety: No Tsunami exercise: Yes (1 time/year) Tsunami exercise: Yes (1 time/year) Taunami awareness materials ral materials to country or community mi awareness programmes, activities y international agencies or experts to 	each: s: hting ar) V V V			
	 Willing to support other countries to develop or enhance public awareness: Yes Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: Yes (?) 			Notes: Sensitisation Response unclear 		
General Comments and Future Plans	General Comments: We are starting to make people and authori and not all of the people know yet its exister prepared and reduce its impact for each reg Future Plans: Exercises are needed for the regions which about tsunami	ties to be conscious of the existence of t nce. Most of the coastal part of the coun ion but it is not yet finished for all the co are already visited and have a knowled	he tsur try are untry ge of ts	nami. Not all of the communities are aware of this disaster still vulnerable face to the tsunami. We make a policy to be sunami Many regions don't have yet SOP and don't know yet		

MALAYSIA						
	Status					Notes/Requirements
	Phase	National		L	ocal	Notes:
	Prevention & Mitigation	Not available		Not a	available	MKN Directive 20
Policios	Preparedness	Not available		Not a	available	
FUICIES	Emergency Response	Multi-hazard inc. Tsuna	ami	Multi-hazar	d inc. Tsunami	
	Rehabilitation & Reconstruction	Not available		Not available		
	Phase	National		Local	Community	Notes:
	Prevention & Mitigation	Not available	N	lot available	Not available	Tsunami Emergency Response Plan
	Preparedness	Not available	N	lot available	Not available	
Plans	Emergency Response	Multi-hazard inc. Tsunami	Mu	lti-hazard inc. Tsunami	Multi-hazard inc. Tsunami	
	Rehabilitation & Reconstruction	Not available Not available		lot available	Not available	
	Country's tsunami disaster r Yes	isk reduction plans bas				
	Phase	National		Local		Notes:
	Prevention & Mitigation	Not available		Not available		Tsunami Emergency Response Plan
Guidelines	Preparedness	Not available		Not available		
Guidennes	Emergency Response	Not available		Multi-hazar	d inc. Tsunami	
	Rehabilitation & Reconstruction	Not available		Not available		
Hazard Assessment	 Reconstruction Single hazard assessment on tsunami undertaken: No Multi-hazard assessment undertaken including: Tsunami, drought, earthquakes, epidemics, flooding, landslides Tsunami hazard assessment undertaken at national level Products available: Hazard map, field studies Capacity to undertake tsunami hazard assessment: Good Capacity to train other countries: Moderate (PTHA, DTHA) to Good (field studies, hazard inundation and evacuation mapping) 					Notes: Hazard assessment of Malaysian coastline conducted by Malaysian Meteorological Department and Akademik Sains Malaysia

MALAYSIA				
		Status	Notes/Requirements	
Risk Assessment	 Single risk assessment of Multi-hazard risk assessment Tsunami risk assessment Products available: No re Capacity to undertake tsu Capacity to provide training countries: Moderate (national community levels) 	n tsunami undertaken: No nent undertaken including <i>No response</i> undertaken at <i>No response</i> sponse inami risk assessment: Fair ng and/or consultancy on tsunami risk assessment to other onal, regional and city levels) to Good (village and		
Detection and Warning	 National capability to asse advise/warn coastal comr Name of organisation with tsunami threat information Use IOTWMS TSP data or TSP data and own asses 24x7 operations? Yes Level of tsunami threat fo Access to national or inte Access to national or inte Other national observing Capability to analyse real- threat: Yes (see notes) Capability for tsunami mo Does organisation for idea watches, advisories, alert Has the NTWC and/or TW 	ess and/or receive potential tsunami threat information and nunities: Yes n responsibility for assessing and/or receiving potential n: Malaysian Meteorological Department or own assessment to determine national threats? Use ssment recast information produced: National and local level rnational seismic networks: Yes (see notes) rnational sea level networks: Yes (see notes) networks used for tsunami early warning: None -time seismic and sea-level data for potential tsunami delling to support threat forecasts: Yes (see notes) ntifying potential tsunami threat issue national tsunami s and/or warnings? Yes VFP participated in tsunami drills? Yes	 Notes: Seedlink, internet National sea level stations: Pulau Perhentian Kudat, Sabah Lahad Datu, Sabah Pulau Perak Kerachut, Penang Porto Malai, Langkawi Use Antelope, SeisComp3, Tide Tool Use Tunami, COMCOT and ComMIT 	
Dissemination	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		
Standard			Support Required to Develop	

MALAYSIA					
	Statu	Note	es/Requirements	3	
Operating Procedures			SOPs	Human Resources	Infrastructure
	 SOPs for <u>upstream</u> emergency response: 24/7 Emergency Response Centre: Yes Receiving information from NTWC: Yes Response criteria/decision making: Yes SOPs for <u>downstream</u> emergency response: Warning dissemination: Yes Evacuation call procedures: Yes Communication with NTWC: Yes Communication with local government: Yes 			V V V V V V V V V V	
	 Media arrangements: Yes Communication with other stakeholders: Y 	/es	√ √	<i>J</i> <i>J</i>	√ √
Evacuation Infrastructure	 Evacuation shelters: No Vertical evacuation shelter: No Natural or artificial hill for vertical evacuation Evacuation signage: No Evacuation infrastructure integrated in evacuation 	Notes:Along Malaysian	coastal waters		
Tsunami Exercises	 Tsunami exercises incorporated in nationa Tsunami exercises incorporated in nationa Tsunami exercises incorporated in nationa Level at which exercises are conducted: National: No Regional: No City: No Village: No Community/neighbourhood: Yes School: Yes 	al policies: Yes al guidelines: Yes			
Public Awareness	 Responsibility for tsunami public awarenes Tsunami related education and awareness material available: Leaflets or flyers: Yes Posters: Yes Booklets: Yes 	ss programmes: NDMO Tsunami awareness activities undertaken: • World Tsunami Awareness Day: Yes (1 time) • Global Disaster Risk Reduction Day:			

MALAYSIA					
	Status		Notes/Requirements		
	 Information boards: No Tsunami signage: No Video or other visual or oral media: Yes Indigenous knowledge, folklore etc: No Teaching kits: No Schools curricula: No Public evacuation maps: No No 	lic tsunami preparedness each: No ool and/or children's awareness: (2 times) ibitions: Yes (3 times) npetitions/other ways of lighting tsunami safety: Yes (2 es) nami exercise: Yes (2 times)			
	 Support from IOTIC required to develop or enhance public awareness Provision of general tsunami awar Customization of general material Development of tsunami awarene or campaigns Participation/support by internatio your country's activities Willing to support other countries to develop or enfi- Communities involved in Indian Ocean Tsunami Ref 				
General Comments and Future Plans	 Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: No <u>General Comments:</u> In 2019, MMD will be conducting public awareness's campaigns and drills on the extreme weather, earthquake & tsunami for the aiming as follow: - 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 & evacuation plan). <u>Future Plans:</u> 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 these living near disaster properties when events live earthquake truncaming turboon and heavy thundersterm are lively to take place. 				

MAURITIUS						
	Status					Notes/Requirements
	Phase	National			Local	Notes:
	Prevention & Mitigation	Not available		Not	available	National: National Disaster Scheme
Delicion	Preparedness	Not available		Not	available	
Policies	Emergency Response	Multi-hazard inc. Tsun	ami	Multi-haza	ard inc. Tsunami	Local: Tsunami Emergency Scheme
	Rehabilitation & Reconstruction	Not available		Not available		
	Phase	National	L	ocal	Community	Notes:
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Not	available	Not available	National Disaster Scheme/Tsunami Emergency Scheme
	Preparedness	Multi-hazard inc. Tsunami	Not	available	Not available	
Plans	Emergency Response	Multi-hazard inc. Tsunami	Not	available	Not available	
	Rehabilitation & Reconstruction	Not available	Not	available	Not available	
	Country's tsunami disaster ris Yes	k reduction plans based				
	Phase	National		Local		Notes:
	Prevention & Mitigation	Not available		Not available		National Disaster Scheme/Tsunami Emergency Scheme
Guidalinas	Preparedness	Not available		Not available		
Guidennes	Emergency Response	Multi-hazard inc. Tsun	ami	Standalone t	sunami guidelines	
	Rehabilitation &	Not available		Not	available	
	Reconstruction			1101		
	 Single hazard assessmen 	t on tsunami undertaker	n: No		. .	Notes:
	Multi-hazard assessment	undertaken including: Te	sunami	, cyclone, d	rought,	vvnole island mapped for tsunami nazard.
11	flooding, landslides					
Hazard	• Tsunami hazard assessment undertaken at national, city and village level					
Assessment	Froducts available: Hazar	u, mundation and eval		maps		
	Capacity to train other act	nami nazaru assessmer	IL. G000	N) to Cood (bozord	
	inundation and evacuation	n mapping)	А, ОТП	-) io Good (nazaru,	

MAURITIUS					
		Status	Notes/Requirements		
Risk Assessment	 Single risk assessment Multi-hazard risk assess flooding, landslide Tsunami risk assessme Products available: Risk Capacity to undertake ts Capacity to provide train countries: Good (nation community levels) 	on tsunami undertaken: No ment undertaken including: Tsunami, cyclone, drought, nt undertaken at: National level a map, action plan sunami risk assessment: Poor ing and/or consultancy on tsunami risk assessment to other al and regional levels). No capacity (city, village and	Notes: 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. Six district councils (Pamplemousses, Riviere du Rempart, Flacq, Black River, Savanne, Grand Port) and one City Council (Port-Louis) are at risk from tsunami The tsunami risk mapped areas for Mauritius is kept for restricted use/application pending policy decision as to their access for general public attention		
Detection and Warning	 National capability to as advise/warn coastal con Name of organisation w tsunami threat information Use IOTWMS TSP data data 24x7 operations? Yes Level of tsunami threat the Access to national or int Access to national or int Other national observing Capability to analyse react threat: No Capability for tsunami m Does organisation for id watches, advisories, ale Has the NTWC and/or T 	sess and/or receive potential tsunami threat information and munities: Yes th responsibility for assessing and/or receiving potential on: Director, Meteorological Services or own assessment to determine national threats? Use TSP orecast information produced: National level ernational seismic networks: Yes (see notes) ernational sea level networks: Yes (see notes) g networks used for tsunami early warning: None al-time seismic and sea-level data for potential tsunami odelling to support threat forecasts: No entifying potential tsunami threat issue national tsunami rts and/or warnings? Yes WFP participated in tsunami drills? Yes	 Notes: Seismic: Internet Sea level: GTS and internet 		
Dissemination	How is tsunami information disseminated within country? How is warning terminated?	Email, SMS, Telephone, Fax, Webpage, Radio, Sirens, Television, Police/military, VHF radio 2 hours after the passage of last high wave and also from observation of tide gauge and visual from police			

MAURITIUS						
	Statu	IS	No	otes/Requirements		
			Support Required to Develop			
	SOPs for upstream emergency response:	SOPs	Human Resources	Infrastructure		
	 Receiving information from NTWC: Yes 		X	√	✓	
	Response criteria/decision making: Yes		X	X		
Standard	SOPs for downstream emergency response:		✓	✓	√	
Procedures	Warning dissemination: Yes		1	x	1	
Trocoution	Evacuation call procedures: N/R		-	-	-	
	Community evacuation procedures: N/R		-	-	-	
	Communication with NTWC: N/R	-	-	-		
	Communication with local government: N/ Madia error gemente: N/	-	-	-		
	 Media analigements. <i>IVR</i> Communication with other stakeholders: <i>N</i> 	/R	-	-	-	
Evacuation Infrastructure	 Evacuation shelters: Yes Vertical evacuation shelter: N/R Natural or artificial hill for vertical evacuation Evacuation signage: No Evacuation infrastructure integrated in evacuation 	 Notes: The existing nation for cyclones is explicable 	onal system of emer ktended for cases of	gency shelters tsunami as far		
	 Tsunami exercises incorporated in nationa Tsunami exercises incorporated in nationa 	l policies: Yes I guidelines: Yes				
Tsunami Exercises	Level at which exercises are conducted: • National: Yes • Regional: No • City: Yes • Village: Yes • Community/neighbourhood: Yes • School: Yes					
	Responsibility for tsunami public awarenes	s programmes: NTWC				
Public Awareness	Tsunami related education and awareness material available: Leaflets or flyers: Yes	Tsunami awareness activities undertaken: • World Tsunami Awareness Day: Yes				
	Posters: Yes	Global Disaster Risk Reduction Day:				

			MAURITIUS	
		Statu	s	Notes/Requirements
	 Booklets: No Information boa Tsunami signag Video or other v Indigenous kno Teaching kits: Schools curricu Public evacuati 	urds: No ge: No visual or oral media: Yes wledge, folklore etc: No Yes la: Yes on maps: No	 Yes Public tsunami preparedness outreach: Yes School and/or children's awareness: Yes Exhibitions: Yes Competitions/other ways of highlighting tsunami safety: N/R Tsunami exercise: Yes 	
IOTIC required to develop or enhance public awareness		 Customization of general materials to country or community Development of tsunami awareness programmes, activities or campaigns Participation/support by international agencies or experts to vour country's activities 		· · · · · · · · · · · · · · · · · · ·
	 Willing to support other countries to develop or enhance public awareness: No Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: No 			
General Comments and Future	General Commen	t <u>s:</u> No Response		
Plans		•		

MOZAMBIQUE						
		Status				Notes/Requirements
	Phase	National			Local	Notes:
	Prevention & Mitigation	No response		No response		The country has only the Policy of Natural Hazards that
Policios	Preparedness	No response		No response		includes all kind of disasters that challenge the country
F Olicies	Emergency Response	No response		Λ.	lo response	including tsunami. But considering the low risk of
	Rehabilitation &	No response		Λ	lo response	tsunami hazard more priority is given to cyclones,
	Reconstruction	Netional	-		Community	Notoo:
	Phase Drevention & Mitigation		L			As above, the country has risk reduction plane taking
	Prevention & Miligation	No response	NO I	esponse	No response	As above, the country has lisk reduction plans taking
	Preparedness	No response	NO I	esponse	No response	
Plans	Emergency Response	No response	NO I	esponse	No response	
	Reconstruction	No response	sponse No		No response	
	Country's tsunami disaster risk	reduction plans base				
	Yes					
	Phase	National		Local		
	Prevention & Mitigation	No response		No response		
Guidelines	Preparedness	No response		No response		
Guidennes	Emergency Response	No response		No response		
	Rehabilitation &	No response		~	la response	
	Reconstruction	10 10000100		/	0 10000100	
	 Single hazard assessment 	on tsunami undertak	en: No			Notes:
	 Multi-hazard assessment u 	indertaken including:	Tsunan	ni, cyclone	, drought,	Hazard assessment conducted by: National Institute of
	earthquakes, epidemics,	flooding	_			Disaster Management/NMHS/Healthy/Agriculture/UN
	 Tsunami hazard assessme 	ent undertaken at city	level			Agencies/UNESCO IOC/NGO/University Eduardo
Hazard	 Products available: Hazaro 	d, inundation and ev	acuatio	n maps		Mondiane
Assessment	 Capacity to undertake tsur 	ami hazard assessm	ent: Fair			Under the tsunami pilot project sponsored by UNDP
	Capacity to train other cou	ntries: Poor (PTHA, I	DTHA, fi	ield studies) to Moderate	three coastal cities were manned on tsunami inundation
	(hazard, inundation and ev	acuation mapping)				and evacuation routes. The cities are Beira, Nacala and
						Pemba.

	MOZAMBIQUE							
	Status	Notes/Requirements						
		RIMES and INCOIS have also sponsored a case study for tsunami hazard and risk assessment and evacuation planning for Beira city in September 2018. Requirements: 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						
Risk Assessment	 Single risk assessment on tsunami undertaken: No Multi-hazard risk assessment undertaken including: Tsunami, cyclone, drought, earthquakes, epidemics, flooding Tsunami risk assessment undertaken at: City level Products available: Risk map, evacuation map Capacity to undertake tsunami risk assessment: Fair Capacity to provide training and/or consultancy on tsunami risk assessment to other countries: Moderate (national and regional levels) to Good (city, village and community levels) 	Notes: 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						

		MOZAMBIQUE			
		Status	No	otes/ <mark>Requireme</mark> r	nts
Detection and Warning	 National capability to as advise/warn coastal corr Name of organisation w tsunami threat informati Use IOTWMS TSP data response 24x7 operations? Yes Level of tsunami threat in Access to national or int Access to national or int Other national observing Capability to analyse reathreat: No Capability for tsunami m Does organisation for id watches, advisories, ale Has the NTWC and/or T 	sess and/or receive potential tsunami threat information and mmunities: Yes ith responsibility for assessing and/or receiving potential on: <i>No response</i> or own assessment to determine national threats? <i>No</i> forecast information produced: National level ernational seismic networks: Yes ernational sea level networks: No g networks used for tsunami early warning: None al-time seismic and sea-level data for potential tsunami modelling to support threat forecasts: No entifying potential tsunami threat issue national tsunami rts and/or warnings? Yes WFP participated in tsunami drills? Yes			
Dissemination How is tsunami information dissemina within country?		Email, SMS, Fax, Television, Public alert system, radio			
	terminated?	tsunami warnings centres			
			Suppo	rt Required to D	evelop
Standard	SUPS for <u>upstream</u> emerge	ency response:	SOPs	Human	Infrastructure
Operating	Receiving information fr	om NTWC: No response		Resources	
Procedures	Response criteria/decisi	on making: <i>No response</i>	No response	No response	No response

MOZAMBIQUE								
	Statu	N	otes/Requiremer	nts				
	 SOPs for <u>downstream</u> emergency response: Warning dissemination: <i>No response</i> Evacuation call procedures: <i>No response</i> Community evacuation procedures: <i>No response</i> Communication with NTWC: <i>No response</i> Communication with local government: <i>No</i> Media arrangements: <i>No response</i> Communication with other stakeholders: <i>N</i> 	No response	No response	No response				
Evacuation Infrastructure	 Evacuation shelters: Yes Vertical evacuation shelter: Yes Natural or artificial hill for vertical evacuatio Evacuation signage: No Evacuation infrastructure integrated in eva 	Notes: Coastal areas b Coastal areas b	but low risk but low risk					
Tsunami Exercises	 Tsunami exercises incorporated in nationa Tsunami exercises incorporated in nationa Level at which exercises are conducted: National: No Regional: No City: Yes Village: No Community/neighbourhood: No School: No 	l policies: No l guidelines: Yes						
Public Awareness	 Responsibility for tsunami public awareness Tsunami related education and awareness material available: Leaflets or flyers: No Posters: Yes Booklets: Yes Information boards: No Tsunami signage: No Video or other visual or oral media: Yes Indigenous knowledge, folklore etc: No Teaching kits: No Schools curricula: No 	 ss programmes: NDMO Tsunami awareness activities undertaken: World Tsunami Awareness Day: No Global Disaster Risk Reduction Day: No Public tsunami preparedness outreach: No School and/or children's awareness: Yes (not often) Exhibitions: No Competitions/other ways of 						

			MOZAMBIQUE				
		Statu	IS		Notes/Requirements		
	Public evacuati	on maps: No	highlighting tsunami safety: NoTsunami exercise: No				
	Support from IOTIC required to develop or enhance public awareness • Willing to support	 Provision of general tsu Customization of gener Development of tsunam or campaigns Participation/support by your country's activities Port other countries to development 	nami awareness materials al materials to country or community ni awareness programmes, activities r international agencies or experts to op or enhance public awareness: No	✓ × ✓ ✓			
General Comments and Future	Communities in <u>General Commen</u> With INCOIS and F mapping using INS Two technicians pa These were good for <u>Future Place</u>	nvolved in Indian Ocean Tsu t <u>s:</u> RIMES in 2018 the country H PIRE and ESCAPE system articipated on the TEMPP-3 or the country in order to stu	unami Ready (IOTR) initiative: No nad opportunity to implement the pilot p s. training in Indonesia. rengthen the local capacity on tsunami	projec risk a	t on tsunami hazard risk assessment and evacuation ssessment and evacuation		
Plans	We hope to continu previous questions	Future Plans: We hope to continue our collaboration and coordination with UNESCO IOC to improve many aspects related to tsunami as stated in different previous questions					

				MYANMA	R	
		Status				Notes/Requirements
	Phase	National			Local	Notes:
	Prevention & Mitigation	Multi-hazard inc. Tsu	nami	Multi-haz	ard inc. Tsunami	National: Myanmar Action Plan of Disaster Risk Reduction
Policios	Preparedness	Multi-hazard inc. Tsunami		Multi-haz	ard inc. Tsunami	
FUICIES	Emergency Response	Multi-hazard inc. Tsu	nami	Multi-haz	ard inc. Tsunami	Local: Community Based Disaster Risk Reduction
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami		Multi-haz	ard inc. Tsunami	
	Phase	National	L	ocal	Community	
	Prevention & Mitigation	-		-	-	
	Preparedness	Multi-hazard inc. Tsunami	Multi-ł Ts	nazard inc. sunami	Multi-hazard inc. Tsunami	
Plans	Emergency Response	-		-	-	
	Rehabilitation & Reconstruction	-		-	-	
	Country's tsunami disaster ris Yes	sk reduction plans bas	ed on ha	azards and r	isk assessment:	
	Phase	National		Local		Notes:
	Prevention & Mitigation	-		-		Tsunami exercise guidelines
Guidelines	Preparedness	Standalone tsuna	mi	Standalone tsunami		
	Emergency Response	-		-		-
	Rehabilitation &	-		-		
	Reconstruction		V-			Netee
	Single nazard assessment	nt on tsunami undertai	ken: Yes	5		Notes: Hazard assessment conducted by Department of
	Multi-nazaru assessment Tounomi bozord oppopp	undenaken including:		porise		Meteorology and Hydrology was cooperated with RIMES-
Hazard	 Products available: Inun 	dation and evacuation	aye leve	71		Regional Integrated Multi-hazard Early Warning System
Assessment	 Capacity to undertake tsi 	inami hazard assessm	nent Po	or.		····g·································
	Capacity to train other co	untries: Moderate (P	THA DT	HA hazard	and inundation	One village mapped: Aung Hlaing Village, Labutta Township,
	mapping) to Poor (field s	tudies, evacuation ma	ppina)	riv (, nazara		Ayeyarwady Region
	Single risk assessment o	n tsunami undertaken:	Yes			Notes:
	Multi-hazard risk assessr	nent undertaken includ	ding: tsu	nami only		Risk assessment conducted by Department of Meteorology
Pick	Tsunami risk assessmen	t undertaken at village	e level	-		and Hydrology with Regional Integrated Multi-hazard Early
Assessment	Products available: evac	uation map				Warning System-RIMES
Assessmell	 Capacity to undertake tsu 	unami risk assessment	t: Poor			
	Capacity to provide traini	ng and/or consultancy	on tsuna	ami risk asse	essment to other	One village mapped: Aung Hiaing Village, Labutta Township,
	countries: Poor (at all lev	els)				

		MYANMAR			
		Status	Notes/Re	equirements	
Detection and Warning	 National capability to assidutise/warn coastal commodel of organisation with tsunami threat information Use IOTWMS TSP data or TSP data 24x7 operations? Yes Level of tsunami threat for Access to national or inte Access to national or inte Other national observing Capability to analyse real threat: Yes (see notes) Capability for tsunami model threat, advisories, alert Has the NTWC and/or TW 	 Notes: Local Seismic Network, F Global Seismic Network National seal level station Kyun Seismic software: Use Ai Sea level data: GTS, inter 	Regional Seismic ns: Sittwe, Mouli ntelope, SeisCon rrnet, Tide Tool s	Network, mein, Haing Gyi np3, SeisAn oftware	
Dissemination	How is tsunami information disseminated within country? How is warning terminated?	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media, Television When tsunami disaster is clear or cannot effect to our coastal areas, we issue the tsunami cancellation			
			Support Req	uired to Develo	р
Standard Operating Procedures	 SOPs for <u>upstream</u> emerger 24/7 Emergency Response Receiving information fro Response criteria/decision 	ncy response: se Centre: Yes m NTWC: Yes n making: Yes	SOPs ✓ ✓ X	Human Resources ✓ ✓ ✓	Infrastructure ✓ ✓ ✓

	Statu	Notes/R	equirements		
	 SOPs for <u>downstream</u> emergency response: Warning dissemination: Yes Evacuation call procedures: Yes Community evacuation procedures: No Communication with NTWC: Yes Communication with local government: Yes Media arrangements: Yes Communication with other stakeholders: Y 	✓ ✓ ✓ ✓ ✓ ✓		~ ~ ~ ~ ~ ~	
Evacuation Infrastructure	 Evacuation shelters: Yes Vertical evacuation shelter: No Natural or artificial hill for vertical evacuatio Evacuation signage: No Evacuation infrastructure integrated in evaluation 	Notes : Just have evacuation shelter Tsunami	for Multi-hazard,	not only for	
Tsunami Exercises	 Tsunami exercises incorporated in nationa Tsunami exercises incorporated in nationa Level at which exercises are conducted: National: Yes Regional: Yes City: Yes Village: Yes Community/neighbourhood: Yes School: No 	ıl policies: No I guidelines: Yes			
Public Awareness	 Responsibility for tsunami public awareness Tsunami related education and awareness material available: Leaflets or flyers: No Posters: Yes Booklets: No Information boards: No Tsunami signage: No Video or other visual or oral media: Yes Indigenous knowledge, folklore etc: No Teaching kits: Yes 	 ss programmes: NTWC Tsunami awareness activities undertaken: World Tsunami Awareness Day: Yes (2 time) Global Disaster Risk Reduction Day: <i>No response</i> Public tsunami preparedness outreach: <i>No response</i> School and/or children's awareness: Yes (2 times) Exhibitions: <i>No response</i> 			

			MYANMAR			
		Sta	atus		Notes/Requirements	
	Schools currictPublic evacuat	ula: No ion maps: No	 Competitions/other ways of highlighting tsunami safety: No response Tsunami exercise: Yes (3 times) 			
	Support from IOTIC required to develop or enhance public awareness	 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 		1 1 1 1		
	 Willing to support other countries to develop or enhance public awareness: Yes Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: No 				 Notes: Knowledge sharing to develop the hazard and risk assessment maps for Tsunami 	
General Comments	General Commer Should do more re	General Comments: Should do more research of tsunami and need to conduct more training and workshop for the tsunami risk reduction				
and Future Plans	Future Plans: Need to share more data and upgrade the existing communication systems					

			(OMAN		
		Status				Notes/Requirements
	Phase	National			Local	
Policios	Prevention & Mitigation	Multi-hazard inc. Tsunami		Multi-haz	ard inc. Tsunami	
Delision	Preparedness	Multi-hazard inc. Tsunami		Multi-haz	ard inc. Tsunami	
Policies	Emergency Response	Multi-hazard inc. Te	sunami	Multi-haz	ard inc. Tsunami	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami		Multi-hazard inc. Tsunami		
	Phase	National	Lo	ocal	Community	
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi-ha Tsເ	azard inc. Inami	-	
	Preparedness	Multi-hazard inc. Tsunami	Multi-ha Tรเ	azard inc. Inami	-	
Plans	Emergency Response	Multi-hazard inc. Tsunami	Multi-ha Tsu	azard inc. ınami	-	
	Rehabilitation &	Multi-hazard inc. Tsunami	Multi-ha Tsu	azard inc. Inami	-	
	Country's tsunami disaster risk Yes	reduction plans base	ed on haza	ards and risł	assessment:	
	Phase	National			Local	
	Prevention & Mitigation	Multi-hazard inc. Te	sunami	Multi-hazard inc. Tsunami		
Cuidalinaa	Preparedness	Multi-hazard inc. Te	sunami	Multi-hazard inc. Tsunami		
Guidennes	Emergency Response	Multi-hazard inc. Te	sunami	Multi-haz	ard inc. Tsunami	
	Rehabilitation &	Multi-hazard inc. Te	unami	Multi bozord ing Tounomi		
	Reconstruction		Sunann	Mana-naz		
Hazard Assessment	 Single hazard assessment Multi-hazard assessment u Tsunami hazard assessme Products available: PTHA, guidelines 	on tsunami undertak ndertaken including: nt undertaken at nati DTHA, field studies	en: No Tsunami, onal and , hazard r	cyclone, e city level nap and int	arthquakes undation maps,	Notes: Hazard assessment conducted by national and international consultants. All coastline mapped with more detail for 9 cities
	 Capacity to undertake tsuna Capacity to train other cour Poor (field studies, hazard 	ami nazard assessm itries: Moderate (PT and evacuation map	ent: Good HA, DTHA ping)	A, inundatior	n mapping) to	Evacuation maps under process with the National Committee for Civil Defense. Guide lines are available such as SOP

		OMAN	
		Status	Notes/Requirements
Risk Assessment	 Single risk assessment or Multi-hazard risk assessment Tsunami risk assessment Products available: Risk i Capacity to undertake tsu Capacity to provide trainir countries: Moderate (natilevel) 	n tsunami undertaken: No nent undertaken including Tsunami, cyclone, earthquakes undertaken at National and city levels map, guidelines and action plan nami risk assessment: Good ng and/or consultancy on tsunami risk assessment to other onal, city, village and community levels). Poor (regional	Notes: Risk assessment conducted by national and international consultants. All coastline mapped with more detail for 9 cities 4 districts are at high risk from local tsunami
Detection and Warning	 National capability to asse advise/warn coastal comm Name of organisation with tsunami threat information (NMHEWC) Use IOTWMS TSP data or data and own assessme 24x7 operations? Yes Level of tsunami threat for Access to national or inter Access to national or inter Other national observing in Capability to analyse real- Yes (see notes) Capability for tsunami mo Does organisation for ider watches, advisories, alerts Has the NTWC and/or TW 	ess and/or receive potential tsunami threat information and nunities: Yes responsibility for assessing and/or receiving potential National Multi Hazard Early Warning Center r own assessment to determine national threats? Use TSP nt recast information produced: National and local level rnational seismic networks: Yes (see notes) mational sea level networks: Yes (see notes) networks used for tsunami early warning: Yes (see notes) time seismic and sea-level data for potential tsunami threat: delling to support threat forecasts: Yes (see notes) ntifying potential tsunami threat issue national tsunami s and/or warnings? Yes /FP participated in tsunami drills? Yes	 Notes: National seismic network, seedlink and internet National sea level network, GTS, IOC website GNSS/GPS, coastal radars Use TOAST, SeisComp3, Antelope Use Easywave, MHRAS
Dissemination	How is tsunami information disseminated within country? How is warning terminated?	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social media, Television, Police/military, Public alert , system, VPN	
Standard		Cancellation message	Support Required to Develop

OMAN								
	Status	3	N	lotes/Requirement	S			
Operating Procedures	SOPs for <u>upstream</u> emergency response: • 24/7 Emergency Response Centre: Yes • Receiving information from NTWC: Yes • Response criteria/decision making: Yes SOPs for downstream emergency response:	SOPs ✓ X ✓	Human Resources ✓ X ✓	Infrastructure ✓ X ✓				
	 Warning dissemination: Yes Evacuation call procedures: Yes Community evacuation procedures: No Communication with NTWC: Yes Communication with local government: Yes Media arrangements: Yes Communication with other stakeholders: Yes 			~ ~ ~ ~ ~ ~ ~ ~				
Evacuation Infrastructure	 Evacuation shelters: Yes Vertical evacuation shelter: No Natural or artificial hill for vertical evacuation Evacuation signage: No Evacuation infrastructure integrated in evacuation 							
Tsunami Exercises	 Tsunami exercises incorporated in national p Tsunami exercises incorporated in national g Level at which exercises are conducted: National: Yes Regional: Yes City: Yes Village: Yes Community/neighbourhood: Yes School: Yes 	policies: Yes guidelines: Yes						
Public Awareness	 Responsibility for tsunami public awareness Tsunami related education and awareness material available: Leaflets or flyers: Yes Posters: Yes Booklets: Yes Information boards: No 	 programmes: NDMO Tsunami awareness activities undertaken: World Tsunami Awareness Day: Yes (2 times) Global Disaster Risk Reduction Day: Yes (2 times) 						

			OMAN		
		Status	Notes/Requirements		
	 Tsunami signag Video or other v Indigenous kno Teaching kits: Schools curricu Public evacuati 	ge: No visual or oral media: Yes wledge, folklore etc: No No la: Yes on maps: No	 Public tsunami preparedness outreach: Yes (2 times) School and/or children's awareness: Yes (many times) Exhibitions: Yes (1 time) Competitions/other ways of highlighting tsunami safety: No Tsunami exercise: Yes (2 times) 		
	Support from IOTIC required to develop or enhance public awareness	 Provision of general tsunami awareness materials Customization of general materials to country or community Development of tsunami awareness programmes, activities Participation/support by international agencies or experts to 			
	 Willing to support other countries to develop or enhance public awareness: No Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: Yes 			Notes:Al Sawadi area	
General Comments and Euture	General Commen	t <u>s:</u> No Response			
Plans	Expanding observation network, improve and add Hazard and risk assessment for more cities level and implementing CBS usi				

PAKISTAN						
		Status				Notes/Requirements
Policies	Phase	National		Local		Notes:
	Prevention & Mitigation	Multi-hazard inc. Tsun	nami	Stand	lalone tsunami	National Earthquake & Tsunami Framework
	Preparedness	Multi-hazard inc. Tsun	nami	Stand	lalone tsunami	
Folicies	Emergency Response	Multi-hazard inc. Tsur	nami	Multi-haz	zard inc. Tsunami	
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsun	nami	Multi-hazard inc. Tsunami		
	Phase	National	L	.ocal	Community	Notes:
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Not	available	Not available	National Earthquake & Tsunami Framework
	Preparedness	Multi-hazard inc. Tsunami	Not	available	Not available	
Plans	Emergency Response	Multi-hazard inc. Tsunami	Not	available	Not available	
	Rehabilitation &	Multi-hazard inc.	Not	available	Not available	
	Reconstruction			zarda and rick appagament:		4
	Yes	k reduction plans based				
	Phase	National			Local	
	Prevention & Mitigation	Not available		Not available		
Guidelines	Preparedness	Not available		No	ot available	
Guidennes	Emergency Response	Not available		No	ot available	
	Rehabilitation &	Not available		N	ot available	
	Reconstruction					
	Single hazard assessmen	t on tsunami undertaker	n: Yes			Notes:
	Multi-hazard assessment	undertaken including: S	ingle ha	izard asses	sment on	Mazard assessment conducted by Pakistan
Hazard			I			
Assessment	I sunami nazaro assessm	ent undertaken at city l	evei			Gwadar and Karachi Cities mapped
	Products available: PIHA Open acity to your doubt by tays	, nazaro ano inundatio	n maps			
	Capacity to undertake tsu	nami nazaro assessmer	TE Very	G000		
	 Capacity to train other col 	intries: very Good (PT	на, naz	ard and inui	ndation mapping)	

		PAKISTAN			
		Status	N	otes/ <mark>Requirements</mark>	
Risk Assessment	 Single risk assessment or Multi-hazard risk assessment Tsunami risk assessment Products available: N/A Capacity to undertake tsu Capacity to provide trainir countries: No capacity (a) 	n tsunami undertaken: No nent undertaken including No risk assessment undertaken undertaken at N/A nami risk assessment: Very poor ng and/or consultancy on tsunami risk assessment to other II levels)			
Detection and Warning	 countries: No capacity (all levels) National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: Yes Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: Pakistan Meteorological Department Use IOTWMS TSP data or own assessment to determine national threats? Use TSP data and own assessment 24x7 operations? No Level of tsunami threat forecast information produced: National and local level Access to national or international seismic networks: Yes (see notes) Access to national or international sea level networks: No Other national observing networks used for tsunami early warning: None Capability to analyse real-time seismic and sea-level data for potential tsunami threat: Yes (see notes) Capability for tsunami modelling to support threat forecasts: Yes (see notes) Does organisation responsible for identifying potential tsunami threat issue national to a support threat forecast: Yes (see notes) 		 Notes: National seismic network, seedlink and internet Use SeisComp3 Use MOST, ComMIT 		
Dissemination	How is tsunami information disseminated within country? How is warning terminated?	Email, SMS, Telephone, Fax, Webpage, Radio, Sirens, Television After confirmation of no threat by second Bulletin			
			Suppo	rt Required to: Dev	velop
Standard Operating Procedures	 SOPs for <u>upstream</u> emergen 24/7 Emergency Response Receiving information fror Response criteria/decision 	cy response: se Centre: Yes n NTWC: Yes n making: Yes	SOPs	Human Resources ✓ ✓ X	Infrastructure

PAKISTAN						
	Status	No	Notes/Requirements			
	 SOPs for <u>downstream</u> emergency response: Warning dissemination: Yes Evacuation call procedures: Yes Community evacuation procedures: No Communication with NTWC: Yes Communication with local government: Yes Media arrangements: Yes Communication with other stakeholders: Yes 	√ √ √ √ √ ×	× × × × × ×	~ ~ ~ ~ ~ ~		
Evacuation Infrastructure	 Evacuation shelters: No Vertical evacuation shelter: No Natural or artificial hill for vertical evacuation Evacuation signage: Yes Evacuation infrastructure integrated in evacuation 	Notes: Gwadar area 				
Tsunami Exercises	 Isunami exercises incorporated in national p Tsunami exercises incorporated in national g Level at which exercises are conducted: National: No Regional: No City: No Village: Yes Community/neighbourhood: Yes School: No 	juidelines: Yes				
Public Awareness	 Responsibility for tsunami public awareness Tsunami related education and awareness material available: Leaflets or flyers: Yes Posters: Yes Booklets: No Information boards: No Tsunami signage: No Video or other visual or oral media: No Indigenous knowledge, folklore etc: No Teaching kits: No 	 programmes: NDMO Tsunami awareness activities undertaken: World Tsunami Awareness Day: Yes (every year) Global Disaster Risk Reduction Day: No Public tsunami preparedness outreach: No School and/or children's awareness: Yes (occasionally) Exhibitions: No 				

PAKISTAN						
		Sta	Notes/Requirements			
	Schools curricuPublic evacuati	ıla: Yes ion maps: No	 Competitions/other ways of highlighting tsunami safety: No Tsunami exercise: Yes (3 times) 			
	Support from IOTIC required to develop or enhance public awareness	 Provision of general tsu Customization of general Development of tsunar or campaigns Participation/support by your country's activities 	unami awareness materials ✓ ral materials to country or community ✓ ni awareness programmes, activities ✓ y international agencies or experts to X			
	Willing to supportCommunities in	ort other countries to develonvolved in Indian Ocean Ts	op or enhance public awareness: No unami Ready (IOTR) initiative: No			
General	General Comments: Research is needed to investigate the potential of Makran Subduction zone.					
and Future Plans	Future Plans: 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					

			SING	APORE		
		Status				Notes/Requirements
	Phase	National Lo		Local	Notes:	
Policies	Prevention & Mitigation	Standalone tsunami		Not available		National Tsunami Response Plan (also applies locally)
	Preparedness	Standalone tsuna	mi	No	t available	
	Emergency Response	Standalone tsuna	mi	No	t available	
	Rehabilitation &	Multi₋bazard inc. Tsu	nami	No	t available	
	Reconstruction				•	
	Phase	National	Lo	ocal	Community	Notes:
	Prevention & Mitigation	Standalone tsunami	Not a	vailable	Not available	National policy applies at local and community level
	Preparedness	Standalone tsunami	Not a	vailable	Not available	
Plans	Emergency Response	Standalone tsunami	Not a	vailable	Not available	
i lano	Rehabilitation &	Multi-hazard inc.	Not a	vailable	Not available	
	Reconstruction	Tsunami	Hora	Valiable	Hot available	
	Country's tsunami disaster	risk reduction plans bas				
	Yes					
	Phase	National		Local		Notes:
	Prevention & Mitigation	Standalone tsunami		Not available		National guidelines apply locally
Guidelines	Preparedness	Standalone tsunal	mi	Not available		4
	Emergency Response	Standalone tsuna	mi	Not available		4
	Renabilitation &	Multi-hazard inc. Tsu	nami	Not available		
	Reconstruction	ant an taunami undartal	(an) Vaa			Notoc
	Single nazard assessme	ent on isunami undertai	Notes.			
	• Multi-nazard assessment undertaken including: tsunami, eartnquakes, flooding					Service Singapore and national university
Hazard	 Isunami nazard assess Broducto evoilable: DTL 	A and inundation ma	lional leve	<u></u>		
Assessment	Products available. DTr Consoity to undertake to	A and munuation ma	p Pont: Coo	4		Whole of Singapore is assessed, including offshore
	Capacity to undertake to	sunami nazaro assessir) And ond in un	dation	islands
	Capacity to train other to mapping)	ountries. Wouerate (D	тпА, паza	iru anu mun	uation	
	 Single risk assessment 	on tsunami undertaken	Vas			Notes [.]
	Multi-bazard risk assess	sment undertaken inclu	lina: teun:	ami floodi	a	Risk assessed for all Singapore coastline including
	 Tsunami risk assessme 	nt undertaken at nation	al lovol	ann, noodh	19	offshore islands
Risk	Products available: Die	k man action nlan (so				
Assessment	Canacity to undertake to	sunami risk assessment	t Good			Guidelines: National Tsunami Response Plan
	Capacity to provide train	ning and/or consultancy	on tsunan	ni risk asse	ssment to other	
		nna anu/or consultanto	on iourian	III IISN A3353		

		SINGAPORE			
		Status	Not	es/Requirements	
Detection and Warning	 National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: Yes Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: Meteorological Service Singapore Use IOTWMS TSP data or own assessment to determine national threats? Use TSP data and own assessment 24x7 operations? Yes Level of tsunami threat forecast information produced: National and local level Access to national or international seismic networks: Yes (see notes) Access to national or international sea level networks: Yes (see notes) Other national observing networks used for tsunami early warning: None Capability to analyse real-time seismic and sea-level data for potential tsunami threat: Yes (see notes) Capability for tsunami modelling to support threat forecasts: Yes (see notes) Does organisation responsible for identifying potential tsunami threat issue national tsunami watches, advisories, alerts and/or warnings? Yes 		 National seismic network, seedlink, internet, GSM National sea level network, GTS Use Operational Tsunami Prediction and Assessment System (OPTAS) Use OPTAS 		
Dissemination	How is tsunami information disseminated within country? How is warning terminated?	Email, SMS, Telephone, Fax, Webpage, Radio, Television, Public alert system Via the same modes used for dissemination of			
		alerts/warnings	Support	Required to Dev	elop
Standard	SOPs for upstream emerger	ncy response:	SOPs	Human Resources	Infrastructure
Operating	24/7 Emergency Response	se Centre: Yes	X	X	X
Procedures	Receiving information fro	m NTWC: Yes	X	X	X
	Response criteria/decisio	n making: Yes	X	X	X

		SINGAPORE			
	Statu	ıs	Note	es/Requirements	
	 SOPs for <u>downstream</u> emergency response: Warning dissemination: Yes Evacuation call procedures: No Community evacuation procedures: No Communication with NTWC: Yes Communication with local government: N Media arrangements: Yes Communication with other stakeholders: Yes 	× × × × × ×	X X X X X X	× × × × × ×	
Evacuation Infrastructure	 Evacuation shelters: No Vertical evacuation shelter: No Natural or artificial hill for vertical evacuation Evacuation signage: No Evacuation infrastructure integrated in evacuation 	on: No acuation plan: No			
Tsunami Exercises	 Tsunami exercises incorporated in nationa Tsunami exercises incorporated in nationa Level at which exercises are conducted: National: Yes Regional: No City: No Village: No Community/neighbourhood: No School: No 				
Public Awareness	 Responsibility for tsunami public awareness Tsunami related education and awareness material available: Leaflets or flyers: No Posters: No Booklets: No Information boards: No Tsunami signage: No Video or other visual or oral media: No Indigenous knowledge, folklore etc: No Teaching kits: No Schools curricula: Yes Public evacuation maps: No 	 ss programmes: NTWC Tsunami awareness activities undertaken: World Tsunami Awareness Day: No Global Disaster Risk Reduction Day: No Public tsunami preparedness outreach: No School and/or children's awareness: No Exhibitions: No Competitions/other ways of highlighting tsunami safety: No 			

	SINGAPORE						
	Status		Notes/Requirements				
		Tsunami exercise: No					
	Support from IOTIC required to develop or enhance public awareness	No response					
	 Willing to support other countries to devel Communities involved in Indian Ocean Ts 						
General	General Comments: No response						
Comments and Future Plans	Future Plans: Upgrading central monitoring and processing system for collating, integrating, and assessing seismic and tsunami data						

SOUTH AFRICA						
		Status			Notes/Requirements	
Policies	Phase	National	Lo	ocal		
	Prevention & Mitigation	Not available	Not av	vailable		
	Preparedness	Not available	Not av	vailable		
	Emergency Response	Not available	Not av	/ailable		
	Rehabilitation & Reconstruction	Not available	Not av	vailable		
	Phase	National	Local	Community	Notes:	
	Prevention & Mitigation	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Seasonal Contingency Plans and Seasonal Hazard Forecast	
	Preparedness	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
Plans	Emergency Response	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami	Multi-hazard inc. Tsunami		
	Rehabilitation &	Multi-hazard inc.	Multi-hazard inc.	Multi-hazard		
	Reconstruction	Tsunami	Tsunami	inc. Tsunami		
	Country's tsunami disaster ris Yes	k reduction plans based or				
	Phase	National	Lo	ocal		
	Prevention & Mitigation	Not available	Not av	vailable		
Guidelines	Preparedness	Not available	Not av	/ailable		
Guidennes	Emergency Response	Not available	Not av	vailable		
	Rehabilitation &	Not available	Not a	vailable		
	Reconstruction		Hord			
	 Single hazard assessmen 	t on tsunami undertaken:	No		Notes:	
	Multi-hazard assessment	undertaken including: Tsu	nami, drought, flo	oding,	Hazard assessment conducted by SA weather	
11	windstorms and snow				Services and Council for Geosciences	
Hazard	Isunami nazara assessm	ent undertaken at regiona	IEVEI		Eastern Coastal from Richards Bay to port Elizabeth	
Assessment	Froducts available: Hazar	and inundation maps	Cood		with a focus on the ports and harbour areas. The	
	Capacity to train other as:		GUUU A field studies) to	Modorato	percentage mapped was between 40-90 kilometres	
	(hazard inundation and e	vacuation mapping)		woderate	within each of the regional centres	

		SOUTH AFRICA			
		Status		Notes/ <mark>Requirement</mark> s	S
Risk Assessment	 Single risk assessment or Multi-hazard risk assessment Tsunami risk assessment Products available: No rest Capacity to undertake tsu Capacity to provide training countries: Poor (at all level 	n tsunami undertaken: No nent undertaken including <i>No response</i> undertaken at <i>No response</i> sponse nami risk assessment: Good ng and/or consultancy on tsunami risk assessment to other els)			
Detection and Warning	 countries: Poor (at all levels) National capability to assess and/or receive potential tsunami threat information and advise/warn coastal communities: Yes Name of organisation with responsibility for assessing and/or receiving potential tsunami threat information: SA Weather Services Use IOTWMS TSP data or own assessment to determine national threats? Use TSP data 24x7 operations? Yes Level of tsunami threat forecast information produced: National level Access to national or international seismic networks: Yes (see notes) Access to national or international sea level networks: Yes (see notes) Other national observing networks used for tsunami early warning: Yes (see notes) Capability to analyse real-time seismic and sea-level data for potential tsunami threat: No Capability for tsunami modelling to support threat forecasts: No Does organisation for identifying potential tsunami threat issue national tsunami watches advisories alerts and/or warnings? Yes 		 Notes: Seismic Netw Geoscience i monitoring ne Use GTS for SA Weather i weather rada 	vork operated by the n collaboration with o etworks such as NAS sea level data services operates a s rs	Council for other seismic A series of coastal
Dissemination	How is tsunami information disseminated within country? How is warning terminated?	Email, SMS, Telephone, Webpage, Radio, National Television A media statement is produced			
			Supp	oort Required to Dev	velop
Standard Operating Procedures	SOPs for <u>upstream</u> emergen	cy response:	SOPs	Human Resources ✓	Infrastructure
Flocedules	 Receiving information fror Response criteria/decision 	n NTWC: Yes n making: Yes	× •	×	X V

SOUTH AFRICA							
	Statu	IS	1	Notes/Requirements	S		
	 SOPs for <u>downstream</u> emergency response: Warning dissemination: Yes Evacuation call procedures: No Communication procedures: No Communication with NTWC: Yes Communication with local government: Yes Media arrangements: Yes Communication with other stakeholders: No 			×	×		
Evacuation Infrastructure	 Evacuation shelters: No Vertical evacuation shelter: Yes Natural or artificial hill for vertical evacuation: Yes Evacuation signage: No Evacuation infrastructure integrated in evacuation plan: No 			 Notes: Many coastal towns have high rise buildings that can be used to evacuate people All 3 coastal regions have vertical evacuation based on topography although distances to these areas vary Limited signage in each of the coastal regions 			
Tsunami Exercises	 Tsunami exercises incorporated in nationa Tsunami exercises incorporated in national Level at which exercises are conducted: National: Yes Regional: No City: No Village: No Community/neighbourhood: No School: No 						
Public Awareness	 Responsibility for tsunami public awareness Tsunami related education and awareness material available: Leaflets or flyers: Yes Posters: No Booklets: No Information boards: No Tsunami signage: No Video or other visual or oral media: No Indigenous knowledge, folklore etc: Yes Teaching kits: No 	s programmes: LDMO Tsunami awareness activities undertaken: • World Tsunami Awareness Day: No • Global Disaster Risk Reduction Day: Yes (annually) • Public tsunami preparedness outreach: No • School and/or children's awareness: No • Exhibitions: No					
			SOUTH AFRICA				
---------------------	--	--	--	------------------	--	--	--
		Statu	Notes/Requirements				
	Schools curricuPublic evacuati	la: No on maps: No	 Competitions/other ways of highlighting tsunami safety: No Tsunami exercise: Yes (annually part of TSP comms tests) 	as			
	Support from IOTIC required to develop or enhance public awareness	 Provision of general tsu Customization of general Development of tsunam or campaigns Participation/support by your country's activities 	nami awareness materials al materials to country or community i awareness programmes, activities international agencies or experts to	✓ ✓ × ×			
	Willing to supportCommunities in	ort other countries to develo volved in Indian Ocean Tsu					
General Comments	General Comments: 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) Undate any relevant information						
and Future Plans	Future Plans: 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						

SRI LANKA								
		Status	Notes/Requirements					
	Phase	National		Local		Notes:		
	Prevention & Mitigation	Multi-hazard inc. Tsuna	ami	Multi-hazard inc. Tsunami		Disaster Management Act No 13 of 2005 and Disaster		
Delision	Preparedness	Multi-hazard inc. Tsuna	ami	Multi-hazard	l inc. Tsunami	Management policy		
Policies	Emergency Response	Multi-hazard inc. Tsuna	ami	Multi-hazard	l inc. Tsunami			
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsuna	ami	Multi-hazard	l inc. Tsunami			
	Phase	National		Local	Community	Notes:		
	Prevention & Mitigation	Not available	No	ot available	Not available	Disaster Management Plan		
	Preparedness	Multi-hazard inc. Tsunami	Mult	ii-hazard inc. Tsunami	Multi-hazard inc. Tsunami			
Plans	Emergency Response	Multi-hazard inc. Multi Tsunami		ti-hazard inc. Tsunami	Multi-hazard inc. Tsunami			
	Rehabilitation & Reconstruction	Not available No		ot available	Not available			
	Country's tsunami disaster i Yes	risk reduction plans base						
	Phase	Phase National		Local		Notes:		
	Prevention & Mitigation	Not available		Not available		Disaster preparedness plans, response plans and		
Guidelines	Preparedness	Multi-hazard inc. Tsuna	ami	Multi-hazard inc. Tsunami		guidelines		
Guidennes	Emergency Response	Multi-hazard inc. Tsuna	ami	Multi-hazard inc. Tsunami				
	Rehabilitation & Reconstruction	Not available		Not available				
	Single hazard assessme	ent on tsunami undertake	en: No			Notes:		
	 Multi-hazard assessmer 	nt undertaken including:	ought,	Hazard assessment conducted by DMC with all the				
	earthquakes, epidemic	cs, flooding, landslide,	coasta	l erosion, light	tning	relevant technical agencies		
Hazard	 Tsunami hazard assess 	ment undertaken at nati	onal, d	istrict and villa	age level	DOM, ID, NARA, GSMB, Health Ministry, NBRO with the		
Assessment	 Products available: PTH 	IA, field studies, hazard	d, inuno	dation and eva	acuation	support of UNDP		
71000001110111	maps							
	 Capacity to undertake ts 	sunami hazard assessme	ent: Poo	or		All 14 coastal districts with the scale of high, moderate		
	Capacity to train other c	ountries: Poor (PTHA, I	DTHA, f	ield studies, ev	acuation	and low mundation and proximity analysis		
	mapping) to Moderate (hazard and inundation m	napping)				

		SRI LANKA	
		Status	Notes/Requirements
Risk Assessment	 Single risk assess Multi-hazard risk a Tsunami risk asses Products available Capacity to under Capacity to provid countries: Poor (a) 	sment on tsunami undertaken: No assessment undertaken including <i>No response</i> assment undertaken at <i>No response</i> a: <i>No response</i> take tsunami risk assessment: Poor le training and/or consultancy on tsunami risk assessment to other at all levels)	
Detection and Warning	 National capability advise/warn coast Name of organisa tsunami threat info Use IOTWMS TSI TSP data 24x7 operations? Level of tsunami t Access to nationa Other national obsistional obsistive to analy threat: Yes (see not capability for tsure) Capability for tsure Does organisation watches, advisorie Has the NTWC ar 	 v to assess and/or receive potential tsunami threat information and tal communities: Yes tion with responsibility for assessing and/or receiving potential pormation: Department of Meteorology P data or own assessment to determine national threats? Use Yes hreat forecast information produced: National and local level I or international seismic networks: Yes (see notes) I or international sea level networks: Yes (see notes) serving networks used for tsunami early warning: No yes real-time seismic and sea-level data for potential tsunami otes) ami modelling to support threat forecasts: Yes (see notes) and for identifying potential tsunami threat issue national tsunami es, alerts and/or warning? Yes 	 Notes: Seismic: California Integrated Seismic Network (CISN), USGS network Also access NDBC DART buoy network Use SeisComp3 Use ComMIT with local or remote databases
Dissemination	How is tsunami information disseminated within country? How is warning	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social, media, Sirens, Television, Warning towers, Megaphone, Police/military, Public alert system, VHF radio Issuing tsunami threat clear message	
	terminated?		
Standard			Support Required to Develop

SRI LANKA								
	Statu	IS	Not	es/Requirements				
Operating Procedures	 SOPs for <u>upstream</u> emergency response: 24/7 Emergency Response Centre: Yes Receiving information from NTWC: Yes Response criteria/decision making: Yes SOPs for <u>downstream</u> emergency response: Warning dissemination: Yes Evacuation call procedures: No Community evacuation procedures: No 	Human Resources ✓ ✓ ✓ ✓						
	 Communication with NTWC: Yes Communication with local government: Yes Media arrangements: Yes Communication with other stakeholders: N 			* * * * * * *				
Evacuation Infrastructure	 Evacuation shelters: Yes Vertical evacuation shelter: Yes Natural or artificial hill for vertical evacuatio Evacuation signage: Yes Evacuation infrastructure integrated in eva 							
Tsunami Exercises	 Tsunami exercises incorporated in nationa Tsunami exercises incorporated in nationa Level at which exercises are conducted: National: Yes Regional: No City: No Village: Yes Community/neighbourhood: Yes School: Yes 	Notes: Tsunami exercises a divisional and "GN" I school drills	llso carried out at o evel as well as ho	district, spital and				
Public Awareness	 Responsibility for tsunami public awareness Tsunami related education and awareness material available: Leaflets or flyers: Yes Posters: Yes Booklets: Yes Information boards: Yes 	 ss programmes: NDMO Tsunami awareness activities undertaken: World Tsunami Awareness Day: Yes (2017) Global Disaster Risk Reduction Day: No 						

			SRI LANKA			
		Statu	Notes/Requirements			
	 Tsunami signa Video or other Indigenous kno Teaching kits: Schools currice Public evacuat 	age: Yes visual or oral media: Yes owledge, folklore etc: Yes Yes ula: Yes tion maps: Yes				
	Support from IOTIC required to develop or enhance public awareness	 Provision of general tsuna Customization of general Development of tsunami or campaigns Participation/support by in your country's activities 	ami awareness materialsXmaterials to country or communityImage: second secon			
	 Willing to supp Communities i response 	port other countries to develo involved in Indian Ocean Ts	Notes: DMC willing to provide support 			
General	General Comments: DMC has developed the hazard profile of Sri Lanka and established 24/7 EOC and EW system also all the districts having Disaster Management					
Comments and Future Plans	Future Plans: 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					

			TÆ	NZANIA		
		Status	Notes/Requirements			
	Phase	National		Local		
	Prevention & Mitigation	Multi-hazard inc. Tsunar	ni	Multi-hazard inc. Tsunami		
Dolision	Preparedness	Multi-hazard inc. Tsunar	ni	Multi-hazard inc. Tsunami		
Funcies	Emergency Response	Multi-hazard inc. Tsunar	ni	Multi-haza	rd inc. Tsunami	
	Rehabilitation &	Multi-hazard inc. Tsunar	ni	Multi-haza	rd inc. Tsunami	
	Reconstruction					
	Phase	National		Local	Community	
	Prevention & Mitigation	Not available	No	ot available	Not available	
	Preparedness	Not available	No	ot available	Not available	
Plane	Emergency Response	Not available	No	ot available	Not available	
Fians	Rehabilitation &	Not available				
	Reconstruction					
	Country's tsunami disaster r	risk reduction plans based				
	Yes	1				
	Phase	National		Local		
	Prevention & Mitigation	Multi-hazard inc. Tsunar	ni	Multi-hazard inc. Tsunami		
Guidelines	Preparedness	Multi-hazard inc. Tsunar	ni	Multi-hazard inc. Tsunami		
	Emergency Response	Multi-hazard inc. Tsunar	ni	Multi-haza	rd inc. Tsunami	
	Rehabilitation &	Multi-hazard inc. Tsunar	mi	Multi-bazard inc. Tsunami		
	Reconstruction					
	Single hazard assessme	ent on tsunami undertake	n: No			Notes:
	Multi-hazard assessmer	nt undertaken including: T	sunan	ni, cyclone, o	lrought,	Hazard assessment conducted by National/Local
	flooding					University
Hazard	Isunami hazard assess	ment undertaken at regio	onal le	vel		
Assessment	Products available: Fiel	d studies, hazard map				
	 Capacity to undertake ts 	sunami hazard assessme	nt: Go	od		
	 Capacity to train other c 	ountries: Moderate (PTH	IA, DT	HA). Good (field studies,	
	hazard and inundation n	napping), Very Good (eva	acuatio	on mapping)		

		TANZANIA	
		Status	Notes/Requirements
Risk Assessment	 Single risk assessment of Multi-hazard risk assessment Tsunami risk assessment Products available: Guide Capacity to undertake tsu Capacity to provide training countries: Good (national community level) 	n tsunami undertaken: No nent undertaken including: Tsunami, drought, flooding undertaken at regional level elines, Action Plan nami risk assessment: Fair ng and/or consultancy on tsunami risk assessment to other , regional and city levels). Moderate (village and	
Detection and Warning	 National capability to asse advise/warn coastal comr Name of organisation with tsunami threat information Use IOTWMS TSP data or TSP data 24x7 operations? Yes Level of tsunami threat fo Access to national or inte Access to national or inte Other national observing Capability to analyse real threat: No Capability for tsunami mo Does organisation for idel watches, advisories, alert 	ess and/or receive potential tsunami threat information and nunities: Yes n responsibility for assessing and/or receiving potential n: <i>No response</i> or own assessment to determine national threats? Use recast information produced: National and local level rnational seismic networks: Yes networks used for tsunami early warning: None -time seismic and sea-level data for potential tsunami delling to support threat forecasts: Yes ntifying potential tsunami threat issue national tsunami s and/or warnings? Yes	
Dissemination	How is tsunami information disseminated within country?	Email, Telephone, Fax, Webpage, Radio, Television, Police/military, Public alert system	
	How is warning terminated?	No response	
Standard			Support Required to Develop

TANZANIA								
	Statu	Notes/Requirements						
Operating Procedures	 SOPs for <u>upstream</u> emergency response: 24/7 Emergency Response Centre: Yes Receiving information from NTWC: Yes Response criteria/decision making: Yes 		SOPs ✓ ✓ ✓	Human Resources ✓ ✓ ✓	Infrastructure ✓ ✓ ✓			
	 SOPs for <u>downstream</u> emergency response: Warning dissemination: Yes Evacuation call procedures: No Community evacuation procedures: No Communication with NTWC: Yes Communication with local government: Yes Media arrangements: Yes Communication with other stakeholders: No 			~ ~ ~ ~ ~ ~ ~				
Evacuation Infrastructure	 Evacuation shelters: Vertical evacuation shelter: Natural or artificial hill for vertical evacuation Evacuation signage: Evacuation infrastructure integrated in evaluation 	Notes No response to this s	ection					
Tsunami Exercises	 Tsunami exercises incorporated in nationa Tsunami exercises incorporated in nationa Level at which exercises are conducted: National: No Regional: No City: Yes Village: No Community/neighbourhood: No School: Yes 							
Public Awareness	 Responsibility for tsunami public awareness Tsunami related education and awareness material available: Leaflets or flyers: Yes Posters: No Booklets: No Information boards: No 	ss programmes: NDMO Tsunami awareness activities undertaken: • World Tsunami Awareness Day: No • Global Disaster Risk Reduction Day: Yes • Public tsunami preparedness						

			TANZANIA		
		Statu	IS		Notes/Requirements
	 Tsunami sign Video or othe Indigenous ki Teaching kits Schools curri Public evacuation 	age: No er visual or oral media: Yes nowledge, folklore etc: No e: No cula: No ation maps: Yes	outreach: No School and/or children's awarene Yes Exhibitions: No Competitions/other ways of highlighting tsunami safety: No Tsunami exercise: No 	ess:	
	Support from IOTIC required to develop or enhance public awareness	 Provision of general tsuna Customization of general Development of tsunami a or campaigns Participation/support by ir your country's activities 	ami awareness materials materials to country or community awareness programmes, activities nternational agencies or experts to	✓ × ✓ ✓	
	 Willing to support other countries to develop or enhance public awareness: Yes Communities involved in Indian Ocean Tsunami Ready (IOTR) initiative: No 				
General Comments and Future Plans	General Common Future Plans: SOPs have to be	ents: No response			

			Tł	HAILAND)		
		Status	Notes/Requirements				
	Phase	National	National		Local	Notes:	
	Prevention & Mitigation	Standalone tsur	nami	Standalone tsunami		National: Tsunami Prevention and Mitigation Master Plan	
	Preparedness	Standalone tsur	nami	Stand	dalone tsunami	(2015-2019)	
Policies	Emergency Response	Standalone tsur	nami	Stand	dalone tsunami	Local:	
	Rehabilitation & Reconstruction	Multi-hazard inc. T	sunami	ami Multi-hazard inc. Tsunami		1.Tsunami Emergency Action Plan for local administrative; 2. Prevention and Mitigation action plan for local, administrative	
	Phase	National	Lo	cal	Community	Notes:	
	Prevention & Mitigation	Standalone tsunami	Standalor	ie tsunami	Standalone tsunami	1.Tsunami Risk Mitigation Strategy for Thailand 2.Disaster Risk Reduction.	
	Preparedness	Standalone tsunami Multi-haz Tsur		zard inc. nami	Multi-hazard inc. Tsunami	3.Risk Reduction from Geo hazard : Tsunami	
Plans	Emergency Response	Multi-hazard inc. Multi-ha Tsunami Tsu		zard inc. nami	Multi-hazard inc. Tsunami	process	
	Rehabilitation &	bilitation & Multi-hazard inc.		Multi-hazard inc. Multi-hazard inc.			
	Reconstruction	Tsunami Ts		nami	Tsunami		
	Country's tsunami disaster risk Yes	reduction plans base					
	Phase	National			Local	Notes:	
	Prevention & Mitigation	Standalone tsur	nami	Standalone tsunami		Guideline for Tsunami preparation	
Guidelines	Preparedness	Standalone tsur	nami	Standalone tsunami			
Guidennes	Emergency Response	Multi-hazard inc. T	sunami	Multi-hazard inc. Tsunami			
	Rehabilitation &	Multi-hazard inc. T	sunami	Multi-bazard inc. Tsunami			
	Reconstruction						
	Single hazard assessmentMulti-hazard assessment ut	on tsunami undertak ndertaken including:	Notes: Hazard assessment conducted by: Department of Mineral				
	earthquakes, flooding and	d landslide				Resources, The Thai Meteorological Department,	
Hazard	Tsunami hazard assessme	nt undertaken at nat	ional, city	, village a	nd local level	Department of Marine and Coastal Resources,	
Assessment	 Products available: PTHA, 	DTHA, field studies	Department of Fishenes, Department of Disaster				
			Brovention and Mitigation, Chulalangkarn University				
	evacuation mapping, guid	lelines				Prevention and Mitigation, Chulalongkorn University, Buranha university, Kasetsart university, Prince of	
	 evacuation mapping, guid Capacity to undertake tsum 	lelines ami hazard assessm	ent: Fair	A field star	dias hamand	Prevention and Mitigation, Chulalongkorn University, Burapha university, Kasetsart university, Prince of Songkla University UNISDR ADPC	

		THAILAND	
		Status	Notes/Requirements
Risk Assessment	 Single risk assessment or Multi-hazard risk assessment earthquakes, epidemics Tsunami risk assessment community level Products available: Risk i Capacity to undertake tsu Capacity to provide trainir countries: Good (national 	n tsunami undertaken: Yes ient undertaken including: Tsunami, cyclone, drought, , flooding, landslide undertaken at national, regional, city, village, nap, evacuation map, guidelines, action plan nami risk assessment: Good ig and/or consultancy on tsunami risk assessment to other , regional and city levels). Moderate (all levels)	Notes: Asian Disaster Preparedness Center (ADPC) and Department of Disaster Prevention and Mitigation, Ministry of Interior Thailand can provide training/consultancy
Detection and Warning	 National capability to asse advise/warn coastal comm Name of organisation with tsunami threat information Use IOTWMS TSP data or data and own assessme 24x7 operations? Yes Level of tsunami threat for Access to national or inter Access to national or inter Other national observing to Capability to analyse real- threat: No Capability for tsunami mo Does organisation for ider watches, advisories, alert Has the NTWC and/or TW 	 ass and/or receive potential tsunami threat information and nunities: Yes responsibility for assessing and/or receiving potential National Disaster Warning Centre r own assessment to determine national threats? Use TSP nt recast information produced: National and local level national sea level networks: Yes national sea level networks: Yes (see notes) networks used for tsunami early warning: Yes (see notes) time seismic and sea-level data for potential tsunami delling to support threat forecasts: Yes (see notes) ntifying potential tsunami threat issue national tsunami s and/or warnings? Yes 	 Notes: Hydrographics Department, Royal Thai Navy, IOC sea level monitoring website, GTS DART buoys and coastal radar stations Use WINITDB, TUNAMI and TSUCAT
Dissemination	How is tsunami information disseminated within country? How is warning terminated?	Email, SMS, Telephone, Fax, Webpage, Radio, WhatsApp / Facebook / Other social, media, Sirens, Television, Warning towers, Public alert system, VHF radio, broadcast alert system 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			
		Statu	IS	N	otes/Requirements	
				Suppo	ort Required to Dev	elop
	 SOPs for <u>upstream</u> emergency response: 24/7 Emergency Response Centre: Yes Receiving information from NTWC: Yes 			SOPs ✓ ✓	Human Resources ✓ ✓	Infrastructure
Standard	Response criteria/decisior	n making: Yes		√	✓	✓
Standard Operating Procedures	 SOPs for <u>downstream</u> emergency response: Warning dissemination: Yes Evacuation call procedures: No Community evacuation procedures: No 				4	× × ×
	 Communication with local 	government: Ye	9S			
	Media arrangements: Yes	S				
	 Communication with other 	stakeholders: N	0	1		v
Evacuation Infrastructure	 Evacuation shelters: Yes Vertical evacuation shelte Natural or artificial hill for Evacuation signage: Yes Evacuation infrastructure 	r: Yes vertical evacuatic integrated in eva	on: Yes cuation plan: Yes	Notes • 233 shelters in 6 p Nga, Phuket, Ran	provinces: Krabi, Tra ong, and Satun	ng, Satun, Phang
	Tsunami exercises incorp	orated in nationa	l policies: Yes			
	Tsunami exercises incorp	l guidelines: Yes				
Tsunami Exercises	Level at which exercises are conducted: • National: Yes • Regional: Yes • City: No • Village: No • Community/neighbourhood: Yes • School: No					
Public	Responsibility for tsunami	public awarenes	s programmes: NDMO/LDMO/NTWC			
Awareness	material available:	u awareness	undertaken:			

THAILAND						
	Status			Notes/Requirements		
	 Leaflets or fly Posters: Yes Booklets: Yes Information boot Tsunami signa Video or other Indigenous kr Teaching kits: Schools currid Public evacua 	ers: Yes s oards: Yes age: Yes r visual or oral media: Yes nowledge, folklore etc: Yes : No cula: Yes ation maps: No	 World Tsunami Awareness Day: Yes (2 times) Global Disaster Risk Reduction Day: Yes (many) Public tsunami preparedness outreach: Yes (many) School and/or children's awareness: Yes (many) Exhibitions: Yes (many) Competitions/other ways of highlighting tsunami safety: No Tsunami exercise: Yes (many) 			
	Support from IOTIC required to develop or enhance public awareness • Provision of general tsunami awareness materials • Development 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		ami awareness materials materials to country or community awareness programmes, activities nternational agencies or experts to	Notes:		
	Willing to supCommunities	port other countries to develo involved in Indian Ocean Tsu	op or enhance public awareness: Yes unami Ready (IOTR) initiative: No	Can provide experts, materials, training, consultancy		
General Comments and Future Plans	 Communes involved in indian Ocean Estimatin Ready (IOTR) initiative. No <u>General Comments:</u> 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. 					

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

TIMOR-LESTE							
	Status					Notes/Requirements	
Policies	Phase	National		Local		Notes:	
	Prevention & Mitigation	Multi-hazard inc. Tsunami		-		National Disaster Management Policy 2008, currently	
	Preparedness	Multi-hazard inc. Tsunami		-		being revised	
	Emergency Response	Multi-hazard inc. Tsur	nami	-			
	Rehabilitation & Reconstruction	Multi-hazard inc. Tsunami		-		At the Municipal level, the local tsunami policy will form part of municipal disaster management plans however these are still in development	
	Phase	National		Local	Community	Notes:	
	Prevention & Mitigation	Standalone tsunami	Multi T	-hazard inc. Isunami	Multi-hazard inc. Tsunami	Comprehensive guide to tsunami exercise at national level in Timor - Leste which would form the basis for	
	Preparedness	Standalone tsunami Multi-		-hazard inc. Tsunami	Multi-hazard inc. Tsunami	standalone plan at sub national level planning form part	
Plans	Emergency Response	Multi-hazard inc. Multi- Tsunami T		-hazard inc. Tsunami	Not available	currently in development	
	Rehabilitation & Reconstruction	Standalone tsunami Not		t available	Not available		
	Country's tsunami disaster risk reduction plans based on hazards and risk assessment: Yes						
	Phase	National		L	.ocal	Notes:	
	Prevention & Mitigation	Not available		Not available		National Disaster Management Policy 2008	
Guidelines	Preparedness	Multi-hazard inc. Tsunami		Not available			
Guidennes	Emergency Response	Multi-hazard inc. Tsunami		Not available		Tsunami DRR guidelines at municipal level are the	
	Rehabilitation &	Multi-bazard inc. Tsunami		Not available		responsibilities of municipalities and these currently in	
	Reconstruction					development as part of multi nazard planning	
	 Single hazard assessment on tsunami undertaken: No 					Notes:	
	Multi-hazard assessment undertaken including: Tsunami, cyclone, drought,					Hazard assessment conducted by UNDP	
Llamand	earthquakes, flooding, landslide, strong wind					Areas manned: municipalities of Ainaro Baucau	
⊓azaru Accessment	Isunami nazard assessment undertaken at regional, city, sub-district level					Bobonaro Covalima Dili Liquica Lautem Manatuto	
Assessment	Products available. Dir	1A Nunami hazard aaaaaam	ont: Eai	-		Manufahi, Viguegue - and the Special Economic Region	
	Capacity to undertake tsunami nazard assessment: Fair Capacity to troin other countries: Deer (DTHA, DTHA, field studies, becard)					of Oecusse.	
	 Capacity to train other countries: Poor (PTHA, DTHA, field studies, hazard, inundation and evacuation mapping). 						

TIMOR-LESTE						
		Status	Notes/Requirements			
Risk Assessment	 Single risk assessment Multi-hazard risk assess earthquakes, flooding Tsunami risk assessme Products available: Ris Capacity to undertake t Capacity to provide train countries: Poor (all level) 	on tsunami undertaken: No sment undertaken including: Tsunami, cyclone, drought, , landslide, strong wind ent undertaken at national, regional and sub-district level k map, evacuation map sunami risk assessment: Fair ning and/or consultancy on tsunami risk assessment to other els)	Notes: Risk assessment conducted by UNDP Municipalities of Ainaro, Baucau, Bobonaro, Covalima, Dili, Liquica, Lautem, Manatuto, Manufahi, Viqueque - and the Special Economic Region of Oecusse. Only major population centers mapped Risk map and evacuation map are in draft form for Dili, but yet to be finalised			
Detection and Warning	 National capability to as advise/warn coastal cor Name of organisation w tsunami threat informati Use IOTWMS TSP data TSP data 24x7 operations? Yes Level of tsunami threat Access to national or in Other national observin Capability to analyse re threat: Yes (see notes) Capability for tsunami n Does organisation for id watches, advisories, ale Has the NTWC and/or analyse re 	seess and/or receive potential tsunami threat information and mmunities: Yes with responsibility for assessing and/or receiving potential ion: National Disaster Risk Management Directorate a or own assessment to determine national threats? Use forecast information produced: National and local level ternational seismic networks: Yes ternational sea level networks: Yes (see notes) g networks used for tsunami early warning: <i>No response</i> al-time seismic and sea-level data for potential tsunami modelling to support threat forecasts: Yes (basic level) lentifying potential tsunami threat issue national tsunami erts and/or warnings? Yes TWFP participated in tsunami drills? Yes (see notes)	 Notes: Sea level via RIMES, BMKG Ocean Forecast, BOM Australia Use JISView and Linuh IOWave only (not in IOTWMS Communications Tests) 			
Dissemination	How is tsunami information disseminated within country? How is warning terminated?	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 Email, sms, phone call, public alert system.				

IOC Technical Series, 143 Annex IV – page 87

TIMOR-LESTE					
	Statu	Notes/Requirements			
			Support Required to Develop		
	SOPs for upstream emergency response:	SOPs	Human Resources	Infrastructure	
	• 24/7 Emergency Response Centre: Yes	✓	✓	✓	
	Receiving information from NTWC: Yes	✓	✓	✓	
	Response criteria/decision making: Yes		✓	✓	✓
Standard Operating	SOPs for <u>downstream</u> emergency response: • Warning dissemination: Yes		✓	✓	✓
Procedures	 Evacuation call procedures: No 		✓	✓	✓
	Community evacuation procedures: No		✓	✓	✓
	Communication with NTWC: Yes		✓	✓	\checkmark
	Communication with local government: Ye	es	✓	✓	\checkmark
	Media arrangements: Yes	1-	✓	✓	\checkmark
	Communication with other stakeholders: N	10	✓	✓	\checkmark
Evacuation Infrastructure	 Evacuation shelters: Yes Vertical evacuation shelter: Yes Natural or artificial hill for vertical evacuatio Evacuation signage: Yes Evacuation infrastructure integrated in evaluation 	 Notes 2 dedicated shelters cor Covalima Municipalities Potential to utilise the m shopping center but no f Limited signage is in pla However this is an area addressed 	npleted in Viqu ulti story Timo formal agreem ce Viqueque a that urgently r	ueque and r Plaza ent yet and Covalima. needs to be	
	Tsunami exercises incorporated in national	al policies: Yes			
	Tsunami exercises incorporated in national guidelines: No Level at which exercises are conducted: National: Yes		Notes:	panese Gover	mment funded
Tsunami	Regional: Yes	School Tsunami Exercise	and the aware	ness program	
Exercises	City: No		conducted in 6 school in 3	municipalities	during 2018
	• Village: No				
	 Community/neighbourhood: Yes 				
	School: Yes				
Dublic	Responsibility for tsunami public awarenes	ss programmes: NDMO			
Awaronose	r sunami related education and awareness	I Sunami awareness activities			
Awareness	Leaflets or flyers: Yes World Tsunami Awareness Day: No				

TIMOR-LESTE				
	Status		Notes/Requirements	
	 Posters: Yes Booklets: Yes Information boards: No Tsunami signage: No Video or other visual or oral media: Yes Indigenous knowledge, folklore etc: Yes Teaching kits: Yes Schools curricula: Yes Public evacuation maps: Yes 	 Global Disaster Risk Reduction Day: Yes (1 time) Public tsunami preparedness outreach: No School and/or children's awareness: Yes (6 times) Exhibitions: Yes (1 time) Competitions/other ways of highlighting tsunami safety: No Tsunami exercise: Yes (1 time) 		
	 Support from IOTIC required to develop or enhance public awareness Provision of general tsuna Customization of general r Development of tsunami a or campaigns Participation/support by in your country's activities Willing to support other countries to develop 	mi awareness materials materials to country or community wareness programmes, activities ternational agencies or experts to p or enhance public awareness: No		
	Communities involved in Indian Ocean Tsu General Comments:	nami Ready (IOTR) initiative: No		
General Comments and Future Plans	 Some material in Bahasa Indonesia been translated to Tetun language. Future Plans: Policy Integration of the Viqueque and Covalima evacuation center in to Tsunami awareness and evacuation planning. 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. Integration of Tsunami hazard mapping and evacuation planning and community awareness into municipal disaster management plan and policy 			

IOC Technical Series, 143 Annex V

ANNEX V

ACRONYMS

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

IOC Technical Series, 143 Annex V – page 2

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

Intergovernmental Oceanographic Commission Technical Series 143



Capacity Assessment of Tsunami Preparedness in the Indian Ocean

Status Report, 2018

Supplement

National Reports

UNESCO

Intergovernmental Oceanographic Commission Technical Series 143

Capacity Assessment of Tsunami Preparedness in the Indian Ocean

Status Report, 2018

Supplement

National Reports

UNESCO 2020

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

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariats of UNESCO and IOC concerning the legal status of any country or territory, or its authorities, or concerning the delimitation of the frontiers of any country or territory.

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

© UNESCO 2020

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

TABLE OF NATIONAL REPORTS

1.	AUSTRALIA1
2.	BANGLADESH17
3.	COMOROS17
4.	FRANCE, INDIAN OCEAN TERRITORIES40
5.	INDIA
6.	INDONESIA63
7.	IRAN (Islamic Republic of)76
8.	KENYA88
9.	MADAGASCAR101
10.	MALAYSIA113
11.	MAURITIUS125
12.	MOZAMBIQUE136
13.	MYANMAR148
14.	OMAN160
15.	PAKISTAN172
16.	SINGAPORE182
17.	SOUTH AFRICA193
18.	SRI LANKA
19.	TANZANIA
20.	THAILAND
21.	TIMOR-LESTE

NATIONAL REPORT OF AUSTRALIA

	PART I: Ba	isic Information
Q3	TNC Name:	Mr Rob Webb
Q4	Position:	Group Executive, National Forecast Services
Q5	Organization	Bureau of Meteorology
Q6	Telephone Number:	+613 9669 4217
Q7	E-mail Address:	rob.webb@bom.gov.au
Q8	Fax Number:	+613 9669 8162
Q9	Postal Address:	GPO Box 1289, Melbourne, VIC 3001, AUSTRALIA
Q10	NTWC Agency Name:	Joint Australian Tsunami Warning Centre (JATWC)
Q11	NTWC URL (web link) for tsunami warnings:	www.bom.gov.au/tsunami
Q12	NTWC Agency Contact or Officer in Charge (person):	Co-Director, JATWC
Q16	Postal Address:	GPO Box 1289, Melbourne, VIC 3001, AUSTRALIA
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? 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.	Yes
Q18	TWFP Agency Name (if different from the NTWC Agency):	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):	JATWC operation desk, National Operations Centre, Bureau of Meteorology

F	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 (select all that apply)	d d out?	Tsunami, Cyclone, Earthquakes, Flooding		
Q32	4d) Who did the tsunami hazard assessment in your country? (select		National Agency		
			National / Local University		
			National / Internation	al 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.		
Q33	 4e) At what level was the tsunami hazard assessment carried out? (select all that apply) 		National Level, Regio	onal Level, City Level	
	Other (please specify):		National & local (GA) Department of Enviro local (NSW State Em Cardno, Mineral Res Macquaire Uni/UNSV	, state & local (QLD onment and Science or DES), nergency Service or NSW SES, ources Tasmania (MRT), UoN, V)	
Q34	4f) Which coastal areas have mapped for tsunami hazard? include the names of the Reg and an approximation of the percentage mapped.	e been ' Please gion / City	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		
Q35	4g) For each of the data type	es listed bel	territories and mainla ow (in rows), answer t	nd) the two questions (in columns).	
	Select Yes / No / Don't know	from the di	rop down menu.		
		Was this d hazar	ata used for tsunami d 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.		
Q36	4h) What products do you ha the tsunami hazard assessm (select all that apply)	ave from hent?	Probabilistic Tsunam	i Hazard Assessment (PTHA)	

	Probabilistic Tsunami Hazard		
	Assessment (PTHA)		
	Field Studies on Tsunami Impacts		
	Hazard map, inundation map,		
	Other (please specify):	I sunami Hazard Modelling Guidelines available via https://knowledge.aidr.org.au/resources/tsunami- planning- handbook/ 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.	
Q37	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Good	
Q38	4j) On a scale of 1 (Not a priority) to 5 (E improve capacity in the following areas of	Essential), what is the priority level in your country to of tsunami hazard assessment?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	Medium priority	
	Deterministic Tsunami Hazard Analysis	Medium priority	
	Field Studies on Tsunami Impacts	Not a priority	
	Hazard map	Low priority	
	Inundation map	Low priority	
	Evacuation map	Medium priority	
Q39	4k) On a scale of 1 (No capacity) to 5 (V give training and/or consultancy on tsun	<pre>/ery good), what capacity does your country have to ami hazard assessment to other countries?</pre>	
	Probabilistic Tsunami Hazard Assessment (PTHA)	Good	
	Deterministic Tsunami Hazard Analysis	Good	
	Field Studies on Tsunami Impacts	Not a priority	
	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	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.	

F	PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines			
	Risk Assessment			
Q40	5a) Has your country undertaken a tsunami risk assessment?	Yes		
Q41	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami		
Q42	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Earthquakes, Epidemics, Flooding, Landslide		
Q43	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.		
Q44	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		
Q45	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).		
Q46	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.		
Q47	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 https://knowledge.aidr.org.au/resources/handbook- 10- national-emergency-risk-assessment-guidelines/ 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.		
Q48	5i) On a scale of 1 (Very poor) to 5 (Ver undertake tsunami risk assessment	y good), please rate your country's capability to		
	Capability to undertake tsunami risk assessment	Good		
Q49	5j) On a scale of 1 (Not a priority) to 5 (E improve capacity in the following areas	Essential), what is the priority level of your country to 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	
Q50	5k) On a scale of 1 (No capacity) to 5 (V give training and/or consultancy on tsun	/ery good) what capacity does your country have to ami 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	
F	PART II: Hazard Assessment, Risk	Assessment, Policies, Plans, Guidelines	
	P	olicies	
Q51	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).		
	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 https://knowledge.aidr.org.au/resources/handbook- 9-australian-emergency-management- arrangements/ ; Tsunami Emergency Planning in Australia Handbook at https://knowledge.aidr.org.au/resources/tsunami- planning- handbook/ Australian Evacuation Planning Handbook at https://knowledge.aidr.org.au/media/5617/aidr- evacuation-planning- handbook.pdf	
Q52	6b) Does your country have local tsunar phases listed below, select standalone p the comments box to detail the specific In what form is the policy?	mi policies? For each of the disaster management policy / multi hazard policy / policy not available. Use name(s) of the policy (if available).	
	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	

F	PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines					
		F	Plan	IS		
Q53	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 includin tsunami	g	Standalone tsunami only	Multi hazard including tsunami	
	Preparedness	Multi hazard includin tsunami	g	Standalone tsunami only	Multi hazard including tsunami	
	Emergency response	Multi hazard includin tsunami	g	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 available):	of the plan(s) (if	CO Fed Tsu Ser and	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		
Q54	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?		Yes	;		
F	ART II: Hazard A	Assessment, Risk /	Ass	essment, Policies, Pla	ans, Guidelines	
		Gui	idel	ines		
Q55	8a) Does your cou phases, select sta the comments box In what form are th	Intry have national tsu ndalone guidelines / n to detail the specific i ne guidelines?	nam nulti nam	i DRR guidelines? For ea hazard guidelines / guide e of the guidelines (if ava	ach of the four lifecycle lines not available. Use ilable).	
	Prevention and mitigation		Sta	ndalone tsunami guidelin	es	
	Preparedness		Standalone tsunami guidelines			
	Emergency respon	nse	Standalone tsunami guidelines			
	Rehabilitation and reconstruction		Guidelines not available			
What is the name of guidelines? (if available): Tsunami Emergency Planning in Austra Handbook and its companion document https://knowledge.aidr.org.au/resources. planning-handbook/				ng in Australia n documents at n/resources/tsunami-		
Q56	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 mi	itigation	Sta	ndalone tsunami guidelin	es	
	Preparedness		Sta	ndalone tsunami guidelin	es	
	Emergency respon	nse	Sta	ndalone tsunami guidelin	es	

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 https://knowledge.aidr.org.au/resources/tsunami- planning-handbook/ refer to local procedures including Evacuation Planning and Community Recovery.	

	PART III: Detection, Warning and Dissemination				
	Detectior	and Warning			
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes			
Q58	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			
Q59	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			
Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes			
Q61	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. 			
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	Ocean-wide, National, Local			

Q63	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.
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocument Record&docID=207 96)?	Yes
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocument Record&docID=207 96), 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
Q66	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.
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php?	Yes

	option=com_oe&task=viewDocument Record&docID=208 33)?	
Q68	9I) When compared to the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocument Record&docID=208 33), 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
Q69	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 http://auscors.ga.gov.au/status/. Detailed information about each GNSS station, including location, instrumentation and agency point-of-contact is available at ftp://ftp.ga.gov.au/geodesy-outgoing/gnss/logs/.
Q70	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
Q71	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
Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
Q73	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

		coastal zones are used to assign one of three threat levels. No Threat <20 cm Marine Threat 20 - 55 cm Land Threat >55 cm The above deep-water thresholds roughly equates to the near shore shallow water values of, after considering the very crude Green's Law approximation. No Threat <40 cm Marine Threat 40 - 100 cm Land Threat >100 cm It's important to note that decision making for JATWC to issue a tsunami warning is solely based on deep-water thresholds.
Q74	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.
Q75	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)
Q76	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):	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 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 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.

Q77	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:	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.		
		Several swimmers were washed into a lagoon at Merimbula NSW although inconclusive whether due to tsunami. Overall the impact to Australia is minor.		
	<u> </u>			
	PART III: Detection, W	larning and Dissemination		
	PART III: Detection, W Disse	Arning and Dissemination		
Q78	PART III: Detection, W Disse 10a) How is the tsunami information (warning, public safety action, etc.) disseminated within country? (select all that apply)	Arning and Dissemination emination 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		
Q78	PART III: Detection, W Disso 10a) How is the tsunami information (warning, public safety action, etc.) disseminated within country? (select all that apply) Other:	Arning and Dissemination emination 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 Emergency Alert; Phone trees; 1300 TSUNAMI telephone services		
Q78 Q79	PART III: Detection, W Disso 10a) How is the tsunami information (warning, public safety action, etc.) disseminated within country? (select all that apply) Other: 10b) How is the warning situation terminated?	Varning and Dissemination emination 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 Emergency Alert; Phone trees; 1300 TSUNAMI telephone services 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.		
Q78 Q79	PART III: Detection, W Disso 10a) How is the tsunami information (warning, public safety action, etc.) disseminated within country? (select all that apply) Other: 10b) How is the warning situation terminated?	Arning and Dissemination emination 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 Emergency Alert; Phone trees; 1300 TSUNAMI telephone services 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. 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.		

	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
		Standa	rd Operating Proc	cedures		
Q81	81 11a) For each of the (upstream) emergency response issues listed below (in rows), con 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	
Q82	11b) For each of the (d consider the four quest menus.	ownstrea ions (in c	am) emergency respo columns). Select a ye	onse issues listed belo s/no response using t	ow (in rows), he drop down	
	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	
	Media arrangementsYesCommunication with other stakeholder i.e. Red Cross, Fire Brigade, Search andYes		Yes	Yes	No	
I	Resource Rolling					
-----	---	----------------------------------	---	-------------------------------------	---	---------------------------------
	Army, Navy etc.					
Q83	11c) Would your countr share your SOPs with the other countries?	y be will ne IOTI(ing to C and	Yes		
Q84	11d) For each emergen methods for emergency	cy respon	onse org se are a	anisation liste vailable? (sel	ed below, which comr ect all that apply)	nunication
	National DMOs			Telephone, below)	Fax, Email, SMS, Oth	ner (please specify
	Local DMOs		Telephone, Fax, Email, SMS, Siren, Other (please specify below)			
	General Public		Telephone, specify belo	Fax, Email, SMS, Sire w)	en, Other (please	
	Coastal Communities		Telephone,	Fax, Email, SMS, Sire	en	
	Media			Telephone, below)	Fax, Email, SMS, Oth	ner (please specify
	Other communication m (please specify)	ethods		As per Q10a	a depending on circur	nstances
	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises. Public Awareness					
	Evacuation Infrastructure					
Q85	12a) Does your country and detail specific areas	have th s). Pleas	e followi se use th	ng evacuatio le scroll bar b	n infrastructure? (sele	ect all that apply re table.
	Evacuation shelter		No			
			There are sh	nelters but not specifi	cally for tsunami	
	Vertical evacuation structure		No			
			There are sh	nelters but not specifie	cally for tsunami	
	Natural or artificial hill for vertical		Yes			
	evacuation			But no definitive percentage		
	Evacuation signage			Yes Limited to so Manly Beacl	ome individual coasta ז	l cities such as
	Other (please specify)			No		
Q86	12b) Is your evacuation integrated in the evacuation	infrastr ation pla	ucture n?	No		
	PART IV: Standard Tsi	l Opera Inami I	ating Pr Exercis	ocedures, l es, Public /	Evacuation Infrast Awareness	ructure,
			Tsunar	ni Exercise	S	
Q87	12a) Are tsunami exerc incorporated within nati and guidelines? (select	ises onal pol all that :	icies apply)	National gui	delines	
Q88	12b) At what levels wer conducted during the in (between ICG Meetings (select all that apply)	e the ex ter-sess) period	ercises ional ?	National level	el, Regional level, Cit	y level, Village

-

Q89	12c) What kind of tsunami exercise active many times during the inter-sessional (b	vities have been undertaken in your country and how etween 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
	PART IV: Standard Operating Pr Tsunami Exercis	ocedures, Evacuation Infrastructure, es, Public Awareness
	Public	Awareness
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	Local Disaster Management Office
Q91	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 https://knowledge.aidr.org.au/resources/the- ultimate-guide- tsunami/#/
Q92	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
Q93	13d) Do you undertake the following tsu	nami 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
Q94	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,	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
Q95	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 I tsunami preparedne	OTIC and all MSs to enhance ess
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	Yes	
	Please list the names	Christmas Island ar	nd Cocos (Keeling) Islands
Q97	13h) For those communities that particip ranking of their performance against the (very good)	bated in the IOTR initial of the IOTR initial of the IOTR indicators, us	itiative, please provide a general sing the scale 1 (very poor) to 5
	Have a community tsunami risk reduction	on plan	3 (Fair)
	Have designated and mapped tsunami l	hazard zones	3 (Fair)
	Have a public display of tsunami informa	ation	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 Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public 		3 (Fair)
			3 (Fair)

	PART V: Narrative
Q98	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

	GA released a new version of the PTHA www.ga.gov.au/ptha (includes open sou publications are progressing)	on World Tsunami Awareness Day, see rce software, rptha. Reviewed at EGU and journal	
	GA have provided options to the IOTWN (the IOPTHA was developed in 2009 foll	IS to leverage the PTHA for Indian Ocean nations lowing the original 2008 PTHA for Australia)	
	Through a DFAT funded project, GA has trained scientists in the Pacific to develop tsunam inundation maps and to integrate into disaster management plans using the open-source PacSAFE software tool, see http://www.ga.gov.au/news-events/news/latest- news/pacsafe helping-build-a-more-resilient-pacific . Project is due for completion at end of 2018.		
	GA participated in the UNESCO/IOC Sc tsunami sources, hazards, risks and unc Subduction Zone	ientific meeting of experts (Nov 2018) to understand certainties associated with the Tonga-Kermadec	
	Bureau of Meteorology performed a maj	or upgrade to its tsunami Decision Support Tool.	
	Bureau of Meteorology published a real- Ocean at www.bom.gov.au/tsunami/iotw IOWave18 exercise	time tsunami warning status page for the Indian ms which was successfully tested during the	
	University of Newcastle completed a study into the potential for submarine landslide inundation off the NSW coast		
	QLD Department of Environment and Science has conducted detailed inundation modelling for a small subset of scenarios at the Sunshine Coast and Moreton Bay		
	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.		
Q99	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements		
→	Develop local tsunami hazard information using the 2018 PTHA and the Tsunami Hazard Modelling Guidelines		
	Collect elevation data in priority areas and support national initiatives in this regard		
	Develop nationally consistent storm surge services 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)		
	Develop and/or refine tsunami evacuation	on maps	
	More inundation modelling and mapping		
	Increase tsunami awareness for coastal	communities and marine users	
Q100	Upload Documents	Respondent skipped this question	



NATIONAL REPORT OF BANGLADESH

	PART I: Basic Information			
Q3	TNC Name:	Shamsuddin Ahmed		
Q4	Position:	Director		
Q5	Organization	Bangladesh Meteorological Department (BMD)		
Q6	Telephone Number:	+88 02 912 3838		
Q7	E-mail Address:	info@bmd.gov.bd		
Q8	Fax Number:	+88 02 581 5209 / +88 02 811 8230		
Q9	Postal Address:	Bangladesh Meteorological Department, E-24, Agargaon, Dhaka-1207		
Q10	NTWC Agency Name:	Bangladesh Meteorological Department (BMD)		
Q11	NTWC URL (web link) for tsunami warnings:	www.bmd.gov.bd		
Q12	NTWC Agency Contact or Officer in Charge (person):	Meteorologist		
Q16	Postal Address:	Seismic Observatory and Research Center, Bangladesh Meteorological Department (BMD), E- 24, Agargaon, Dhaka-1207.		
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? 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.	Yes		
Q18	TWFP Agency Name (if different from the NTWC Agency):	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):	Seismic Observatory and Research Center, Bangladesh Meteorological Department (BMD)		

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 tsunamis	
Q31	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclone, Drought, E Landslide	arthquakes, Flooding,
Q32	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National Agency, National / Int	ernational Consultant
	Please specify the name(s) of the agencies:	Respondent skipped this ques	tion
Q33	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Level	
Q34	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 to Chattogram division have bee hazard	tal Khulna, Barishal, n mapped for tsunami
Q35	4g) For each of the data types listed belo Select Yes / No / Don't know from the dr	ow (in rows), answer the two qu op down menu.	estions (in columns).
		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
Q36	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 Deterministic Tsunami Hazard Map, Inundation Map	Assessment (PTHA), Analysis, Hazard
	Other (please specify):		
Q37	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Poor	
Q38	4j) On a scale of 1 (Not a priority) to 5 (E improve capacity in the following areas of) to 5 (Essential), what is the priority level in your country to 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
Q39	4k) On a scale of 1 (No capacity) to 5 (V give training and/or consultancy on tsum	ery good), what capacity does your country have to ami 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)
l	PART II: Hazard Assessment, Risk	Assessment, Policies, Plans, Guidelines
	Risk A	Assessment
Q40	Sa) Has your country undertaken a tsunami risk assessment?	Assessment Yes
Q40 Q41	Risk A5a) Has your country undertaken atsunami risk assessment?5b) What type of risk assessment?	Yes Multi-hazard risk assessment including tsunami
Q40 Q41 Q42	Risk #5a) Has your country undertaken a tsunami risk assessment?5b) What type of risk assessment?5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Yes Multi-hazard risk assessment including tsunami Tsunami, Cyclone, Drought, Earthquakes, Flooding, Landslide
Q40 Q41 Q42 Q43	Risk #5a) Has your country undertaken a tsunami risk assessment?5b) What type of risk assessment?5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)5d) Who did the tsunami risk assessment in your country?	Yes Multi-hazard risk assessment including tsunami Tsunami, Cyclone, Drought, Earthquakes, Flooding, Landslide National Agency, National/International Consultant
Q40 Q41 Q42 Q43 Q44	Risk #5a) Has your country undertaken a tsunami risk assessment?5b) What type of risk assessment?5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)5d) Who did the tsunami risk assessment in your country?5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Assessment Yes Multi-hazard risk assessment including tsunami Tsunami, Cyclone, Drought, Earthquakes, Flooding, Landslide National Agency, National/International Consultant National Level
Q40 Q41 Q42 Q43 Q44 Q45	Risk #5a) Has your country undertaken a tsunami risk assessment?5b) What type of risk assessment?5c) What type of risk assessment?5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)5d) Who did the tsunami risk assessment in your country?5e) At what level was the tsunami risk assessment carried out? (select all that apply)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.	Yes Multi-hazard risk assessment including tsunami Tsunami, Cyclone, Drought, Earthquakes, Flooding, Landslide National Agency, National/International Consultant National Level 0.5 percent coastal areas of total Khulna, Barishal, Chattogram division have been mapped for tsunami risk.
Q40 Q41 Q42 Q43 Q44 Q45 Q45	Risk #5a) Has your country undertaken a tsunami risk assessment?5b) What type of risk assessment?5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)5d) Who did the tsunami risk assessment in your country?5e) At what level was the tsunami risk assessment carried out? (select all that apply)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.5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Yes Multi-hazard risk assessment including tsunami Tsunami, Cyclone, Drought, Earthquakes, Flooding, Landslide National Agency, National/International Consultant National Level 0.5 percent coastal areas of total Khulna, Barishal, Chattogram division have been mapped for tsunami risk. More than five (5) important cities are at risk from tsunami.
Q40 Q41 Q42 Q43 Q44 Q45 Q45 Q46 Q47	Risk #5a) Has your country undertaken a tsunami risk assessment?5b) What type of risk assessment?5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)5d) Who did the tsunami risk assessment in your country?5e) At what level was the tsunami risk assessment carried out? (select all that apply)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.5g) How many Cities / Municipalities / Regencies are at risk from tsunami?5h) What products do you have from the tsunami risk assessment? (select all that apply)	Yes Multi-hazard risk assessment including tsunami Tsunami, Cyclone, Drought, Earthquakes, Flooding, Landslide National Agency, National/International Consultant National Level 0.5 percent coastal areas of total Khulna, Barishal, Chattogram division have been mapped for tsunami risk. More than five (5) important cities are at risk from tsunami. Risk Map

	Capability to undertake tsunami risk assessment	Poor
Q49	5j) On a scale of 1 (Not a priority) to 5 (E improve capacity in the following areas of	Essential), what is the priority level of your country to 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
Q50	5k) On a scale of 1 (No capacity) to 5 (V give training and/or consultancy on tsun	ery good) what capacity does your country have to ami 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 gives 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)
I	PART II: Hazard Assessment, Risk	Assessment, Policies, Plans, Guidelines
	Р	olicies
Q51	6a) Does your country have a national to management phases listed below, selec available. Use the comments box to deta In what form is the policy?	sunami policy? For each of the four disaster t standalone policy / multi hazard policy / policy not ail the specific name of the policy (if available).
	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

Q52	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 haz	zard including tsunami		
	Emergency response		Multi hazard including tsunami			
	Rehabilitation and reconstr	uction	Multi ha:	zard including tsunami		
I	PART II: Hazard Assess	ment, Risk	Assess	Assessment, Policies, Plans, Guidelines		
			Plans			
Q53	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.			i disaster risk d below, select nts box to detail the view the entire table.		
		National	level	Local level	Community level	
	Prevention and mitigation	Multi hazard including tsu	nami	Multi hazard including tsunami	Multi hazard including tsunami	
	Preparedness	Multi hazard including tsu	nami	Multi hazard including tsunami	Multi hazard including tsunami	
	Emergency response	Multi hazard including tsu	nami	Multi hazard including tsunami	Multi hazard including tsunami	
	Rehabilitation and reconstruction	Multi hazard including tsu	nami	Multi hazard including tsunami	Multi hazard including tsunami	
	What is the name of the pla available):	ın(s) (if	Respondent skipped this question			
Q54	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					
Q55	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 guidel	nes?	Multi ho		a tounomi	
	Prevention and miligation					
	Preparedness		Multi hazard guidelines including tsunami			
	Rehabilitation and reconstr	uction				
	What is the name of guidelines?		Not provided			
Q56	8b) Does your country have phases, select standalone the comments box to detail	e local tsunan guidelines / m the specific r	ni DRR g nulti-haza name of t	uidelines? For each of rd guidelines / guidelin he guidelines (if availal	the four lifecycle es not available. Use ble).	
	In what form are the guideli	nes?				
	Prevention and mitigation		Multi haz	zard guidelines includir	ng 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			
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes		
Q58	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		
Q59	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		
Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes		
Q61	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Fax, UPS (Uninterruptable Power Supply)		
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National		
Q63	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.		
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentR ecord&docID=207 96)?	Yes		

Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentR ecord&docID=207 96), 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
Q66	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.
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentR ecord&docID=208 33)?	Yes
Q68	9I) When compared to the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentR ecord&docID=208 33), 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
Q69	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
Q70	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)
Q71	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	No
Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami	Yes

	watches, advisories, alerts and/or warnings?	
Q73	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.)
Q74	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.
Q75	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
Q76	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.
Q77	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, V	Varning and Dissemination
	Diss	
Q78	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
Q79	10b) How is the warning situation terminated?	Based on the updated information on tsunami warning from IOTWMS TSPs the warning situation in terminated
Q80	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

Q81 11a) For each of the (upstream) emergency response issues listed below (in row the four questions (in columns). Select a yes/no response using the drop down					vs), consider 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
Q82 11b) For each of the (downstream) e consider the four questions (in colum menus.		n) emer lumns).	gency response issue Select a yes/no respo	s listed below (in onse using the dro	rows), op down
	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
Q83	11c) Would your country be willin share your SOPs with the IOTIC a other countries?	g to and	Yes		
Q84	11d) For each emergency respon for emergency response are avai	se orga lable? (anisation listed below, select all that apply)	which communica	ation methods
	National DMOs		Fax, Email		
	Local DMOs		Fax, Email		
	General Public		SMS, Siren		

	Coastal Communities	SMS, Siren			
	Media	Telephone, Fax, SMS			
	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness				
	Evacuatio	n Infrastructure			
Q85	i 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			
Q86	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes			
	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness				
	Tsunami Exercises				
Q87	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National guidelines			
Q88	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level			
Q89	12c) What kind of tsunami exercise activ many times during the inter-sessional (b	ities have been undertaken in your country and how etween 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)			

	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness			
	Public	: Awareness		
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office		
Q91	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Information boards		
Q92	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		
Q93	13d) Do you undertake the following tsu	nami 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		
Q94	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		
Q95	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		
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	Yes		
	Please list the names	Bangladesh Meteorological Department		

Q97	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			
Q98	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.			
Q99	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.			
Q100	Upload Documents Respondent skipped this question			



NATIONAL REPORT OF COMOROS

	PART I: Basic Information			
Q3	TNC Name:	An-Ynaya Bintie Abdourazakou		
Q4	Position:	Agent		
Q5	Organization	Agence Nationale de l'Aviation Civile et de la Meteorologie (ANACM)		
Q6	Telephone Number:	002 697 738 003		
Q7	E-mail Address:	Masoibrah1@yahoo.fr		
Q8	Fax Number:	002697738003		
Q9	Postal Address:	ANACM, Boulevard de Strasbourg B.P 72, Moroni Union des Comoroes		
Q10	NTWC Agency Name:	Agence Nationale de l'Aviation Civile et de la Météorologie		
Q11	NTWC URL (web link) for tsunami warnings:	No link, we just have agreement to build a separate website for NMHS		
Q12	NTWC Agency Contact or Officer in Charge (person):	Director General		
Q16	Postal Address:	ANACM, Boulevard de Strasbourg B.P 72, Moroni Union des Comores		
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? 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.	Yes		
Q18	TWFP Agency Name (if different from the NTWC Agency):	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):	Service Prévisions, Exploitation des Alertes et Recherche		

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 a hazard assessn	essessment on tsunami AND multi- nent including tsunami		
Q31	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Cyclo	Tsunami, Cyclone, Flooding, Volcanic eruptions		
Q32	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National / Intern	National / International Consultant		
	Please specify the name(s) of the agencies:	Not provided			
Q33	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)			
Q34	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			
Q35	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.			ns (in columns).	
			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	
	Fopography		Don't know	Don't know	
	Land Cover		Don't know	Don't know	
	Infrastructure details		Don't know	Don't know	
Q36	 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, Inu Evacuation map,	ndation map, Guidelines	
	Other (please specify):		Guidelines (SOP level (stakeholde) for national rs)	
Q37	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment		Fair		
Q38	4j) On a scale of 1 (Not a priority) to 5 (Es improve capacity in the following areas of	sential), what is t tsunami hazard a	he priority level in assessment?	your country to	
	Probabilistic Tsunami Hazard Assessmer	nt (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
Q39	4k) On a scale of 1 (No capacity) to 5 (Very good), what ca give training and/or consultancy on tsunami hazard assess	apacity does your country have to sment 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
I	PART II: Hazard Assessment, Risk Assessment, Po	olicies, Plans, Guidelines
	Risk Assessment	
Q40	5a) Has your country undertaken a tsunami risk assessment?	Yes
Q41	5b) What type of risk assessment?	Single risk assessment on tsunami AND multi-hazard risk assessment including tsunami
Q42	5c) What hazards have been considered in your multi- hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Earthquakes, Epidemics, Flooding
Q43	5d) Who did the tsunami risk assessment in your country?	National/International Consultant
Q44	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National Level
Q45	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
Q46	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Respondent skipped this question
Q47	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Risk map, Evacuation map, Guidelines (please specify below)
Q48	5i) On a scale of 1 (Very poor) to 5 (Very good), please rat undertake tsunami risk assessment	e your country's capability to
	Capability to undertake tsunami risk assessment	Fair
Q49	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is t improve capacity in the following areas of tsunami risk ass	the priority level of your country to essment?
	Tsunami risk assessment at national level	Low priority
	Tsunami risk assessment at regional level	Not a priority

	Tsunami risk assessment a	t city level		High price	prity
	Tsunami risk assessment a	t village level		High price	prity
	Tsunami risk assessment a level	t community / neighbou	rhood	High pric	prity
	What other areas of capacit assessment require improve	y in tsunami hazard ement?		Harbor a	reas
Q50	5k) On a scale of 1 (No cap give training and/or consulta	acity) to 5 (Very good) v ancy on tsunami risk as	what cap sessmei	bacity doe	s your country have to countries?
	Tsunami risk assessment a	t national level		Poor	
	Tsunami risk assessment a	t regional level		Poor	
	Tsunami risk assessment a	t city level		Poor	
	Tsunami risk assessment a	t village level		Poor	
	Tsunami risk assessment a level	t community / neighbou	rhood	Poor	
	Other (specify below)			Poor	
I	PART II: Hazard Assessn	nent, Risk Assessme	ent, Po	licies, P	lans, Guidelines
		Policies			
Q51	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 haz	zard including tsunami
	Preparedness			Multi haz	zard including tsunami
	Emergency response			Standalo	one tsunami only
	Rehabilitation and reconstruction		Multi haz	zard including tsunami	
	What is the name of policy?	(if available):		Not prov	ided
Q52	6b) Does your country have phases listed below, select the comments box to detail In what form is the policy?	e local tsunami policies? standalone policy / mult the specific name(s) of	For eac ti hazarc the polic	ch of the c I policy / p cy (if avail	lisaster management policy not available. Use able).
	Prevention and mitigation			Policy is	not available
	Preparedness			Policy is	not available
	Emergency response			Policy is	not available
	Rehabilitation and reconstru	uction		Policy is	not available
I	PART II: Hazard Assessn	nent, Risk Assessme	ent, Po	licies, P	lans, Guidelines
		Plans			
Q53	7a) Does your country have reduction plans? For each o standalone plan / multi haza specific name(s) of the plan	e national, local and com of the four disaster mana ard plan / plan not availa (s) (if available). Please	nmunity agemen able. Use suse the	level tsun t phases e the com e scroll ba	ami disaster risk listed below, select ments box to detail the r to view the entire table.
		National level	Loca	level	Community level
	Prevention and mitigation	Respo	ndent sk	kipped this	s question

	Preparedness		
	Emergency response		
	Rehabilitation and reconstruction		
	What is the name of the pla	n(s) (if available):	Disaster risk reduction plans are not yet adapted to the local level (it's under an ongoing project)
Q54	7b) Are your country's tsuna plans based on hazards and	ami disaster risk reduction d risk assessments?	Yes
I	PART II: Hazard Assessm	nent, Risk Assessment, Po	olicies, Plans, Guidelines
		Guidelines	
Q55	8a) Does your country have phases, select standalone g the comments box to detail In what form are the guideling	national tsunami DRR guidelir juidelines / multi hazard guideli the specific name of the guidel nes?	nes? For each of the four lifecycle nes / guidelines not available. Use ines (if available).
	Prevention and mitigation		Guidelines not available
	Preparedness		Guidelines not available
	Emergency response		Guidelines not available
	Rehabilitation and reconstru	uction	Guidelines not available
	What is the name of guidelin (if available):	nes?	Not provided
Q56	8b) Does your country have phases, select standalone g the comments box to detail In what form are the guideling	local tsunami DRR guidelines' juidelines / multi-hazard guideli the specific name of the guidel nes?	? For each of the four lifecycle ines / guidelines not available. Use ines (if available).
	Prevention and mitigation		Guidelines not available
	Preparedness		Guidelines not available
	Emergency response		Guidelines not available
	Rehabilitation and reconstru	uction	Guidelines not available
	What is the name of guidelin (if available):	nes?	Not provided

	PART III: Detection, Warning and Dissemination				
	Detection and Warning				
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes			
Q58	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			
Q59	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
Q60	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
Q61	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)
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
Q63	9g) Does the organisation have access to national or international seismic networks?	No
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=207 96)?	No
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=207 96), 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
Q66	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)):	loc-sealevelmonitoring.org
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=208 33)?	Yes
Q68	9I) When compared to the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=208 33), 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
Q69	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
Q70	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	No

-		
Q71	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	No
Q72	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
Q73	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
Q74	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)
Q75	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
Q76	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
Q77	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 Dise	semination
	Dissemination	
Q78	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
Q79	10b) How is the warning situation terminated?	By a message confirm the no threat in our coastal area
Q80	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)

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

Standard Operating Procedures

Q81	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
Q82	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.			rows), rop down		
	Does your SOP address this asp tsunami emergency response	ect of e?	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
Q83	11c) Would your country be willing with the IOTIC and other countrie	g to sha s?	re your SOPs	Yes		
Q84	11d) For each emergency respon methods for emergency response	se orgar are ava	nisation listed bel iilable? (select al	ow, wh I that a	iich communic pply)	cation
	National DMOs			Telep	hone, Fax, Er	nail, 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		
	PART IV: Standard Operating Procedures, Evac Tsunami Exercises, Public Awar	uation Infrastructure, eness		
	Evacuation Infrastructure			
Q85	12a) Does your country have the following evacuation infra and detail specific areas). Please use the scroll bar below	astructure? (select all that apply 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		
Q86	12b) Is your evacuation infrastructure integrated in the evacuation plan?	No		
	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness			
	Tsunami Exercises			
Q87	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy		
Q88	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		
Q89	12c) What kind of tsunami exercise activities have been ur many times during the inter-sessional (between ICG Meeti	ndertaken in your country and how ngs) 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)		
	PART IV: Standard Operating Procedures, Evac Tsunami Exercises, Public Awar	uation Infrastructure, eness		
	Public Awareness			
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office		

Q91	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	
Q92	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	
Q93	13d) Do you undertake the following tsunami awareness a	ctivities?	
	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	
Q94	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	
Q95	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	
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	No	
	Please list the names	Respondent skipped this question	
Q97	13h) For those communities that participated in the IOTR in ranking of their performance against the IOTR indicators, u (very good)	nitiative, please provide a general using the scale 1 (very poor) to 5	
	Have a community tsunami risk reduction plan	Respondent skipped this	
	Have designated and mapped tsunami hazard zones	question	
	Have a public display of tsunami information		
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities		

IOC Technical Series, 143 (Suppl.1) Comoros – page 39

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				
Q98	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				
Q99	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements				
→	Not provided				
Q100	Upload Documents	Respondent skipped this question			



NATIONAL REPORT OF FRANCE, INDIAN OCEAN TERRITORIES

	PART I: Basic Information			
Q3	TNC Name:	David Goutx		
Q4	Position:	Regional Director		
Q5	Organization	Météo-France		
Q6	Telephone Number:	+262 262 92 11 01		
Q7	E-mail Address:	david.goutx@meteo.fr		
Q8	Fax Number:	Respondent skipped this question		
Q9	Postal Address:	Météo-France, 50 boulevard du Chaudron, F- 97490 Sainte Clotilde La Réunion (France)		
Q10	NTWC Agency Name:	Météo-France		
Q11	NTWC URL (web link) for tsunami warnings:	Respondent skipped this question		
Q12	NTWC Agency Contact or Officer in Charge (person):	Head of the Forecast Division		
Q16	Postal Address:	Météo-France DIROI, 50, boulevard du Chaudron 97490 Sainte Clotilde, La Réunion		
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? 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.	Yes		
Q24	TWFP 24x7 point of contact (office, operational unit or position, not a person):	Meteo-France La Réunion Weather Forecasting Service		

	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, Flooding, Landslide, Volcanic eruptions		
Q32	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National / Local University		

1					
	Please specify the name(s) of the agencies:		Not provided		
Q33	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)		Regional	Regional Level	
	Other (please specify):				
Q34	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 costs (Saint Benoit - Saint André - Sainte Suzanne - Sainte Marie - Saint Denis - Saint Paul).		
Q35	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.			questions (in columns).	
		Was this data us tsunami hazard ass	ed for essment?	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	
Q36	 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	n map	
Q37	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment		Fair		
Q38	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?			level in your country to t?	
	Probabilistic Tsunami Hazard Asses	Medium p	priority		
	Deterministic Tsunami Hazard Analy	rsis	High priority		
	Field Studies on Tsunami Impacts		Medium priority		
	Hazard map		Essential		
	Inundation map		Medium priority		
	Evacuation map		Essential		
Q39	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country h give training and/or consultancy on tsunami hazard assessment to other countries?			s your country have to her countries?	
	Probabilistic Tsunami Hazard Asses	sment (PTHA)	Poor		
	Deterministic Tsunami Hazard Analy	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				
	PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines				
	Risk Assessment				
Q40	5a) Has your country undertaken a tsunami risk assessment?	Yes			
Q41	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami			
Q42	5c) What hazards have been considered in your multi- hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Flooding, Landslide, Volcanic eruptions			
Q43	5d) Who did the tsunami risk assessment in your country?	National Agency			
Q44	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Regional Level			
	Other (please specify):				
Q45	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.			
Q46	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).			
Q47	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Risk map			
Q48	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			
Q49	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			
Q50	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to git 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)						
	PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines						
Policies							
Q51	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 reconstr	uction		Multi hazard including tsunami			
	What is the name of policy	? (if available):		Not provided			
Q52	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 av	vailable		
	Preparedness			Policy is not av	vailable		
	Emergency response			Policy is not available			
	Rehabilitation and reconstr	uction		Policy is not available			
	PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines						
	Plans						
Q53	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.						
		ocal level	Community level				
	Prevention and mitigation	Multi hazard including tsunami	Local availa	plan is not able	Community plan is not available		
	Preparedness	Multi hazard including tsunami	Local availa	plan is not able	Community plan is not available		
	Emergency response Multi hazard including Multi tsunami including			hazard ling tsunami	Community plan is not available		
	Rehabilitation and reconstruction	Multi hazard including tsunami	Local availa	plan is not able	Community plan is not available		
	What is the name of the pla	Not provided					
Q54	7b) Are your country's tsunami disaster risk reduction Yes plans based on hazards and risk assessments?						
	PART II: Hazard Assess	sment, Risk Assessm	ent, P	olicies, Plans	, Guidelines		
		Guidelines					
Q55	 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):		
Q56	8b) Does your country have local tsunami DRR guidelines? phases, select standalone guidelines / multi-hazard guideli the comments box to detail the specific name of the guideli In what form are the guidelines?	? For each of the four lifecycle nes / guidelines not available. Use ines (if available).	
	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				
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes			
Q58	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			
Q59	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			
Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes			
Q61	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:				
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	Ocean-wide			
Q63	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):	
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=207 96)?	Yes
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=207 96), 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
Q66	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
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=208 33)?	Yes
Q68	9I) When compared to the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=208 33), 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
Q69	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
Q70	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	No
Q71	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	No
Q72	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
Q73	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
Q74	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 Antartic Lands)

Q75	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
Q76	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
Q77	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 Dis	ssemination
	Dissemination	
Q78	10a) How is the tsunami information (warning, public safety action, etc.) disseminated within country? (select all that apply)	Email, SMS, Radio, Television, Megaphone
Q79	10b) How is the warning situation terminated?	Media info and official communication (email - sms)
Q80	10c) What website is used for display of national threat status during events? Please provide the URL.	Respondent skipped this question

PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness						
	Standa	ard Op	erating Procedure	S		
Q81	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	
Q82	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 asp tsunami emergency response?	ect of	Is support required to	Is support required to	Is support required to	

			develop/improve this aspect of tsunami emergency response in you SOP?	e develop Human Resources in this aspect of tsunami r 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
Q83	11c) Would your country be willin with the IOTIC and other countrie	ig to sha s?	are your SOPs	Yes	
Q84	11d) For each emergency respor for emergency response are avail	nse orga ilable? (anisation listed bel select all that appl	ow, which communicat y)	ion methods
	National DMOs			Telephone, Fax, Ema	il, SMS, Siren
	Local DMOs			Telephone, Fax, Ema	il, SMS
	General Public			Other (please specify	below)
	Coastal Communities			Telephone, Fax, Ema	il, SMS
	Media		Telephone, Email, SM	IS	
PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
	Eva	icuatio	n Infrastructure)	
Q85	12a) Does your country have the detail specific areas). Please use	followin the scr	ng evacuation infra oll bar below to vie	structure? (select all the work the entire table.	at apply and
	Evacuation shelter			No	
	Vertical evacuation structure			No	
	Natural or artificial hill for vertical	evacua	tion	Yes	
	Evacuation signage			No	
Q86	12b) Is your evacuation infrastructer evacuation plan?	cture inte	egrated in the	No	
	PART IV: Standard Opera Tsunami I	ting P	rocedures, Eva ses, Public Awa	cuation Infrastructu reness	ire,
		Tsunar	mi Exercises		
Q87	12a) Are tsunami exercises incor policies and guidelines? (select a	porated	within national pply)	National guidelines	

Q88	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)Regional level			
Q89	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		
	PART IV: Standard Operating Procedures, Eva	cuation Infrastructure,		
	Tsunami Exercises, Public Awa	ireness		
	Public Awareness			
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office		
Q91	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Information boards		
Q92	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		
Q93	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		
Q94	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		
Q95	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No		
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	No		
Q97	13h) For those communities that participated in the IOTR in ranking of their performance against the IOTR indicators, u (very good)	nitiative, please provide a general using the scale 1 (very poor) to 5		
	Have a community tsunami risk reduction plan	Respondent skipped this question		
IOC Technical Series, 143 (Suppl.1) France – page 49

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				
Q98	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				
Q99	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements				
→	Respondent skipped this question				
Q100	Upload Documents	Respondent skipped this question			



NATIONAL REPORT OF INDIA

	PART I: Basic Information			
Q3	TNC Name:	Dr. Satheesh C. Shenoi		
Q4	Position:	Director		
Q5	Organization	Indian National Centre for Ocean Information Services (INCOIS)		
Q6	Telephone Number:	91-40-2389 5000		
Q7	E-mail Address:	shenoi@incois.gov.in		
Q8	Fax Number:	+91-40-2389 5001		
Q9	Postal Address:	Indian National Centre for Ocean Information Services (INCOIS) Ocean Valley, Pragathi Nagar (BO), Nizampet (SO) Hyderabad – 500 090, INDIA		
Q10	NTWC Agency Name:	Indian National Centre for Ocean Information Services (INCOIS)		
Q11	NTWC URL (web link) for tsunami warnings:	http://www.incois.gov.in/tsunami/eqevents.jsp		
Q12	NTWC Agency Contact or Officer in Charge (person):	In-charge, Indian Tsunami Early Warning Centre; Head- ODG &TWG		
Q16	Postal Address:	Indian National Centre for Ocean Information Services (INCOIS) Ocean Valley, Pragathi Nagar (BO), Nizampet (SO) Hyderabad – 500 090, INDIA		
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? 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.	Yes		
Q24	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)		

	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, Flooding	
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:		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	
Q33	4e) At what level was the tsunam assessment carried out? (select a apply)	i hazard all that	National Level, Reg	ional Level
	Other (please specify):			
Q34	4f) Which coastal areas have bee for tsunami hazard? Please inclue names of the Region / City and an approximation of the percentage	en mapped de the n mapped.	Entire Indian coast I Nicobar Islands Pro	ine except Andaman and vince
Q35 4g) For each of the data types listed below (in rows), answer the tr Select Yes / No / Don't know from the drop down menu.		n rows), answer the tw own menu.	o questions (in columns).	
	Was th tsunami ha		iis data used for azard assessment?	Is this data publicly available?
	Bathymetry	у		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 pu service on ISRO/NR	blicly available as map RSC Bhuvan portal
Q36	Q36 4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment		Deterministic Tsuna Field Studies on Tsu Hazard map, Inunda	mi Hazard Analysis unami Impacts ation map.
	(PTHA) Field Studies on Tounomi Imposto			
	Hazard map. Inundation map.			
	Guidelines (please specify below)			
	Other (please specify):		Besides, the multi-h mapping was carrie using data of histori	azard vulnerability d out by holistic approach cal extreme water levels,
			events, sea level ch topography.	ange and coastal

Q38	4j) On a scale of 1 (Not a priority) to 5 (Essen improve capacity in the following areas of tsue	On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to rove 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		
Q39	4k) On a scale of 1 (No capacity) to 5 (Very g give training and/or consultancy on tsunami h	ood), what capacity does your country have to azard 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		
	PART II: Hazard Assessment, Risk Ass	essment, Policies, Plans, Guidelines		
	PART II: Hazard Assessment, Risk Ass Risk Asse	essment, Policies, Plans, Guidelines essment		
Q40	PART II: Hazard Assessment, Risk Ass Risk Asse 5a) Has your country undertaken a tsunami risk assessment?	essment, Policies, Plans, Guidelines essment Yes		
Q40 Q41	PART II: Hazard Assessment, Risk Asse Risk Asse 5a) Has your country undertaken a tsunami risk assessment? 5b) What type of risk assessment?	essment, Policies, Plans, Guidelines essment Yes Multi-hazard risk assessment including tsunami		
Q40 Q41 Q42	PART II: Hazard Assessment, Risk Asse Risk Asses 5a) Has your country undertaken a tsunami risk assessment? 5b) What type of risk assessment? 5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	essment, Policies, Plans, Guidelines essment Yes Multi-hazard risk assessment including tsunami Tsunami, Cyclone, Flooding		
Q40 Q41 Q42 Q43	PART II: Hazard Assessment, Risk Asse Risk Asse 5a) Has your country undertaken a tsunami risk assessment? 5b) What type of risk assessment? 5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply) 5d) Who did the tsunami risk assessment in your country?	essment, Policies, Plans, Guidelines essment Yes Multi-hazard risk assessment including tsunami Tsunami, Cyclone, Flooding National Agency		
Q40 Q41 Q42 Q43	PART II: Hazard Assessment, Risk Asse Risk Asse 5a) Has your country undertaken a tsunami risk assessment? 5b) What type of risk assessment? 5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply) 5d) Who did the tsunami risk assessment in your country? Please specify the name(s) of the agency(ies):	essment, Policies, Plans, Guidelines essment Yes Multi-hazard risk assessment including tsunami Tsunami, Cyclone, Flooding National Agency Indian National Centre for Ocean Information Services (INCOIS); National Centre for Coastal Research (NCCR)		
Q40 Q41 Q42 Q43 Q44	PART II: Hazard Assessment, Risk Asse Risk Asses Sa) Has your country undertaken a tsunami risk assessment? Sb) What type of risk assessment? Sb) What type of risk assessment? Sc) What hazards have been considered in your multi-hazard risk assessment? (select all that apply) Sd) Who did the tsunami risk assessment in your country? Please specify the name(s) of the agency(ies): Se) At what level was the tsunami risk assessment carried out? (select all that apply)	essment, Policies, Plans, Guidelines essment Yes Multi-hazard risk assessment including tsunami Tsunami, Cyclone, Flooding National Agency Indian National Centre for Ocean Information Services (INCOIS); National Centre for Coastal Research (NCCR) National Level, Regional Level, City Level		
Q40 Q41 Q42 Q43 Q44 Q45	PART II: Hazard Assessment, Risk Asse Risk Asses Sa) Has your country undertaken a tsunami risk assessment? Sb) What type of risk assessment? Sb) What type of risk assessment? Sc) What hazards have been considered in your multi-hazard risk assessment? (select all that apply) Sd) Who did the tsunami risk assessment in your country? Please specify the name(s) of the agency(ies): Se) At what level was the tsunami risk assessment carried out? (select all that apply) Sf) 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.	essment, Policies, Plans, Guidelines ssment Yes Multi-hazard risk assessment including tsunami Tsunami, Cyclone, Flooding National Agency Indian National Centre for Ocean Information Services (INCOIS); National Centre for Coastal Research (NCCR) National Level, Regional Level, City Level Entire Coast line of India except Andaman and Nicobar Islands Province		

Q47	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	
Q48	5i) On a scale of 1 (Very poor) to 5 (Very good undertake tsunami risk assessment	d), please rate your country's capability to	
	Capability to undertake tsunami risk assessment	Very good	
Q49	5j) On a scale of 1 (Not a priority) to 5 (Essen improve capacity in the following areas of tsue	tial), what is the priority level of your country to nami 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	
Q50	5k) On a scale of 1 (No capacity) to 5 (Very g give training and/or consultancy on tsunami ri	ood) what capacity does your country have to sk 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 gives 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)	
	PART II: Hazard Assessment, Risk Ass	essment, Policies, Plans, Guidelines	
	Polic	ies	
Q51	6a) Does your country have a national tsunan management phases listed below, select stan available. Use the comments box to detail the	ni policy? For each of the four disaster idalone policy / multi hazard policy / policy not specific name of the policy (if available).	
	In what form is the policy?		
	Prevention and mitigation	Standalone tsunami only	
	Preparedness		
	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)	

Q52	6b) Does your c phases listed be the comments b	b) Does your country have local tsunami policies? For each of the disaster management hases listed below, select standalone policy / multi hazard policy / policy not available. Use e comments box to detail the specific name(s) of the policy (if available).			
	In what form is t	he policy?			
	Prevention and mitigation			Multi hazard including	g tsunami
	Preparedness			Multi hazard including	g tsunami
	Emergency response			Multi hazard including	g tsunami
	Rehabilitation a	nd reconstruction		Multi hazard including	g tsunami
	What is the nam	ne of policy? (if available):		Multi Hazard Policies Provinces level	are available at
	PART II: Haza	rd Assessment, Risk A	lss	essment, Policies,	Plans, Guidelines
		Р	lar	IS	
Q53	7a) Does your c reduction plans standalone plan specific name(s)	ountry have national, local ? For each of the four disas / multi hazard plan / plan) of the plan(s) (if available	l an ster not e). F	d community level tsur management phases available. Use the con Please use the scroll ba	nami disaster risk listed below, select nments box to detail the ar to view the entire table.
		National level		Local level	Community level
	Prevention and mitigation	Standalone tsunami only	M ts	ulti hazard including unami	Multi hazard including tsunami
	Preparedness	Standalone tsunami only	M ts	ulti hazard including unami	Multi hazard including tsunami
	Emergency response	Standalone tsunami only	M ts	ulti hazard including unami	Multi hazard including tsunami
	Rehabilitation and reconstruction	Standalone tsunami only	M ts	Aulti hazard including Multi hazard including sunami	
	What is the nam available):	ne of the plan(s) (if		Not provided	
Q54	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?				
	PART II: Haza	rd Assessment, Risk A	lss	essment, Policies,	Plans, Guidelines
		Gui	del	ines	
Q55	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).			each of the four lifecycle delines not available. Use railable).	
	Prevention and	mitigation		Standalone tsunami guidelines	
	Preparedness		Standalone tsunami guidelines		
	Emergency response			Standalone tsunami guidelines	
	Rehabilitation a	nd 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)		
Q56	8b) Does your country have local tsunami DR phases, select standalone guidelines / multi-h the comments box to detail the specific name		R guidelines? For eac azard guidelines / guidelines (if av	h of the four lifecycle delines not available. Use railable).	

In what form are the guidelines?	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			
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes		
Q58	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		
Q59	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		
Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes		
Q61	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		
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	Respondent skipped this question		
Q63	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)		
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecor d&docID=207 96)?	Yes		

Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentRecor d&docID=207 96), 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
Q66	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
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecor d&docID=208 33)?	Yes
Q68	9I) When compared to the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentRecor d&docID=208 33), 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
Q69	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
Q70	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
Q71	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
Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes

Q73	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 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).
		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 upgraded to WARNING/ALERT.
		Estimated Wave Amplitude (EWA) > 2.0 m - WARNING EWA 0.5 to 2.0 m - ALERT
		EWA 0.2 to 0.5 m - WATCH
Q74	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.
Q75	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
Q76	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
Q77	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.
	PART III: Detection, Warn	ing and Dissemination
	Dissemir	nation
Q78	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
Q79	10b) How is the warning situation terminated?	After receiving the final bulletin from INCOIS, local DMOs are taking decision on termination of warning situation.
Q80	10c) What website is used for display of national threat status during events? Please provide the URL.	http://www.incois.gov.in/tsunami/eqevents.jsp

	PART IV: Standar Ts	d Opera unami	ating Procedures, E Exercises, Public A	vacuation Infrastr	ucture,	
		Standa	ard Operating Proc	edures		
Q81	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	
Q82	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
Q83	11c) Would your country your SOPs with the IOT countries?	be willir IC and of	ng to share ther	Yes		
Q84	11d) For each emergend for emergency response	cy respor are ava	nse organisat ilable? (selec	tion listed t all that a	below, which comm apply)	unication methods
	National DMOs			Telephone, Fax, Email, SMS, Siren, Other (please specify below)		
	Local DMOs			Telepho (please	ne, Fax, Email, SMS specify below)	, Siren, Other
	General Public			Telepho below)	ne, Email, SMS, Oth	er (please specify
	Coastal Communities			Telephone, Email, SMS, Other (please specify below)		
	Media			Telephone, Fax, Email, SMS, Other (please specify below)		
PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					ructure,	
		Eva	acuation In	frastruct	ure	
Q85	5 12a) Does your country have the following evacuation infrastructure? (select all that apply a detail specific areas). Please use the scroll bar below to view the entire table.					et all that apply and e.
	Evacuation shelter			Yes Evacuation shelters are available at Province Level. Around 60% of risk prone areas covered		lable at Province one areas covered
	Vertical evacuation struc	cture		Yes Evacuation shelters are available at Pro		lable at Province one areas covered
	Natural or artificial hill fo	r vertical	evacuation	n Yes Natural hills are available in few coastal provinces.		few coastal
	Evacuation signage			Yes Evacuation signage is available in few place		ble in few places.
Q86	12b) Is your evacuation integrated in the evacua	infrastruc tion plan	cture ?	Yes		
	PART IV: Standar Ts	d Opera unami l	ating Proce Exercises,	dures, E Public A	vacuation Infrast wareness	ructure,
			Tsunami E	xercises	; ;	
Q87	12a) Are tsunami exerci within national policies a	ses incor Ind guide	porated lines?	National	policy, National guid	delines

Q88	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			
Q89	12c) What kind of tsunami exercise activities I many times during the inter-sessional (between	ities have been undertaken in your country and how etween 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			
PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
	Public Awa	areness			
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office			
Q91	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			
Q92	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			
Q93	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		
Q94	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 agencie		
Q95	 or experts to your c 5 13f) Can your country offer support to other Member States to develop or enhance public awareness in their country? 		ountry's activities	
	Please specify what type of support: Training on preparint tsunami modelling, analysis, preparatio		ng SOPs, GIS maps, Seismic & Sea level n of education material etc.	
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	Yes		
	Please list the names In Odisha Province the IOTR program Jayadevkasaba Pa Sasan 4) Noliasah Venkatraipur		e, 6 communities are piloting me. Community Names: 1) ahi 2) Podhuan 3) Tantiapal i 5) Keutajanga 6)	
Q97	13h) For those communities that participated ranking of their performance against the IOTR (very good)	please provide a general scale 1 (very poor) to 5		
	Have a community tsunami risk reduction plar	1	4 (Good)	
	Have designated and mapped tsunami hazard	d zones	4 (Good)	
	Have a public display of tsunami information		4 (Good)	
	Produce easily understood tsunami evacuatio determined appropriate by local authorities in communities	n maps as collaboration with	4 (Good)	
	Develop and distribute outreach and public ec	lucation materials	5 (Very good)	
	Hold at least three outreach or educational ac	tivities annually	5 (Very good)	
	Conduct an annual tsunami community exerci	se	5 (Very good)	
	Address tsunami hazards in the community's Operations Plan (EOP)	Emergency	5 (Very good)	
	Commit to support the Emergency Operations during a tsunami incident, if an EOC is open a	Centre (EOC) and activated	5 (Very good)	
	Have redundant and reliable means for a 24-h (and EOC if activated) to receive official tsuna information	nour warning point ami threats /	5 (Very good)	
	Have redundant and reliable means for a 24-h and/or EOC to receive official tsunami alerts to	4 (Good)		

	PART V: N	arrative			
Q98	 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. → 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 				
→					
Q99	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements				
•	Enhance observational network by deployment of additional stations Enhancements in Tsunami Modelling and Sea-level Inversion Utilization of real-time GNSS & 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				
Q100	Upload Documents	Respondent skipped this question			



NATIONAL REPORT OF INDONESIA

	PART I: Basic Information			
Q3	TNC Name:	Dr. Ir. Muhamad Sadly, M.Eng		
Q4	Position:	Deputy for Geophysics		
Q5	Organization	ВМКС		
Q6	Telephone Number:	0811826804		
Q7	E-mail Address:	muhamad.sadly@bmkg.go.id		
Q8	Fax Number:	6546329		
Q9	Postal Address:	10610		
Q10	NTWC Agency Name:	ВМКС		
Q11	NTWC URL (web link) for tsunami warnings:	www.bmkg.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? 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.	Yes		
Q18	TWFP Agency Name (if different from the NTWC Agency):	ВМКС		
Q20	Position	Head of Earthquake Information and Tsunami Early Warning Division		
Q23	Postal Address:	10610		

I	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, Earthquakes, Epidemics, Flooding, Landslide, Volcanic eruptions		
	Other (please specify):	Forest and land fires		
Q32	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National, Agency, National / Local University National / International Consultant		
Q33	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Level, Regional Leve	l, City Level, Village Level	
Q34	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		
Q35	4g) For each of the data types listed I Select Yes / No / Don't know from the	below (in rows), answer the two e drop down menu.	o questions (in columns).	
		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):			
Q36	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 an Warning	d sign of Tsunami	
Q37	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Fair		
Q38	4j) On a scale of 1 (Not a priority) to s improve capacity in the following area	5 (Essential), what is the priority	y level in your country to ent?	
	Probabilistic Tsunami Hazard Assessment (PTHA)	Respondent skipped this ques	tion	
	Deterministic Tsunami Hazard Analysis			
	Field Studies on Tsunami Impacts			

	Hazard map	
	Inundation map	
	Evacuation map	
Q39	4k) On a scale of 1 (No capacity) to 5 give training and/or consultancy on te	5 (Very good), what capacity does your country have to sunami 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	
	PART II: Hazard Assessment, Ri	sk Assessment, Policies, Plans, Guidelines
	Ris	k Assessment
Q40	5a) Has your country undertaken a tsunami risk assessment?	Yes
Q41	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami
Q42	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
Q43	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)
Q44	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National Level, Regional Level, City Level, Village Level
Q45	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.
Q46	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	There are 26 provinces included tsunami risk area
Q47	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		
Q48	5i) On a scale of 1 (Very poor) to 5 (V undertake tsunami risk assessment	On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to ertake tsunami risk assessment		
	Capability to undertake tsunami risk assessment	Good		
Q49 5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your co 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		
Q50	5k) On a scale of 1 (No capacity) to 5 give training and/or consultancy on ts	(Very good) what capacity does your country have to unami 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 gives the names of any individuals / institutions in your country that could provide this training / consultancy	NDMO (BNPB) and UNDP		
F	PART II: Hazard Assessment, Ris	sk Assessment, Policies, Plans, Guidelines		
		Policies		
Q51	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 n 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)		

Q52	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 reconstr	uction	Multi hazard	including tsunami		
	PART II: Hazard Assess	ment, Ris	sk Assessr	nent, Policies, Plan	s, Guidelines	
			Plans			
Q53	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.					
		Natio	nal level	Local level	Community level	
	Prevention and mitigation	Standalor only	ne tsunami	Standalone tsunami only	Standalone tsunami only	
	Preparedness	Standalor only	ne tsunami	Standalone tsunami only	Standalone tsunami only	
	Emergency response	Multi haza including	ard tsunami	Multi hazard including tsunami	Multi hazard including tsunami	
	Rehabilitation and reconstruction	Multi haz	zard J tsunami	Multi hazard including tsunami	Multi hazard including tsunami	
	What is the name of the pla available):	in(s) (if	NDMO (BNF	IPB) and UNDP		
Q54	7b) Are your country's tsun disaster risk reduction plan on hazards and risk assess	ami s based ments?	Yes			
	PART II: Hazard Assess	ment, Ris	sk Assessr	nent, Policies, Plan	s, Guidelines	
	1		Guidelines			
Q55	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 reconstr	uction	Multi hazar	d guidelines including t	sunami	
	What is the name of guideli (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)				

Q56 8b) Does your country have local tsunami DRR guidelines? For each of the four life phases, select standalone guidelines / multi-hazard guidelines / guidelines not avai the comments box to detail the specific name of the guidelines (if available). In what form are the guidelines?		nami DRR guidelines? For each of the four lifecycle / multi-hazard guidelines / guidelines not available. Use fic name of the guidelines (if available).
	Prevention and mitigation Guidelines not available	
Preparedness Guidelines not available		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					
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes				
Q58	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				
Q59	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)				
Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes				
Q61	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				
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	Ocean-wide, National, Local				
Q63	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				

Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocume ntRecord&docID=207 96)?	No
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocume ntRecord&docID=207 96), 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 NWAO 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
Q66	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)):	http://www.ioc-sealevelmonitoring.org (IOC) ; http://tides.big.go.id/index.html (BIG)
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocume ntRecord&docID=208 33)?	No
Q68	9I) When compared to the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocume ntRecord&docID=208 33), 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 moul 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
Q69	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
Q70	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
Q71	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
Q72	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
Q73	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
Q74	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?	Do validation with own system.
Q75	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
Q76	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
Q77	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
	PART III: Detection	, Warning and Dissemination
	Di	ssemination
Q78	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
Q79	10b) How is the warning situation terminated?	based on: sea level observation and monitoring; Modelling Tsunami on the last ETA +2 hours
Q80	10c) What website is used for display of national threat status during events? Please provide the URL.	www.bmkg.go.id

	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness				
		Stand	ard Operating Pro	cedures	
Q81	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
Q82	11b) For each of the (do consider the four questic menus.	wnstre ons (in	am) ei colum	mergency respo ns). Select a yes	nse issues listed belo s/no response using t	ow (in rows), he drop down
	Does your SOP address this aspect of tsunami emergency response? th tsuna resp		evelop/improve is aspect of ami emergency ponse 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
Q83	11c) Would your country be willing to share your SOPs with the IOTIC and other countries?		ling TIC	Yes		
Q84	11d) For each emergend for emergency response	cy resp are av	onse o vailable	organisation liste e? (select all that	ed below, which comr t apply)	nunication methods
	National DMOs			Fax, Email, SMS		
	Local DMOs			Fax, Email, SMS, Siren, Other		
	General Public			Other		
	Coastal Communities			Other		
	Media			Email, Other		
	PART IV: Standard Tsu	l Oper Inami	ating Exer	Procedures, cises, Public A	Evacuation Infras Awareness	tructure,
		Ev	acua	tion Infrastruc	ture	
Q85	12a) Does your country and detail specific areas	have th). Pleas	ne follo se use	wing evacuation the scroll bar b	n infrastructure? (sele	ect all that apply e 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
Q86	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes
	PART IV: Standard Operating	Procedures, Evacuation Infrastructure,
	Tsunami Exer	cises, Public Awareness
	Tsu	nami Exercises
Q87	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines
Q88	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level, Regional level
Q89 12c) What kind of tsunami exercise activities have been undertaken in your many times during the inter-sessional (between ICG Meetings) period?		ctivities have been undertaken in your country and how I (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
	PART IV: Standard Operating Tsunami Exer	Procedures, Evacuation Infrastructure, cises, Public Awareness
	Pub	lic Awareness
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	National Tsunami Warning Centre
Q91	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, Teachi Public Evacuation Map	ng kits on tsunamis,	
Q92	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		
Q93	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 arou	nd Indonesia	
	Competitions or other ways of highlighting tsunami safety	No		
	Tsunami Exercise	Yes Twice a year		
Q94	 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 		areness materials onal agencies or s	
Q95	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?			
	Please specify what type of support:	BMKG had Cooperation with IOT consecutive years since 2017 un	IC for 5 (five) til 2021	
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	Yes		
	Please list the names	NDMO (BNPB) develop about Destana (Disaster Resllience Village) at several villages spreading in Indonesia		
Q97	13h) For those communities that part ranking of their performance against (very good)	icipated in the IOTR initiative, plea the IOTR indicators, using the sca	ase provide a general lle 1 (very poor) to 5	
	Have a community tsunami risk redu	ction plan	3 (Fair)	
	Have designated and mapped tsunar	mi 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 sunami 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			
Q98	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.			
Q99	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.			
Q100	Upload Documents	Respondent skipped this question		



NATIONAL REPORT OF IRAN (ISLAMIC REPUBLIC OF)

	PART I: Basic Information			
Q3	TNC Name:	Behrooz Abtahi		
Q4	Position:	Director of INIOAS		
Q5	Organization	Iranian National Institute for Oceanography and Atmospheric Science		
Q6	Telephone Number:	+982166944873		
Q7	E-mail Address:	inioas@inio.ac.ir		
Q8	Fax Number:	+982166944869		
Q9	Postal Address:	No.3, Etemad Zadeh St., Fatemi Ave., Tehran, IR. Iran		
Q10	NTWC Agency Name:	Iranian National Institute for Oceanography and Atmospheric Science		
Q11	NTWC URL (web link) for tsunami warnings:	http://www.inio.ac.ir/Default.aspx?tabid=2725		
Q16	Postal Address:	No.3, Etemad Zadeh St., Fatemi Ave., Tehran, IR. Iran		
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? 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.	No		
Q18	TWFP Agency Name (if different from the NTWC Agency):	Iranian National Center for Ocean Hazards (INCOH)		
Q23	Postal Address:	No.3, Etemad Zadeh St., Fatemi Ave., Tehran, IR. Iran		

F	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			
Q32	4d) Who did the tsunami hazard assessment in your country? (select all that apply)		National Agency; National / Local University			
	Please specify the name(s) or agencies:	of the	Iranian National Institute for Oceanography and Atmospheric Science - Tarbiat Modares University, Tehran, Iran - Ports & Maritime Organization			
Q33	4e) At what level was the tsu hazard assessment carried o (select all that apply)	nami but?	Regional Level, Villa	Regional Level, Village Level		
Q34	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%			
Q35	4g) For each of the data type columns). Select Yes / No / D	s listed belo Don't know f	ow (in rows), answer t rom the drop down m	the two questions (in enu.		
		Was th tsunami h	his data used for azard assessment?	Is this data publicly available?		
	Bathymetry		Yes	Yes		
	Seismo-tectonic model		Yes	Yes		
	Topography		Yes	Yes		
	Land Cover		No			
	Infrastructure details		No			
Q36	4h) What products do you ha the tsunami hazard assessm (select all that apply)	ve from ent?	Deterministic Tsunami Hazard Analysis, Hazard map, Inundation map, Evacuation map, Guidelines			
	Probabilistic Tsunami Hazaro Assessment (PTHA)	ł				
	Field Studies on Tsunami Im	pacts				
	Guidelines (please specify be	, elow)				
	Other (please specify):		Educational Brochure as Guidelines			
Q37	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment		Good			
Q38	4j) On a scale of 1 (Not a prio improve capacity in the follow	ority) to 5 (E ving areas c	Essential), what is the priority level in your country to of tsunami hazard assessment?			
	Probabilistic Tsunami Hazaro Assessment (PTHA)	Ŀ	Medium priority			
	Deterministic Tsunami Hazar Analysis	rd	Medium priority			
	Field Studies on Tsunami Im	pacts	Medium priority			
	Hazard map		High priority			

	Inundation map	High priority	
	Evacuation map	High priority	
Q39	4k) On a scale of 1 (No capacity) to 5 (Vo give training and/or consultancy on tsuna	ery good), what capacity does your country have to ami 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	
F	PART II: Hazard Assessment, Risk A	ssessment, Policies, Plans, Guidelines	
	Risk As	sessment	
Q40	5a) Has your country undertaken a tsunami risk assessment?	No	
Q41	5b) What type of risk assessment?	Respondent skipped this question	
Q42	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Respondent skipped this question	
Q43	5d) Who did the tsunami risk assessment in your country?	Respondent skipped this question	
Q44	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Respondent skipped this question	
Q45	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	
Q46	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Respondent skipped this question	
Q47	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Respondent skipped this question	
Q48	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	
Q49	5j) On a scale of 1 (Not a priority) to 5 (E improve capacity in the following areas o	ssential), what is the priority level of your country to f 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	
Q50	5k) On a scale of 1 (No capacity) to 5 (V give training and/or consultancy on tsuna	ery good) what capacity does your country have to ami risk assessment to other countries?
	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	
F	PART II: Hazard Assessment, Risk A	ssessment, Policies, Plans, Guidelines
	Ро	licies
Q51	6a) Does your country have a national ts management phases listed below, select available. Use the comments box to deta	unami policy? For each of the four disaster standalone policy / multi hazard policy / policy not il the specific name of the policy (if available).
	In what form is the policy?	
	Prevention and mitigation	A national tsunami policy is undergoing
	Preparedness	preparation
	Emergency response	
	Rehabilitation and reconstruction	
	What is the name of policy? (if available):	
Q52	6b) Does your country have local tsunaments below, select standalone performents box to detail the specific results form is the policy?	ni policies? For each of the disaster management olicy / multi hazard policy / policy not available. Use name(s) of the policy (if available).
	Prevention and mitigation	Local tsunami policies are undergoing preparation
	Preparedness	
	Emergency response	
	Rehabilitation and reconstruction	
	What is the name of policy? (if available):	
F	PART II: Hazard Assessment, Risk A	ssessment, Policies, Plans, Guidelines

Q53	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.							
		Nationa	l level	Local level	Community level			
	Prevention and mitigation	There are u	nder-develo	der-development plans which will be issue				
	Preparedness							
	Emergency response							
	Rehabilitation and reconstruction							
	What is the name of the plan(s) (if available):							
Q54	7b) Are your country's tsuna risk reduction plans based of and risk assessments?	ami disaster Yes on hazards						
P	PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines							
	Guidelines							
Q55	8a) Does your country have phases, select standalone g Use the comments box to de form are the guidelines?	national tsur Juidelines / m etail the spec	nami DRR ç ulti hazard ific name o	guidelines? For eacl guidelines / guidelir f the guidelines (if a	h of the four lifecycle nes not available. available). In what			
	Prevention and mitigation		Respondent skipped this question					
	Preparedness							
	Emergency response							
	Rehabilitation and reconstru	uction						
	What is the name of guidelin (if available):	nes?						
Q56	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		Responde	ent skipped this que	stion			
	Preparedness							
	Emergency response							
	Rehabilitation and reconstru	uction						
	What is the name of guidelin (if available):	nes?						

	PART III: Detection, Warning and Dissemination				
	Detection	and Warning			
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information	Yes			

	and advise/warn its coastal communities?	
Q58	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
Q59	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
Q60	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
Q61 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
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
Q63	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
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentR ecord&docID=207 96)?	No
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentR ecord&docID=207 96), 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)	
Q66	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 http://www.ioc-sealevelmonitoring.org/
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentR ecord&docID=208 33)?	Yes
Q68	9l) When compared to the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentR ecord&docID=208 33), 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
Q69	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
Q70	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	Νο
Q71	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
Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
Q73	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
Q74	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?	
Q75	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
Q76	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
Q77	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, Wa	arning and Dissemination
	Disse	mination
Q78	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
Q79	10b) How is the warning situation terminated?	When sea level would be less than 0.5 meters according to observation and model results
Q80	10c) What website is used for display of national threat status during events? Please provide the URL.	http://www.inio.ac.ir/Default.aspx?tabid=2725

	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
	Standard Operating Procedures					
Q81	11a) For each of the (upstrea consider the four questions (i menus.	am in) emergency response issues listed below (in rows), columns). Select a yes/no response using the drop down			
	Does your SOP address this aspect of tsunami emergency response?	з У	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 th	is question	L	

	Receiving information from the NTWC					
	Response Criteria / decision making					
Q82	11b) For each of the (downs consider the four questions menus.	stre (in	am) emer columns).	gency respons Select a yes/r	se issues listed belo no response using t	w (in rows), he drop down
	Does your SOP address th aspect of tsunami emergen response?	is cy	Is suppo develop aspect emerger in yc	rt required to /improve this of tsunami ncy response our 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		Respond	lent skipped th	is 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.					
Q83	11c) Would your country be share your SOPs with the IC other countries?	wil DTI	ling to C and	Respondent s	skipped this questic	'n
Q84	11d) For each emergency remethods for emergency res	esp por	onse orga ise are av	nisation listed ailable? (selec	below, which comn t all that apply)	nunication
	National DMOs			Respondent s	skipped this questic	n
	Local DMOs					
	General Public					
	Coastal Communities					
	Media					
	Other communication metho (please specify)	ods				
	PART IV: Standard Op Tsunar	era ni	ating Pro Exercise	cedures, Ev s, Public Aw	acuation Infrastr areness	ucture,
		Eva	acuation	Infrastructu	re	
Q85	12a) Does your country hav and detail specific areas). P	'e tł 'lea	ne followir se use the	ng evacuation i e scroll bar belo	nfrastructure? (sele ow to view the entir	ect all that apply e table.
	Evacuation shelter	No				
-----	---	--				
	Vertical evacuation structure	No				
	Natural or artificial hill for vertical evacuation	Yes				
	Evacuation signage	No				
	Other (please specify)	No				
Q86	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes				
	PART IV: Standard Operating Pro Tsunami Exercise	ocedures, Evacuation Infrastructure, s, Public Awareness				
	Tsunam	i Exercises				
Q87	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	Respondent skipped this question				
Q88	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	Village level				
Q89	12c) What kind of tsunami exercise activ how many times during the inter-session	ities have been undertaken in your country and al (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				
	PART IV: Standard Operating Pro Tsunami Exercise	ocedures, Evacuation Infrastructure, s, Public Awareness				
	Public A	Awareness				
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	National Tsunami Warning Centre				
Q91	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Posters, Booklets, School curricula				
Q92	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				
Q93	13d) Do you undertake the following tsur	nami 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	
Q94	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 ge Customization community, Development of activities or car Participation/su experts to your	neral tsunami awareness materials of general materials to country or of tsunami awareness programmes, mpaigns, upport by international agencies or country's activities
Q95	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No	
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	No	
Q97	13h) For those communities that participated in the IOTF ranking of their performance against the IOTR indicators (very good)		t initiative, please provide a general , using the scale 1 (very poor) to 5
	Have a community tsunami risk reduction	n plan	Respondent skipped this question
	Have designated and mapped tsunami h	ve designated and mapped tsunami hazard zones	
	Have a public display of tsunami informa	public display of tsunami information	
	Produce easily understood tsunami evac as determined appropriate by local author collaboration with communities	uation maps prities in	
	Develop and distribute outreach and pub materials	lic education	
	Hold at least three outreach or education annually	al activities	
	Conduct an annual tsunami community e	exercise	
	Address tsunami hazards in the commur Emergency Operations Plan (EOP)	nity's	
	Commit to support the Emergency Opera (EOC) during a tsunami incident, if an EC and activated	ations Centre DC is open	
	Have redundant and reliable means for a warning point (and EOC if activated) to re tsunami threats / information	a 24-hour eceive official	
	Have redundant and reliable means for a warning point and/or EOC to receive offic alerts to the public	a 24-hour cial tsunami	

	PART V: Narrative			
Q98	14) Please briefly describe any innovatio procedures or operations since your last tsunami related research projects, tsunan (especially in preparedness and emerged programmes or other measures taken to risk.	ns or modifications to National tsunami warnings National Report. For example, this might include mi mitigation activities and best practices ncy management), as well as public education heighten awareness of the tsunami hazard and		
→	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			
Q99	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.			
Q100	Upload Documents	Respondent skipped this question		



NATIONAL REPORT OF KENYA

PART I: Basic Information			
Q3	TNC Name:	Ms. Stella Aura MBS	
Q4	Position:	Ag. Director	
Q5	Organization	Kenya Meteorological Department	
Q6	Telephone Number:	+254-722 822553	
Q7	E-mail Address:	stellahaura@gmail.com	
Q8	Fax Number:	Respondent skipped this question	
Q9	Postal Address:	P.O BOX 30259 00100 Nairobi, Kenya	
Q10	NTWC Agency Name:	Kenya Meteorological Department	
Q11	NTWC URL (web link) for tsunami warnings:	www.meteo.go.ke	
Q12	NTWC Agency Contact or Officer in Charge (person):	Ag. Senior Assistant Director	
Q16	Postal Address:	P.O BOX 30259 00100 Nairobi, Kenya	
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? 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.	Yes	

PA	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, Volcanic eruptions		
	Other (please specify):	Lightning		

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:			
Q33	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)		National Level	
Q34	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	
Q35	4g) For each of the data types columns). Select Yes / No / Do	listec n't kr	below (in rows), answer the	e two questions (in nu.
		tsu	Was this data used for nami 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):	Ass	essment to be completed	
Q36	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	
	Other (please specify):		Historic data	
Q37	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment		Fair	
Q38	4j) On a scale of 1 (Not a priorition to improve capacity in the follow	ty) to wing	5 (Essential), what is the p areas of tsunami hazard as	riority level in your country sessment?
	Probabilistic Tsunami Hazard Assessment (PTHA)		Essential	
	Deterministic Tsunami Hazard Analysis		Essential	
	Field Studies on Tsunami Impa	acts	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
Q39	4k) On a scale of 1 (No capacity) to to give training and/or consultancy of	5 (Very good), what capacity does your country have 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
PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines		
	Risk	Assessment
Q40	5a) Has your country undertaken a tsunami risk assessment?	Yes
Q41	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami
Q42	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
Q43	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
Q44	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National Level
Q45	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
Q46	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Kenyan coastal cities along approximately 600 kilometers

Q47	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Other		
	Please specify:	Products	Products to be developed	
Q48	5i) On a scale of 1 (Very poor) to 5 undertake tsunami risk assessment	(Very goo	d), please rate your country's capability to	
	Capability to undertake tsunami risk assessment	Very poo	n	
Q49	5j) On a scale of 1 (Not a priority) to to improve capacity in the following	5 (Essential), what is the priority level of your country areas of tsunami risk assessment?		
	Tsunami risk assessment at national level	Essentia	ıl	
	Tsunami risk assessment at regional level	Essentia	l	
	Tsunami risk assessment at city level	Essentia		
	Tsunami risk assessment at village level	Essentia	ll.	
	Tsunami risk assessment at community / neighbourhood level	Essentia	ll i	
	What other areas of capacity in tsunami hazard assessment require improvement?	General	y all tsunami capacity requirements	
Q50	50 5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your count to give training and/or consultancy on tsunami risk assessment to other countries		ood) what capacity does your country have i risk assessment to other countries?	
	Tsunami risk assessment at nationa	al level	Poor	
	Tsunami risk assessment at regiona	al level	Poor	
	Tsunami risk assessment at city lev	el	Poor	
	Tsunami risk assessment at village	level	Poor	
	Tsunami risk assessment at commu neighbourhood level	unity /	Poor	
PA	ART II: Hazard Assessment, Ris	k Assess	sment, Policies, Plans, Guidelines	
		Policies		
Q51	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)		ni policy? For each of the four disaster adalone policy / multi hazard policy / policy I the specific name of the policy (if available).	
	In what form is the policy?			
	Prevention and mitigation	Multi haz		
		Multi haz		
	Emergency response			
	Renabilitation and reconstruction	Multi haz	zard including tsunami	
	vvnat is the name of policy? (if available):	Disaster	Ivianagement Policy	

Q52	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?				saster management olicy not available. available).
	Prevention and mitigation		Multi haza	rd including tsunami	
	Preparedness		Multi haza	rd including tsunami	
	Emergency response		Multi haza	rd including tsunami	
	Rehabilitation and reco	nstruction	Multi haza	rd including tsunami	
	What is the name of po available):	licy? (if	National D	Disaster Management I	Policy
PA	ART II: Hazard Assess	sment, Ris	k Assessr	nent, Policies, Plar	s, Guidelines
			Plans		
Q53	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.			ami disaster risk sted below, select nents box to detail bar to view the	
		Nationa	al level	Local level	Community level
	Prevention and mitigation	Multi hazar including ts	d unami	Local plan is not available	Community plan is not available
	Preparedness	Multi hazar	d unami	Local plan is not available	Community plan is not available
	Emergency response	Multi hazar	d unami	Local plan is not available	Community plan is not available
	Rehabilitation and reconstruction	Multi hazar including ts	d unami	Local plan is not available	Community plan is not available
	What is the name of the available):	e plan(s) (if	National E	I Disaster Response Plan	
Q54	7b) Are your country's t disaster risk reduction p based on hazards and assessments?	sunami blans risk	Yes		
PA	ART II: Hazard Assess	sment, Ris	k Assessr	nent, Policies, Plar	s, Guidelines
		G	uidelines		
Q55	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).			ach of the four es / guidelines not iidelines (if	
	Prevention and mitigati	0n	Multi haza	rd quidelines including	n tsunami
	Preparedness		Multi haza	rd guidelines including	g tsunami
	Emergency response		Multi haza	rd guidelines including	g tsunami
	Rehabilitation and reco	nstruction	Multi haza	rd guidelines including	j tsunami
Rehabilitation and reconstruction Wull hazard guidelines What is the name of guidelines? Standard Operating Provide in the standard operating Provide		Operating Procedures			

Q56	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	

	PART III: Detection, Warning and Dissemination				
	Detection and Warning				
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes			
Q58	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			
Q59	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			
Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes			
Q61	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)			
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	Ocean-wide			
Q63	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)
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocum entRecord&docID=207 96)?	No
Q65	9i) When compared to the IOTWMS tsunami.org/index.php? option=com have you decommissioned or added (Check all that apply and include de	seismic database (http://www.ioc- _oe&task=viewDocumentRecord&docID=207 96), d broadband seismometers operated by your country tails 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
Q66	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
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocum entRecord&docID=208 33)?	Yes
Q68	9I) When compared to the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocum entRecord&docID=208 33), 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
Q69	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
Q70	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
Q71	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
Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
Q73	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 >or= 6.5 on a Richter scale magnitude for Western Indian Ocean
Q74	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
Q75	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
Q76	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

Q77	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
	Dis	semination
Q78	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
Q79	10b) How is the warning situation terminated?	Using the above mentioned communication methods
Q80	10c) What website is used for display of national threat status during events? Please provide the URL.	www.meteo.go.ke

PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
	Stan	dard O	perating Procedur	es	
Q81	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 Yes Operation Centre (EOC)		Yes	Yes	Yes
	Receiving information Yes from the NTWC		Yes	Yes	Yes
	Response Criteria / decision making	Yes	Yes	Yes	Yes
Q82	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 aspect of tsunami emerg response?	this ency	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	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
Q83	11c) Would your country be to share your SOPs with the IOTIC and other countries?	our country be willing Yes SOPs with the her countries?			
Q84	11d) For each emergency remethods for emergency res	esponse ponse a	organisation listed below, which communication re available? (select all that apply)		
	National DMOs Local DMOs General Public Coastal Communities		Telephone, Fax, Em	nail, SMS, Siren	
			Telephone, Email, S	SMS, Siren	
			Telephone, SMS, S	iren	
			Telephone, SMS, Siren		
	Media		Telephone, Fax, Email, SMS, Siren, Other		
	Other communication metho (please specify)	ods	Radio and Televisio	n	
	PART IV: Standard Ope Tsunam	rating l i Exerc	Procedures, Evacuises, Public Aware	uation Infrastruc	ture,
	E	vacuati	on Infrastructure		
Q85	12a) Does your country hav and detail specific areas). P	ve the fol Please us	llowing evacuation inf se the scroll bar belov	rastructure? (select w to view the entire	t all that apply table.
	Evacuation shelter Vertical evacuation structure		Yes All coastal towns use tents as evacuation shelters		on shelters
			No		
	Natural or artificial hill for ve evacuation	ertical	No		
	Evacuation signage		Yes Limited places as known or commons knowledge to the communities		knowledge to
	Other (please specify)		No		

Q86	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes		
	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness			
	Tsuna	ami Exercises		
Q87	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines		
Q88	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level, Regional level		
Q89	12c) What kind of tsunami exercise how many times during the inter-set	activities have been undertaken in your country and ssional (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		
	PART IV: Standard Operating I Tsunami Exerc	Procedures, Evacuation Infrastructure, ises, Public Awareness		
	Publi	c Awareness		
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office		
Q91	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		
Q92	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		
Q93	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	Yes	
	outreach	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	
Q94	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 a Customization of general mate community, Development of tsunami awar activities or campaigns, Participation/support by intern experts to your country's activ	awareness materials, erials to country or eness programmes, ational agencies or ities
Q95	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	
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	Yes	
	Please list the names	Kilifi Blue Beach area	
Q97	13h) For those communities that pa general ranking of their performance poor) to 5 (very good)	rticipated in the IOTR initiative, a against the IOTR indicators, u	please provide a Ising the scale 1 (very
	Have a community tsunami risk red	uction 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 Hold at least three outreach or educational activities annually Conduct an annual tsunami community exercise		3 (Fair)
			3 (Fair)
			3 (Fair)
	Address tsunami hazards in the con Operations Plan (EOP)	nmunity's Emergency	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)

	PART V: Narrative					
Q98	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 Warining Centre has been collaborating with many stakeholders in IOWAVE and IOTR activities. Inthese 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 articipation 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.					
Q99	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					
Q100	Upload Documents	Respondent skipped this question				



NATIONAL REPORT OF MADAGASCAR

	PART I: Basic Information			
Q3	TNC Name:	Solofoarisoa RAKOTONIAINA		
Q4	Position:	Director		
Q5	Organization	Institute and Observatory of Geophysics of Antananarivo (IOGA)		
Q6	Telephone Number:	+(261) 34 64 27704		
Q7	E-mail Address:	solofoarisoa@gmail.com		
Q8	Fax Number:	Respondent skipped this question		
Q9	Postal Address:	Institute and Observatory of Geophysics of Antananarivo (IOGA), P.O. Box 3843, 101 - Antananarivo Madagascar		
Q10	NTWC Agency Name:	Institute and Observatory of Geophysics of Antananarivo (IOGA)		
Q11	NTWC URL (web link) for tsunami warnings:	http://www.bngrc-mid.mg/		
Q12	NTWC Agency Contact or Officer in Charge (person):	Director		
Q16	Postal Address:	Institute and Observatory of Geophysics of Antananarivo (IOGA), P.O. Box 3843, 101 - Antananarivo Madagascar		
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? 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.	Yes		
Q24	TWFP 24x7 point of contact (office, operational unit or position, not a person):	Laboratory of Seismology and Infrasound		

	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	
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:	Institute and Observato Antananarivo (IOGA), I des Risque et des Cata	ory of Geophysics of Bureau National de Gestion astrophes (BNGRC)
Q33	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Level, Regional Level, City Level	
Q34	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	
Q35	4g) For each of the data types listed below (Select Yes / No / Don't know from the drop o	in rows), answer the two down menu.	o questions (in columns).
		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
Q36	 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	
Q37	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Poor	
Q38	4j) On a scale of 1 (Not a priority) to 5 (Esse improve capacity in the following areas of ts	ntial), what is the priorit unami hazard assessme	y level in your country to ent?
	Probabilistic Tsunami Hazard Assessment (PTHA)	nt 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	
Q39	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)	
	PART II: Hazard Assessment, Risk A	ssessment, Policies, Plans, Guidelines	
	Risk As	ssessment	
Q40	5a) Has your country undertaken a tsunami risk assessment?	Yes	
Q41	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami	
Q42	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Drought, Earthquakes, Epidemics, Flooding, Landslide	
Q43	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)	
Q44	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National Level, Regional Level, City Level	
Q45	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	
Q46	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Risk assessment ongoing	
Q47	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Evacuation map	
Q48	5i) On a scale of 1 (Very poor) to 5 (Very go tsunami risk assessment	ood), please rate your country's capability to undertake	
	Capability to undertake tsunami risk assessment	Poor	
Q49	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	
Q50	5k) On a scale of 1 (No capacity) to 5 (Very training and/or consultancy on tsunami risk	good) what capacity does your country have to give 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 gives 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)	
	PART II: Hazard Assessment, Risk A	Assessment, Policies, Plans, Guidelines	
	Pc	licies	
Q51	6a) Does your country have a national tsunami policy? For each of the four disaster manageme 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).		
	phases listed below, select standalone polic comments box to detail the specific name of In what form is the policy?	y / multi hazard policy / policy not available. Use the of the policy (if available).	
	phases listed below, select standalone polic comments box to detail the specific name of In what form is the policy? Prevention and mitigation	y / multi hazard policy / policy not available. Use the of the policy (if available). Multi hazard including tsunami	
	phases listed below, select standalone polic comments box to detail the specific name of In what form is the policy? Prevention and mitigation Preparedness	y / multi hazard policy / policy not available. Use the of the policy (if available). Multi hazard including tsunami Multi hazard including tsunami	
	phases listed below, select standalone polic comments box to detail the specific name of In what form is the policy? Prevention and mitigation Preparedness Emergency response	y / multi hazard policy / policy not available. Use the of the policy (if available). Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami	
	phases listed below, select standalone polic comments box to detail the specific name of In what form is the policy?Prevention and mitigationPreparednessEmergency responseRehabilitation and reconstruction	y / multi hazard policy / policy not available. Use the of the policy (if available). Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami	
	phases listed below, select standalone polic comments box to detail the specific name of In what form is the policy? Prevention and mitigation Preparedness Emergency response Rehabilitation and reconstruction What is the name of policy? (if available):	y / multi hazard policy / policy not available. Use the of the policy (if available). Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami 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.	
Q52	 phases listed below, select standalone polic comments box to detail the specific name of In what form is the policy? Prevention and mitigation Preparedness Emergency response Rehabilitation and reconstruction What is the name of policy? (if available): 6b) Does your country have local tsunami polisted below, select standalone policy / multi comments box to detail the specific name(s) 	y / multi hazard policy / policy not available. Use the of the policy (if available). Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami 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. Dicies? For each of the disaster management phases hazard policy / policy not available. Use the of the policy (if available).	
Q52	 phases listed below, select standalone polic comments box to detail the specific name of In what form is the policy? Prevention and mitigation Preparedness Emergency response Rehabilitation and reconstruction What is the name of policy? (if available): 6b) Does your country have local tsunami policited below, select standalone policy / multi comments box to detail the specific name(s) In what form is the policy? 	y / multi hazard policy / policy not available. Use the of the policy (if available). Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami 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. Dicies? For each of the disaster management phases hazard policy / policy not available. Use the of the policy (if available).	
Q52	 phases listed below, select standalone polic comments box to detail the specific name of In what form is the policy? Prevention and mitigation Preparedness Emergency response Rehabilitation and reconstruction What is the name of policy? (if available): 6b) Does your country have local tsunami polisted below, select standalone policy / multi comments box to detail the specific name(s) In what form is the policy? 	y / multi hazard policy / policy not available. Use the of the policy (if available). Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami 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. Dicies? For each of the disaster management phases hazard policy / policy not available. Use the of the policy (if available).	
Q52	 phases listed below, select standalone polic comments box to detail the specific name of In what form is the policy? Prevention and mitigation Preparedness Emergency response Rehabilitation and reconstruction What is the name of policy? (if available): 6b) Does your country have local tsunami polisted below, select standalone policy / multi comments box to detail the specific name(s) In what form is the policy? Prevention and mitigation Preparedness 	y / multi hazard policy / policy not available. Use the of the policy (if available). Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami 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. Dicies? For each of the disaster management phases hazard policy / policy not available. Use the of the policy (if available). Multi hazard including tsunami Multi hazard including tsunami	
Q52	 phases listed below, select standalone polic comments box to detail the specific name of In what form is the policy? Prevention and mitigation Preparedness Emergency response Rehabilitation and reconstruction What is the name of policy? (if available): 6b) Does your country have local tsunami polisted below, select standalone policy / multi comments box to detail the specific name(s) In what form is the policy? Prevention and mitigation Preparedness Emergency response 	y / multi hazard policy / policy not available. Use the of the policy (if available). Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami 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. Dicies? For each of the disaster management phases hazard policy / policy not available. Use the of the policy (if available). Multi hazard including tsunami Multi hazard including tsunami	
Q52	 phases listed below, select standalone polic comments box to detail the specific name of In what form is the policy? Prevention and mitigation Preparedness Emergency response Rehabilitation and reconstruction What is the name of policy? (if available): 6b) Does your country have local tsunami polisted below, select standalone policy / multi comments box to detail the specific name(s) In what form is the policy? Prevention and mitigation Preparedness Emergency response Rehabilitation and reconstruction 	y / multi hazard policy / policy not available. Use the of the policy (if available). Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami 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. Dicies? For each of the disaster management phases hazard policy / policy not available. Use the of the policy (if available). Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami	

	Plans				
Q53	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.				isaster risk reduction ect standalone plan / specific name(s) of the
		National le	evel	Local level	Community level
	Prevention and mitigation	Multi hazard in tsunami	cluding	Multi hazard including tsunami	Multi hazard including tsunami
	Preparedness	Multi hazard	ami	Multi hazard including tsunami	Multi hazard including tsunami
	Emergency response	including tsun	ami	including tsunami	tsunami
	Rehabilitation and reconstruction	Multi hazard including tsun	ami	Multi hazard including tsunami	Multi hazard including tsunami
	What is the name of the plar available):	(s) (if 1) Nati approa multiha Region Atsimo includi Marie		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	
Q54	7b) Are your country's tsuna risk reduction plans based of risk assessments?	mi disaster n hazards and	Yes		
	PART II: Hazard Asses	sment, Risk A	ssessr	nent, Policies, Plar	ns, Guidelines
		Gui	delines		
Q55	 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). 		f the four lifecycle not available. Use the		
	Prevention and mitigation		Multi h	azard guidelines inclu	ding tsunami
	Preparedness		Multi h	azard guidelines inclu	ding tsunami
	Emergency response		Multi h	azard guidelines inclu	ding tsunami
	Rehabilitation and reconstru	ction	Multi h	azard guidelines inclu	ding tsunami
	What is the name of guidelines? (if available):		National Rapid Reaction Matrix on Tsunami		
Q56	8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle ph 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?		e four lifecycle phases, lable. Use the		
	Prevention and mitigation		Multi h	azard guidelines inclu	ding tsunami
	Preparedness		Multi h	azard guidelines inclu	ding tsunami
	Emergency response		Multi h	azard guidelines inclu	ding tsunami
	Rehabilitation and reconstru	ction	Multi h	azard guidelines inclu	ding tsunami
	What is the name of guidelin (if available):	es?	Regior	al / local Rapid React	ion Matrix on Tsunami

	PART III: Detection, Warning and Dissemination			
	Detection	and Warning		
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes		
Q58	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		
Q59	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.)		
Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes		
Q61	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone		
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	Ocean-wide, National		
Q63	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		
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentReco rd&docID=207 96)?	Yes		
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentReco rd&docID=207 96), 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		
Q66	9j) Does the organisation have access to national or international sea level networks?	No		

Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentReco rd&docID=208 33)?	Yes
Q68	9l) When compared to the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentReco rd&docID=208 33), 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
Q69	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
Q70	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
Q71	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
Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
Q73	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)
Q74	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?	Send warning to the NDMO
Q75	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)
Q76	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)
Q77	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:	
	PART III: Detection, Wa	arning and Dissemination
	Disse	mination
Q78	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
Q79	10b) How is the warning situation terminated?	The warning will end few hours after the TSPs "all clear " message
Q80	10c) What website is used for display of national threat status during events? Please provide the URL.	http://www.bngrc-mid.mg/

	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness						
	Standard Operating Procedures						
Q81	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 re deve Res this t en re	a support quired to elop Human sources in a aspect of sunami nergency sponse?	l r for c r	s support equired to develop frastructure this aspect of tsunami mergency esponse?
	24/7 Emergency Operation Centre (EOC)	Y e s	Yes		Yes		Yes
	Receiving information from the NTWC	Y e s	Yes		Yes		Yes
	Response Criteria / decision making	Y e s	Yes		Yes		Yes

Q82	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	
Q83	11c) Would your country be willing to share your SOPs with the IOTIC and countries?	o d other	Yes			
Q84	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)					
	National DMOs	Telephone, Fax, E	mail, SMS			
	Local DMOs		Telephone, SMS, S	Siren		
	General Public		SMS, Siren			
	Coastal Communities		Telephone, SMS, S	Telephone, SMS, Siren		
	Media		Telephone, Fax, Email, SMS			
	PART IV: Standard Operat Tsunami E	ing Pr xercis	ocedures, Evacu es, Public Aware	ation Infrastruct ness	ure,	
	Evac	cuatior	n Infrastructure			
Q85	12a) Does your country have the fol detail specific areas). Please use the	lowing e e scroll	evacuation infrastruc bar below to view th	cture? (select all th e entire table.	at apply and	
	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			
Q86	12b) Is your evacuation infrastructur integrated in the evacuation plan?	e	Yes			

PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
	Tsunami Exercises				
Q87	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines			
Q88	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			
Q89	12c) What kind of tsunami exercise activities times during the inter-sessional (between IC	s have been undertaken in your country and how many G 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			
	PART IV: Standard Operating Pro Tsunami Exercise	ocedures, Evacuation Infrastructure, es, Public Awareness			
	Public	Awareness			
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office			
Q91	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Posters, Booklets, Teaching kits on tsunamis			
Q92	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			
Q93	13d) Do you undertake the following tsunam	ii 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			

Q94	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public	Provision of general tsunam Customization of general ma community,	i awareness materials, aterials to country or
	require support, please leave blank.	Development of tsunami awa activities or campaigns,	areness programmes,
		Participation/support by interest experts to your country's act	rnational agencies or ivities
Q95	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	
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	Yes	
	Please list the names	Institute and Observatory of Geophysics of Antananarivo (IOGA) / Bureau National de Gesti des Risques et des Catastrophes (BNGRC)	
Q97	13h) For those communities that participated ranking of their performance against the IOT good)	d in the IOTR initiative, please R indicators, using the scale	e provide a general 1 (very poor) to 5 (very
	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 of	2 (Poor)	
	Hold at least three outreach or educational activities annually		2 (Poor)
	Conduct an annual tsunami community exer	rcise	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 EOC if activated) to receive official tsunami	-hour warning point (and threats / information	2 (Poor)
	Have redundant and reliable means for a 24-hour warning point and EOC to receive official tsunami alerts to the public		2 (Poor)

	PART V: Narrative			
Q98	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.	
Q99	99 15) Please provide a brief summary of plans for future tsunami warning and mitigation syste improvements	
→	Exercises are needed for the regions which are already visited and have a knowledge of tsunar Many regions don't have yet SOP and don't know yet about tsunami	
Q100	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:	http://www.met.gov.my		
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? 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.	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

Q31	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Drought, Earthquakes, Epidemics, Flooding, Landslide		
Q32	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National Agency		
Q33	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	National Agency		
Q34	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		
Q35	4g) For each of the data types listed be columns). Select Yes / No / Don't know	low (in rows), answer the two questions (in 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):			
Q36	 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	
Q37	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Good		
Q38	4j) On a scale of 1 (Not a priority) to 5 (improve capacity in the following areas	scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to capacity in the following areas of tsunami hazard assessment?		
	Probabilistic Tsunami Hazard Medium priority Assessment (PTHA)			
	Deterministic Tsunami Hazard Analysis	Medium priority		
	Field Studies on Tsunami Impacts	High priority		
	Hazard map	High priority		
	Inundation map	High priority		
	Evacuation map	Essential		

Q39	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	
F	ART II: Hazard Assessment, Risk	Assessment, Policies, Plans, Guidelines	
	Risk A	Assessment	
Q40	5a) Has your country undertaken a tsunami risk assessment?	No	
Q41	5b) What type of risk assessment?	Respondent skipped this question	
Q42	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Respondent skipped this question	
Q43	5d) Who did the tsunami risk assessment in your country?	Respondent skipped this question	
Q44	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Respondent skipped this question	
Q45	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	
Q46	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Respondent skipped this question	
Q47	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Respondent skipped this question	
Q48	5i) On a scale of 1 (Very poor) to 5 (Ve undertake tsunami risk assessment	ry good), please rate your country's capability to	
	Capability to undertake tsunami risk assessment	Fair	
Q49	5j) On a scale of 1 (Not a priority) to 5 (improve capacity in the following areas	Essential), what is the priority level of your country to of tsunami risk assessment?	
	Tsunami risk assessment at national level	Medium priority	

T

	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
Q50	5k) On a scale of 1 (No capacity) to 5 (give training and/or consultancy on tsu	Very good) what capacity does your country have to nami 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 gives the names 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
F	PART II: Hazard Assessment, Risk	Assessment, Policies, Plans, Guidelines
F	PART II: Hazard Assessment, Risk P	Assessment, Policies, Plans, Guidelines olicies
Q51	PART II: Hazard Assessment, Risk P 6a) Does your country have a national management phases listed below, sele available. Use the comments box to de In what form is the policy?	Assessment, Policies, Plans, Guidelines olicies tsunami policy? For each of the four disaster ct standalone policy / multi hazard policy / policy not tail the specific name of the policy (if available).
Q51	PART II: Hazard Assessment, Risk P 6a) Does your country have a national management phases listed below, sele available. Use the comments box to de In what form is the policy? Prevention and mitigation	Assessment, Policies, Plans, Guidelines olicies tsunami policy? For each of the four disaster ct standalone policy / multi hazard policy / policy not tail the specific name of the policy (if available). Policy is not available
Q51	PART II: Hazard Assessment, Risk P 6a) Does your country have a national management phases listed below, sele available. Use the comments box to de In what form is the policy? Prevention and mitigation Preparedness	Assessment, Policies, Plans, Guidelines olicies tsunami policy? For each of the four disaster ct standalone policy / multi hazard policy / policy not tail the specific name of the policy (if available). Policy is not available Policy is not available
Q51	PART II: Hazard Assessment, Risk P 6a) Does your country have a national management phases listed below, sele available. Use the comments box to de In what form is the policy? Prevention and mitigation Preparedness Emergency response	Assessment, Policies, Plans, Guidelines olicies tsunami policy? For each of the four disaster ct standalone policy / multi hazard policy / policy not tail the specific name of the policy (if available). Policy is not available Policy is not available Multi hazard including tsunami
Q51	PART II: Hazard Assessment, Risk P 6a) Does your country have a national management phases listed below, sele available. Use the comments box to de In what form is the policy? Prevention and mitigation Preparedness Emergency response Rehabilitation and reconstruction	Assessment, Policies, Plans, Guidelines olicies tsunami policy? For each of the four disaster ct standalone policy / multi hazard policy / policy not tail the specific name of the policy (if available). Policy is not available Policy is not available Multi hazard including tsunami Policy is not available
Q51	PART II: Hazard Assessment, Risk P 6a) Does your country have a national management phases listed below, sele available. Use the comments box to de In what form is the policy? Prevention and mitigation Preparedness Emergency response Rehabilitation and reconstruction What is the name of policy? (if available):	Assessment, Policies, Plans, Guidelines olicies tsunami policy? For each of the four disaster ct standalone policy / multi hazard policy / policy not tail the specific name of the policy (if available). Policy is not available Policy is not available Multi hazard including tsunami Policy is not available MKN Directive 20
Q51 Q52	PART II: Hazard Assessment, Risk P 6a) Does your country have a national management phases listed below, sele available. Use the comments box to de In what form is the policy? Prevention and mitigation Preparedness Emergency response Rehabilitation and reconstruction What is the name of policy? (if available): 6b) Does your country have local tsuna phases listed below, select standalone the comments box to detail the specific In what form is the policy?	Assessment, Policies, Plans, Guidelines olicies tsunami policy? For each of the four disaster ct standalone policy / multi hazard policy / policy not tail the specific name of the policy (if available). Policy is not available Policy is not available Multi hazard including tsunami Policy is not available MKN Directive 20 mi policies? For each of the disaster management policy / multi hazard policy / policy not available. Use name(s) of the policy (if available).
Q51	PART II: Hazard Assessment, Risk P 6a) Does your country have a national management phases listed below, sele available. Use the comments box to de In what form is the policy? Prevention and mitigation Preparedness Emergency response Rehabilitation and reconstruction What is the name of policy? (if available): 6b) Does your country have local tsuna phases listed below, select standalone the comments box to detail the specific In what form is the policy? Prevention and mitigation	Assessment, Policies, Plans, Guidelines olicies tsunami policy? For each of the four disaster ct standalone policy / multi hazard policy / policy not tail the specific name of the policy (if available). Policy is not available Policy is not available Multi hazard including tsunami Policy is not available MKN Directive 20 mi policies? For each of the disaster management policy / multi hazard policy / policy not available. Use name(s) of the policy (if available).
Q51	PART II: Hazard Assessment, Risk P 6a) Does your country have a national management phases listed below, sele available. Use the comments box to de In what form is the policy? Prevention and mitigation Preparedness Emergency response Rehabilitation and reconstruction What is the name of policy? (if available): 6b) Does your country have local tsuna phases listed below, select standalone the comments box to detail the specific In what form is the policy? Prevention and mitigation Preparedness	Assessment, Policies, Plans, Guidelines olicies tsunami policy? For each of the four disaster ct standalone policy / multi hazard policy / policy not tail the specific name of the policy (if available). Policy is not available Policy is not available Multi hazard including tsunami Policy is not available MKN Directive 20 mi policies? For each of the disaster management policy / multi hazard policy / policy not available. Use name(s) of the policy (if available). Policy is not available Policy is not available
Q51	PART II: Hazard Assessment, Risk P 6a) Does your country have a national management phases listed below, sele available. Use the comments box to de In what form is the policy? Prevention and mitigation Preparedness Emergency response Rehabilitation and reconstruction What is the name of policy? (if available): 6b) Does your country have local tsuna phases listed below, select standalone the comments box to detail the specific In what form is the policy? Prevention and mitigation Preparedness Emergency response	Assessment, Policies, Plans, Guidelines olicies tsunami policy? For each of the four disaster ct standalone policy / multi hazard policy / policy not tail the specific name of the policy (if available). Policy is not available Policy is not available Multi hazard including tsunami Policy is not available MKN Directive 20 mi policies? For each of the disaster management policy / multi hazard policy / policy not available. Use name(s) of the policy (if available). Policy is not available Policy is not available Multi hazard including tsunami
Q51	PART II: Hazard Assessment, Risk P 6a) Does your country have a national management phases listed below, sele available. Use the comments box to de In what form is the policy? Prevention and mitigation Preparedness Emergency response Rehabilitation and reconstruction What is the name of policy? (if available): 6b) Does your country have local tsuna phases listed below, select standalone the comments box to detail the specific In what form is the policy? Prevention and mitigation Preparedness Emergency response Rehabilitation and reconstruction	Assessment, Policies, Plans, Guidelines olicies tsunami policy? For each of the four disaster ct standalone policy / multi hazard policy / policy not tail the specific name of the policy (if available). Policy is not available Policy is not available Multi hazard including tsunami Policy is not available MKN Directive 20 mi policies? For each of the disaster management policy / multi hazard policy / policy not available. Use name(s) of the policy (if available). Policy is not available Policy is not available MKN Directive 20 mi policies? For each of the disaster management policy / multi hazard policy / policy not available. Use name(s) of the policy (if available). Policy is not available Policy is not available Multi hazard including tsunami Policy is not available Multi hazard including tsunami Policy is not available

PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines					
	Plans				
Q53	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.			disaster risk d below, select hts box to detail the view the entire	
		National level Local level Community 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 hazaro	d unami	Multi hazard including tsunami	Multi hazard including tsunami
	Rehabilitation and reconstruction	National pla available	ın is not	Local plan is not available	Community plan is not available
	What is the name of the pl available):	lan(s) (if	Tsunami E	Emergency Response	Plan
Q54	7b) Are your country's tsur disaster risk reduction plan on hazards and risk asses) Are your country's tsunami saster risk reduction plans based hazards and risk assessments?			
F	PART II: Hazard Assess	ment, Risk	Assessm	ent, Policies, Plans	, Guidelines
		Gu	idelines		
Q55	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?			of the four lifecycle is not available. ailable).	
	Prevention and mitigation		Guidelines	s not available	
	Preparedness		Guidelines	s not available	
	Emergency response		Guidelines	s not available	
	Rehabilitation and reconst	truction	Guidelines not available		
	What is the name of guidelines? (if available):		Not provided		
Q56	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).		he four lifecycle es not available. ailable).		
	Prevention and mitigation		Guidelines	s not available	
	Preparedness		Guidelines	s not available	
	Emergency response		Multi haza	rd guidelines including	ı tsunami
	Rehabilitation and reconst	truction	Guidelines	s not available	
	What is the name of guide (if available):	lines?	Tsunami E	Emergency Response	Plan

PART III: Detection, Warning and Dissemination				
	Detection and Warning			
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes		
Q58	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		
Q59	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		
Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes		
Q61	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		
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local		
Q63	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		
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocument Record&docID=207 96)?	Yes		
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocument Record&docID=207 96), 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)	
Q66	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)
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocument Record&docID=208 33)?	Yes
Q68	9I) When compared to the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocument Record&docID=208 33), 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
Q69	9m) What other observing networks are early warning?	e operated by your country and used for tsunami
	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
Q70	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
Q71	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
Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes

Q73	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; Warming - sea level more than 0.5 m			
Q74	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.			
Q75	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			
Q76	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			
Q77	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					
 	Diss	emination			
Q78	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)			
Q79	10b) How is the warning situation terminated?	When no significant wave heights is observed from the national tide gauge station.			
Q80	10c) What website is used for display of national threat status during events? Please provide the URL.	http://www.met.gov.my			
PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
---	---	---	--	--	---
	Standa	rd Op	erating Procedur	es	
Q81	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.				n rows), e drop down
	Does your SOP address this as of tsunami emergency respon	Does your SOP address this aspect of tsunami emergency response?		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
Q82	 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. 				/ (in rows), e drop down
	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
Q83	11c) Would your country be willi share your SOPs with the IOTIC other countries?	ng to and	Yes		

Q84	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)	
	PART IV: Standard Operating Pr Tsunami Exercis	ocedures, Evacuation Infrastructure, es, Public Awareness	
	Evacuatio	n Infrastructure	
Q85	12a) Does your country have the follow and detail specific areas). Please use the follow the transmission of trans	ing evacuation infrastructure? (select all that apply he 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	
Q86	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes	
	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness		
	Tsunar	ni Exercises	
Q87	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines	
Q88	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	
Q89	12c) What kind of tsunami exercise act how many times during the inter-sessio	e activities have been undertaken in your country and essional (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)	
	PART IV: Standard Operating P	rocedures. Evacuation Infrastructure.
	Tsunami Exercis	ses, Public Awareness
	Public	Awareness
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office
Q91	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
Q92	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
Q93	13d) Do you undertake the following ts	unami 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
Q94	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
Q95	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	Νο
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	No

Q97	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	
Q98	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.		
→	In 2019, MMD will be conducting public weather, earthquake & tsunami for the	awareness's campaigns and drills on the extreme aiming as follow: -	
	Preparing the publics for all hazards the	rough 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 & evacuation plan).		
Q99	15) Please provide a brief summary of system improvements	plans for future tsunami warning and mitigation	
→	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.		
Q100	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:	http://metservice.intnet.mu	
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? 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	Yes	
	an ICG Tsunami Service Provider according to established National Standard Operating Procedures. The TWFP may or not be the NTWC.		
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	

Q34	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			
Q35	4g) For each of the dat Select Yes / No / Don't	a types listed below (in rows), ar know from the drop down menu	iswer the two questions (in columns).			
		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			
Q36	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			
Q37	4i) On a scale of 1 (Ve please rate your count tsunami hazard assess	ry poor) to 5 (Very good), ry's capability to undertake sment	Good			
Q38	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 I	Hazard Assessment (PTHA)	Medium priority			
	Deterministic Tsunami	Hazard Analysis	Essential			
	Field Studies on Tsuna	ami Impacts	Medium priority			
	Hazard map		Essential			
	Inundation map		Essential			
	Evacuation map		Essential			
Q39	9 4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country ha give training and/or consultancy on tsunami hazard assessment to other countries?					
	Probabilistic Tsunami I	Hazard Assessment (PTHA)	Moderate			
	Deterministic Tsunami	Hazard Analysis	Moderate			
	Field Studies on Tsuna	ami Impacts	No-capacity			
	Hazard map		Good			
	Inundation map		Good			
	Evacuation map		Good			
	Please provide the nar any individuals / institu provide this training / c	ne(s) and contact detail(s) of tions in your country that could onsultancy	Not provided			
	PART II: Hazard Ass	essment, Risk Assessment	, Policies, Plans, Guidelines			
		Risk Assessment				

Q40	5a) Has your country undertaken a tsunami risk assessment?	Yes
Q41	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami
Q42	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Drought, Flooding, Landslide
Q43	5d) Who did the tsunami risk assessment in your country?	National Agency National/local University
Q44	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National level
Q45	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.
Q46	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.
Q47	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.
Q48	5i) On a scale of 1 (Very poor) to 5 (Very good), please undertake tsunami risk assessment	a rate your country's capability to
	Capability to undertake tsunami risk assessment	Poor
Q49 5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level of your cour improve capacity in the following areas of tsunami risk assessment?		t is the priority level of your country to 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
Q50	5k) On a scale of 1 (No capacity) to 5 (Very good) what give training and/or consultancy on tsunami risk assess	t capacity does your country have to sment 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 a	assessment at village level	No d	capacity	
	Tsunami risk a neighbourhood	assessment at community / d level	No d	capacity	
	Other (specify	below)	The Insticarr asse the	Mauritius Ocea itute has persor ied out the tsun essment throug Sumatra and M	anography nnel who has ami risk h modelling for akran scenarios
	PART II: Haz	ard Assessment, Risk Assessment	:, Pol	icies, Plans,	Guidelines
		Policies			
Q51	6a) Does your management available. Use In what form is	country have a national tsunami policy? phases listed below, select standalone po the comments box to detail the specific s the policy?	For e blicy / name	ach of the four multi hazard po e of the policy (disaster blicy / policy not if available).
	Prevention and	d mitigation	Poli	cv is not availat	ble
	Preparedness		Poli	cy is not availab	ble
	Emergency re	sponse	Mult	ti hazard includi	ing tsunami
	Rehabilitation	and reconstruction	Poli	cy is not availat	ble
	What is the na	me of policy? (if available):	Nati	onal Disaster S	cheme
Q52	 b) Does your country have local tsunami policies? For each of the disaster managen phases listed below, select standalone policy / multi hazard policy / policy not availabl the comments box to detail the specific name(s) of the policy (if available). In what form is the policy? 			management ot available. Use	
	Prevention and	d mitigation	Poli	cy is not availat	ble
	Preparedness		Poli	cy is not availat	ble
	Emergency re	sponse	Mult	ti hazard includi	ing tsunami
	Rehabilitation	and reconstruction	Poli	cy is not availat	ble
	What is the na	me of policy? (if available):	Tsu	nami Emergeno	cy Scheme
	PART II: Haz	ard Assessment, Risk Assessment	:, Pol	icies, Plans,	Guidelines
		Plans			
Q53	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 deta specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire		aster risk elow, select box to detail the w 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
	Preparednes s	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
	Rehabilitatio n and	National plan is not available		Local plan is not available	Community plan is not available

	reconstructio n					
	What is the na	me of the plan(s) (if available):	Nat Em	National Disaster Scheme/Tsunar Emergency Scheme		
Q54	7b) Are your country's tsunami disaster risk reduction Yes plans based on hazards and risk assessments?					
	PART II: Haz	ard Assessment, Risk Assessmen	t, Po	licies, Plans,	Guidelines	
		Guidelines				
Q55	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?			the four lifecycle not available. Use		
	Prevention an	d mitigation	Gui	Guidelines not available		
	Preparedness	Preparedness		Guidelines not available		
	Emergency response		Gui	Guidelines not available		
	Rehabilitation	and reconstruction	Mul tsur	ti hazard guidel nami	ines including	
	What is the na (if available):	me of guidelines?	Gui	delines not ava	ilable	
Q56	 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. Us the comments box to detail the specific name of the guidelines (if available). 		four lifecycle not available. Use			
	Provention an	d mitigation	Gui	delines not ava	ilable	
	Proparadpass		Gui	delines not avai	ilable	
	Frepareuriess		04.			
	Emergency re	sponse	Sta	ndalone tsunar	ni guidelines	
	Rehabilitation	and reconstruction	Gui	delines not ava	ilable	
	What is the na (if available):	me of guidelines?	Not	provided		

	PART III: Detection, Warning and Dissemination		
	Detection and Warnir	ng	
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes	
Q58	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	
Q59	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	

Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes	
Q61	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)	
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National	
Q63	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	
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID= 207 96)?	Yes	
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID= 207 96), 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	
Q66	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	
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID= 208 33)?	Yes	
Q68	9I) When compared to the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID= 208 33), 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	
Q69	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	
Q70	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	No	

Q71 9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?		No
Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
Q73	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
Q74	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 tsumani was detected
Q75	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
Q76	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 Disater Centre Police Force Fire Services Local Authorities Community NGOs
Q77	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	
Q78	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
Q79	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
Q80	10c) What website is used for display of national threat status during events? Please provide the URL.	http://metservice.intnet.mu/warning- bulletin-tsunami-warning.php

	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness		
Standard Operating Procedures			
Q81	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 su requi develop e this a tsur emer respo your	pport red to b/improv spect of nami gency nse in SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructur e for this aspect of tsunami emergency response?	
	24/7 Emergency Operation Centr (EOC)	re	Yes	Ν	lo	Yes	Yes
	Receiving information from the NTWC		Yes	Ν	lo	No	Yes
	Response Criteria / decision mak	king	Yes	Y	es	Yes	Yes
Q82	11b) For each of the (downstrear consider the four questions (in comenus.	m) em plumn	nergency s). Sele	/ respons ct a yes/r	e issues li 10 respons	sted below (in se using the dro	rows), op down
	Does your SOP address this a tsunami emergency respo	s your SOP address this aspect of sunami emergency response? g dissemination Yes		Is support required to develop/improve this aspect of tsunami emergency response in your SOP?		Is support required to develop Human Resource s in this aspect of tsunami emergenc y response ?	Is support required to develop infrastructur e for this aspect of tsunami emergency response?
	Warning dissemination				No	Yes	Yes
	Evacuation call procedures	ا pro	Not vided	Not p	provided	Not provided	Not provided
	Community evacuation procedures	ا pro	Not wided	Not provided		Not provided	Not provided
	Communication with NTWC	l orq	Not wided	Not provided		Not provided	Not provided
	Communication with Local Government	ا pro	Not wided	Not provided		Not provided	Not provided
	Media arrangements	ا pro	Not wided	Not p	provided	Not provided	Not provided
	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	pro	Not ovided	Not p	provided	Not provided	Not provided
Q83	11c) Would your country be willin SOPs with the IOTIC and other c	ing to share yo countries?		ur	Yes		
Q84	11d) For each emergency respor for emergency response are available	nse or ilable	ganisati ? (select	on listed all that a	below, wh apply)	ich communica	ation methods
	National DMOs				Telephor	ne, Fax, Email,	SMS
	Local DMOs				Not provided		

	General Public	SMS, Siren
	Coastal Communities	SMS, Siren
	Media	Telephone, Fax, Email
	Other communication methods (please specify)	
	PART IV: Standard Operating Procedures, E Tsunami Exercises, Public A	vacuation Infrastructure, wareness
	Evacuation Infrastruct	ure
Q85	12a) Does your country have the following evacuation i and detail specific areas). Please use the scroll bar below	nfrastructure? (select all that apply ow 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
Q86	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes
	PART IV: Standard Operating Procedures, E Tsunami Exercises, Public A	vacuation Infrastructure, wareness
	Tsunami Exercises	
Q87	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines
Q88	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
Q89	12c) What kind of tsunami exercise activities have been many times during the inter-sessional (between ICG Me	n undertaken in your country and how eetings) 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
	PART IV: Standard Operating Procedures, E Tsunami Exercises, Public A	vacuation Infrastructure, wareness
	Public Awareness	
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	National Tsunami Warning Centre

Q91	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	
Q92	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	
Q93	13d) Do you undertake the following tsunami awarenes	s 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	
Q94	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	
Q95	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No	
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	No	
Q97	97 13h) For those communities that participated in the IOTR initiative, please provide a ranking of their performance against the IOTR indicators, using the scale 1 (very po (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 a determined appropriate by local authorities in collaboration with communities	s	
	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					
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					
15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements					
Respondent skipped this question					
Upload Documents	Respondent skipped this question				
	PART V: Narrative 14) Please briefly describe any innovations or modificated procedures or operations since your last National Reportsunami related research projects, tsunami mitigation are in preparedness and emergency management), as well other measures taken to heighten awareness of the tsute Respondent skipped this question 15) Please provide a brief summary of plans for future to improvements Respondent skipped this question Upload Documents				



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? 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.	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/earthqua ke/tsunami			

Q32	32 4d) Who did the tsunami hazard assessment in your country? (select all that apply) N Please specify the name(s) of the agencies: N A A		National Agency		
			National / Local University		
			National Institute of Disaster Management/NMHS/Healthy/Agriculture/UN Agencies/UNESCO IOC/NGO/University Eduardo Mondlane		
Q33	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)		City level		
Q34	Q34 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 tsunam UNDP tres coasta tsunami inundatio The cities are Bei	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.		
Q35	4g) For each of the data types lis Select Yes / No / Don't know from	sted below (in r m the drop dow	rows), answer the tw /n menu.	wo questions (in columns).	
		Was this tsunami haza	data used for ard assessment?	Is this data publicly available?	
	Bathymetry	Respondent skipped this question		n	
	Seismo-tectonic model]			
	Topography				
	Land Cover				
	Infrastructure details				
Q36	 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, Inur map	ndation map, Evacuation	
Q37	4i) On a scale of 1 (Very poor) to good), please rate your country's undertake tsunami hazard asses	o 5 (Very s capability to ssment	Fair		
Q38	4j) On a scale of 1 (Not a priority improve capacity in the following	v) to 5 (Essentia areas of tsuna	al), what is the prior ami hazard assessr	rity level in your country to nent?	
	Probabilistic Tsunami Hazard Assessment (PTHA)		Medium priority		
	Deterministic Tsunami Hazard A	Analysis	Medium priority		
	Field Studies on Tsunami Impac	cts	High priority		
	Hazard map Inundation map		High priority		
			High priority		

	Evacuation map	High priority	
Q39	4k) On a scale of 1 (No capacity) to 5 (Very goo give training and/or consultancy on tsunami has	od), what capacity does your country have to zard 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.	
	PART II: Hazard Assessment, Risk Asse	ssment, Policies, Plans, Guidelines	
	Risk Asses	sment	
Q40	5a) Has your country undertaken a tsunami risk assessment?	Yes	
Q41	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami	
Q42	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/earthqua ke/tsunami	
Q43	5d) Who did the tsunami risk assessment in	National Agency	
	your country?	International Agency	
		National/local University	
	agency(ies):	with Disaster Management Agency, Weather Service, National Institute of Hydrography and Navigation, Institute of Geology, University of Eduardo Mondlane	
Q44	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	City Level	
Q45	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.	
Q46	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.			
Q47	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Risk map, Evacuation map			
Q48	5i) On a scale of 1 (Very poor) to 5 (Very good) undertake tsunami risk assessment	, please rate your country's capability to			
	Capability to undertake tsunami risk assessment	Fair			
Q49	5j) On a scale of 1 (Not a priority) to 5 (Essentia improve capacity in the following areas of tsuna	al), what is the priority level of your country to ami 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			
Q50	5k) On a scale of 1 (No capacity) to 5 (Very goo give training and/or consultancy on tsunami risk	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			
	PART II: Hazard Assessment, Risk Asse	ssment, Policies, Plans, Guidelines			
	Policie	es			
Q51	6a) Does your country have a national tsunami management phases listed below, select stand available. Use the comments box to detail the s form is the policy?	policy? For each of the four disaster alone policy / multi hazard policy / policy not specific name of the policy (if available). In what			
	Prevention and mitigation	The country has only the Policy of Natural			
	Preparedness	that challenging the country including			
	Emergency response	tsunami. But considering the low risk of			
	Rehabilitation and reconstruction	cyclones, floods, drought and epidemics.			
	What is the name of policy? (if available):				
Q52	6b) Does your country have local tsunami polic phases listed below, select standalone policy / the comments box to detail the specific name(s policy?	ies? For each of the disaster management multi hazard policy / policy not available. Use) of the policy (if available). In what form is the			
	Prevention and mitigation	The country does not have local tsunami			
	Preparedness	policies			
	Emergency response				
	Rehabilitation and reconstruction				

	What is the name of	policy? (if available):			
	PART II: Hazard A	Assessment, Risk Asse	ssment, Policies, Plar	ns, Guidelines	
	Plans				
Q53	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.			disaster risk I below, select Its box to detail the 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 cou reduction plans taking in challenging hazards	ntry has risk consideration the	
Q54	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				
Q55	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?		of the four lifecycle is not available. Use le) In what form are		
	Prevention and mitig	gation	Respondent skipped this	s question	
	Preparedness				
	Emergency response	е			
	Rehabilitation and re	econstruction			
	What is the name of (if available):	guidelines?			
Q56	 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? 			he four lifecycle es not available. Use le). In what form are	
	Prevention and mitig	ation	Respondent skipped this question	question	
[Preparedness				
	Emergency response	e			
	Rehabilitation and re	econstruction			
	What is the name of guidelines? (if available):		Not applicable		

	PART III: Detection, Warning and Dissemination				
	Detection and Warning				
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes			
Q58	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			
Q59	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			
Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes			
Q61	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)			
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National			
Q63	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			
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord &docID=207 96)?	No			
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentRecord &docID=207 96), 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			
Q66	9j) Does the organisation have access to national or international sea level networks?	No			
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS	Yes			

	sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentRecord &docID=208 33)?	
Q68	9I) When compared to the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentRecord &docID=208 33), 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
Q69	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
Q70	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	No
Q71	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	No
Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
Q73	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
Q74	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.
Q75	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
Q76	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

Q77	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, Warni	ng and Dissemination
	Dissemin	ation
Q78	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
Q79	10b) How is the warning situation terminated?	Cancellation based on the information received from tsunami warnings centres
Q80	10c) What website is used for display of national threat status during events? Please provide the URL.	www.inam.gov.mz

	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness				
			Standard Operatin	g Procedures	
Q81	11a) For each of the the four questions (ir	(u) n co	ostream) emergency res blumns). Select a yes/no	ponse issues listed belo response using the dro	w (in rows), consider o 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 th	nis question	
	Receiving information from the NTWC				
	Response Criteria / decision making				
Q82 11b) For each of the (downstream) emergend consider the four questions (in columns). Selemenus.		ownstream) emergency ons (in columns). Select	response issues listed b a yes/no response usin	elow (in rows), g the drop down	
	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 t	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.			
Q83	11c) Would your cour your SOPs with the IC countries?	try be willing to share DTIC and other	Yes	
Q84	11d) For each emergency response organisation listed below, which communication r for emergency response are available? (select all that apply)		on listed below, which communication methods 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	
	PART IV: Stand	lard Operating Proce Tsunami Exercises, F	dures, Evacuation Infrastructure, Public Awareness	
		Evacuation Inf	rastructure	
Q85	12a) Does your count detail specific areas).	ry have the following eva Please use the scroll bar	cuation infrastructure? (select all that apply and below to view the entire table.	
	Evacuation shelter		Yes coastal areas but at low risk	
	Vertical evacuation st	ructure	Yes coastal areas but at low risk	
	Natural or artificial hill	for vertical evacuation	No	
	Evacuation signage		No	
	Other (please specify)		

Q86	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes					
	PART IV: Standard Operating Proced Tsunami Exercises, P	lures, Evacuation Infrastructure, Public Awareness					
	Tsunami Exercises						
Q87	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National guidelines					
Q88	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	City level					
Q89 12c) What kind of tsunami exercise activities have been undertaken in your many times during the inter-sessional (between ICG Meetings) period?		ave been undertaken in your country and how 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					
	PART IV: Standard Operating Procee Tsunami Exercises, F	dures, Evacuation Infrastructure, Public Awareness					
	Public Awa	ireness					
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office					
Q91	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Posters, Booklets, Video, or other visual or oral media					
Q92	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					
Q93	13d) Do you undertake the following tsunami av	wareness 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	
Q94	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 tsun materials Development of tsunami programmes, activities o Participation/support by i agencies or experts to yo activities	ami awareness , awareness r campaigns, nternational our country's
Q95	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No	
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	No	
Q97	13h) For those communities that participated in ranking of their performance against the IOTR i (very good)	e provide a general 1 (very poor) to 5	
	Have a community tsunami risk reduction plan	3 (Fair)	
	Have designated and mapped tsunami hazard	4 (Good)	
	Have a public display of tsunami information	2 (Poor)	
	Produce easily understood tsunami evacuation appropriate by local authorities in collaboration	2 (Poor)	
	Develop and distribute outreach and public edu	2 (Poor)	
	Hold at least three outreach or educational activ	2 (Poor)	
	Conduct an annual tsunami community exercis	1 (Very poor)	
	Address tsunami hazards in the community's E Plan (EOP)	1 (Very poor)	
	Commit to support the Emergency Operations of tsunami incident, if an EOC is open and activate	4 (Good)	
	Have redundant and reliable means for a 24-ho EOC if activated) to receive official tsunami three	our warning point (and eats / information	4 (Good)
	Have redundant and reliable means for a 24-ho EOC to receive official tsunami alerts to the put	4 (Good)	

	PART V: Narrative
Q98	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.

Q99	 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. 		
•			
Q100	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:	https://www.moezala.gov.mm/		
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? 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.	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		

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	National Agency		
	assessment in your country? (select all that apply)	International Agency		
	Please specify the name(s) of the agencies:	Department of Meteorology cooperated with RIMES-Reg Multi-hazard Early Warning	and Hydrology was gional Integrated System	
Q33	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 Map and Evacuation Map ha Myanmar	Risk Assessment ave done in	
Q34	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		
Q35	4g) For each of the data types listed below Select Yes / No / Don't know from the drop	(in rows), answer the two que down menu.	estions (in columns).	
		Was this data used for tsunami hazard assessment?	Is this data publicly available?	
	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):		1	
Q36	 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		
Q37	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Poor		
Q38	4j) On a scale of 1 (Not a priority) to 5 (Ess improve capacity in the following areas of t	ential), what is the priority lev sunami hazard assessment?	el in your country to	
	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	
Q39	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	
I	PART II: Hazard Assessment, Risk As	sessment, Policies, Plans, Guidelines	
	Risk Ass	essment	
Q40	5a) Has your country undertaken a tsunami risk assessment?	Yes	
Q41	5b) What type of risk assessment?	Single risk assessment only on tsunami	
Q42	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Respondent skipped this question	
Q43	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.	
Q44	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.	
Q45	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	
Q46	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	All of Myanmar coastal areas have the risk from Tsunami.	
Q47	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Evacuation map	

Q48	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		
Q49	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		
Q50	5k) On a scale of 1 (No capacity) to 5 (Vergive training and/or consultancy on tsunam	y good) what capacity does your country have to ii 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		
I	PART II: Hazard Assessment, Risk As	sessment, Policies, Plans, Guidelines		
	Poli	cies		
Q51	6a) Does your country have a national tsur management phases listed below, select si available. Use the comments box to detail	nami policy? For each of the four disaster tandalone policy / multi hazard policy / policy not the specific name of the policy (if available).		
	In what form is the policy?			
	Prevention and mitigation	Multi hazard including tsunami		
	Dranaradnaga	Multi hazard including tsunami		
	Preparedness			
	Emergency response	Multi hazard including tsunami		
	Emergency response Rehabilitation and reconstruction	Multi hazard including tsunami Multi hazard including tsunami		
	Emergency response Rehabilitation and reconstruction What is the name of policy? (if available):	Multi hazard including tsunami Multi hazard including tsunami Myanmar Action Plan of Disaster Risk Reduction		
Q52	Emergency response Rehabilitation and reconstruction What is the name of policy? (if available): 6b) Does your country have local tsunami p phases listed below, select standalone poli the comments box to detail the specific nar In what form is the policy?	Multi hazard including tsunami Multi hazard including tsunami Myanmar Action Plan of Disaster Risk Reduction policies? For each of the disaster management cy / multi hazard policy / policy not available. Use me(s) of the policy (if available).		
Q52	Emergency response Rehabilitation and reconstruction What is the name of policy? (if available): 6b) Does your country have local tsunami p phases listed below, select standalone poli the comments box to detail the specific nar In what form is the policy? Prevention and mitigation	Multi hazard including tsunami Multi hazard including tsunami Myanmar Action Plan of Disaster Risk Reduction policies? For each of the disaster management cy / multi hazard policy / policy not available. Use me(s) of the policy (if available).		
Q52	Emergency response Rehabilitation and reconstruction What is the name of policy? (if available): 6b) Does your country have local tsunami p phases listed below, select standalone poli the comments box to detail the specific nar In what form is the policy? Prevention and mitigation Preparedness	Multi hazard including tsunami Multi hazard including tsunami Multi hazard including tsunami Myanmar Action Plan of Disaster Risk Reduction policies? For each of the disaster management cy / multi hazard policy / policy not available. Use me(s) of the policy (if available). Multi hazard including tsunami Multi hazard including tsunami		
Q52	Emergency response Rehabilitation and reconstruction What is the name of policy? (if available): 6b) Does your country have local tsunami p phases listed below, select standalone poli the comments box to detail the specific nar In what form is the policy? Prevention and mitigation Preparedness Emergency response	Multi hazard including tsunami Multi hazard including tsunami Myanmar Action Plan of Disaster Risk Reduction policies? For each of the disaster management cy / multi hazard policy / policy not available. Use me(s) of the policy (if available). Multi hazard including tsunami Multi hazard including tsunami		

	What is the name of policy? (if available):		Community Based Disaster Risk Reduction		
F	PART II: Hazard Assess	ment, Risk As	sessmei	nt, Policies, Plans,	Guidelines
		Pla	ins		
Q53	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			Community level
	Prevention and mitigation	Not provid	ded	Not provided	Not provided
	Preparedness	Not provid	ded	Multi hazard including tsunami	Not provided
	Emergency response	Not provid	ded	Not provided	Not provided
	Rehabilitation and reconstruction	Not provid	bed	Not provided	Not provided
	What is the name of the plan available):	an(s) (if	Not provided		
Q54	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?		Yes		
F	PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines				
	Guidelines				
Q55	8a) Does your country hav phases, select standalone the comments box to detai In what form are the guide	e national tsuna guidelines / mul I the specific nar lines?	mi DRR g ti hazard g me of the g	uidelines? For each c guidelines / guidelines guidelines (if available	of the four lifecycle s not available. Use e).
	Prevention and mitigation		Not provided		
	Preparedness		Standalone tsunami guidelines		
	Emergency response		Not provided		
	Rehabilitation and reconst	ruction	Not provided		
	What is the name of guide (if available):	ines?	Not provided		
Q56	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).			e four lifecycle s not available. ilable).	
	Prevention and mitigation		Respondent skipped this question		
	Preparedness				
	Emergency response				
	Rehabilitation and reconst	ruction			
	What is the name of guide (if available):	ines?			

	PART III: Detection, Warning and Dissemination				
	Detection and Warning				
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes			
Q58	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			
Q59	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			
Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes			
Q61	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)			
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local			
Q63	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			
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentRec ord&docID=207 96)?	No			
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentRec ord&docID=207 96), 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			

Q66	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		
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRec ord&docID=208 33)?	Yes		
Q68	9l) When compared to the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentRec ord&docID=208 33), 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		
Q69	9m) What other observing networks are op warning?	erated by your country and used for tsunami early		
	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		
Q70	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		
Q71	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	No		
Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes		
Q73	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		
Q74	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?	
Q75	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
Q76	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.
Q77	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, Wa	ning and Dissemination
	Dissem	ination
Q78	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
Q79	10b) How is the warning situation terminated?	When tsunami disaster is clear or cannot effect to our coastal areas, we issue the tsunami cancellation.
Q80	10c) What website is used for display of national threat status during events? Please provide the URL.	https://www.moezala.gov.mm/

	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness						
	Standard Operating Procedures						
Q81	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
Q82	11b) For each of the (downs consider the four questions (menus.	tream) e (in colum	n) emergency response issues listed below (in rows), olumns). Select a yes/no response using the drop down			(in rows), drop down
	Does your SOP address this aspect of tsunami emergenc response?	s Yy	ls su to de th tsuna res	pport required evelop/improve is aspect of ami emergency ponse 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
Q83	11c) Would your country be share your SOPs with the IC other countries?	willing to TIC and)	Yes		
Q84	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)					nication
	National DMOs			Telephone, Fax, Email, SMS		
	Local DMOs		Telephone, Fax, Email, SMS			
	General Public			Telephone, Fax, Email, SMS		
	Coastal Communities Telephone, I				x, Email, SMS	
	Media Telephone, Fax, Email, SMS					
PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness						
Evacuation Infrastructure						
Q85	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				
Q86	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes				
	PART IV: Standard Operating Proc Tsunami Exercises	edures, Evacuation Infrastructure, , Public Awareness				
	Tsunami	Exercises				
Q87	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National guidelines				
Q88	12b) At what levels were the exercises	National level, Regional level, City level, Village				
	(between ICG Meetings) period? (select all that apply)	level, Community/Neighbourhood level				
Q89	I2c) What kind of tsunami exercise activities have been undertaken in your country and h 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				
	PART IV: Standard Operating Proc	edures. Evacuation Infrastructure.				
	Tsunami Exercises	, Public Awareness				
	Public Av	vareness				
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	National Tsunami Warning Centre				
Q91	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				
Q92	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?		
Q93	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	
Q94	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	
Q95	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	
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	No	
Q97	13h) For those communities that participated in the IOTR initiative, please provide a gener ranking of their performance against the IOTR indicators, using the scale 1 (very poor) to 5 (very good)		ease provide a general ale 1 (very poor) to 5
	Have a community tsunami risk reduction p	blan	3 (Fair)
	Have designated and mapped tsunami haz	ard zones	3 (Fair)
	 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 		3 (Fair)
			3 (Fair)
			3 (Fair)
			3 (Fair)
	Conduct an annual tsunami community exe	ercise	3 (Fair)
	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		3 (Fair)
			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)

	PART V: Narrative			
Q98	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			
Q99	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.			
Q100	0 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? 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.	Yes	
Q24	TWFP 24x7 point of contact (office, operational unit or position, not a person):	National Multi Hazard Early Warning Center	

F	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		on
Q32	4d) Who did the tsunami hazard assessment in your country? (select all that apply)	National / International Consultant		tant
	Please specify the name(s) of the agencies:			
Q33	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	Nation	National Level, City Level	
Q34	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		details for 9 cities
Q35	4g) For each of the data types listed below columns). Select Yes / No / Don't know fro	(in row: m the di	s), answer the two ques rop down menu.	tions (in
			Was this data used for tsunami hazard assessment?	ls 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):			
Q36	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA)	Probabilistic Tsunami Hazard Assessment (PTHA), Deterministic Tsunami Hazard Analysis, Field Studies on Tsunami Impacts, Hazard map, Inundation map, Guidelines (please specify below)		Assessment ni Hazard nami Impacts, Guidelines
	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		ss with the efense. Guide P
Q37	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment	Good		
Q38	4j) On a scale of 1 (Not a priority) to 5 (Ess improve capacity in the following areas of t	sential), tsunami	what is the priority level hazard assessment?	in your country to
	Probabilistic Tsunami Hazard Assessment (PTHA)	Low pr	riority	
	Deterministic Tsunami Hazard Analysis	Low pr	riority	
	Field Studies on Tsunami Impacts	Mediu	m priority	
	Hazard map	Low pr	riority	

	Inundation map	Low priority	
	Evacuation map	Essential	
Q39	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	
Р	ART II: Hazard Assessment, Risk Ass	sessment, Policies, Plans, Guidelines	
	Risk Assessment		
Q40	5a) Has your country undertaken a tsunami risk assessment?	Yes	
Q41	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami	
Q42	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	
Q43	5d) Who did the tsunami risk assessment in your country?	National/International Consultant	
Q44	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National Level, City Level	
Q45	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	
Q46	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	4 districts at high risk from local Tsunami	
Q47	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Risk map, Guidelines, Action Plan	
Q48	5i) On a scale of 1 (Very poor) to 5 (Very g undertake tsunami risk assessment	ood), please rate your country's capability to	
	Capability to undertake tsunami risk assessment	Good	
Q49	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	
Q50	5k) On a scale of 1 (No capacity) to 5 (Vergive training and/or consultancy on tsunam	y good) what capacity does your country have to ii 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	
PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines			
	Policies		
Q51	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).		
	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	
Q52	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).		
	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		
Q53	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		
Q54	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?	Yes		
P	ART II: Hazard Assessment, Risk As	sessment, Polici	ies, Plans, Guio	delines
	Guide	lines		
Q55	8a) Does your country have national tsunal phases, select standalone guidelines / mul Use the comments box to detail the specifi In what form are the guidelines?	ami DRR guidelines? For each of the four lifecycle Iti hazard guidelines / guidelines not available. fic name of the guidelines (if available).		
	Prevention and mitigation	Multi hazard guide	elines including ts	sunami
	Preparedness	Multi hazard guide	elines including ts	sunami
	Emergency response	Multi hazard guide	elines including ts	sunami
	Rehabilitation and reconstruction	Multi hazard guide	elines including ts	sunami
	What is the name of guidelines? (if available):	Not provided		
Q56	8b) Does your country have local tsunami l phases, select standalone guidelines / mul Use the comments box to detail the specifi	DRR guidelines? For ti-hazard guidelines c name of the guide	or each of the fou s / guidelines not elines (if available	ır lifecycle available. ∍).
	Prevention and mitigation	Multi hazard guid	elines including ts	sunami
	Prenaredness	- Multi hazard guide	elines including ts	sunami
	Emergency response	Multi hazard guide	elines including ts	sunami
	Rehabilitation and reconstruction	Multi hazard guide	elines including ts	sunami
	What is the name of guidelines? (if available):	Not provided		

PART III: Detection, Warning and Dissemination		
Detection and Warning		
Q57	257 9a) Does your country have a national capability to assess and/or receiveYes	

	potential tsunami threat information and advise/warn its coastal communities?	
Q58	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
Q59	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)
Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
Q61	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
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
Q63	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)
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentRe cord&docID=207 96)?	Yes
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentRe cord&docID=207 96), 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
Q66	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
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRe cord&docID=208 33)?	Yes
Q68	9I) When compared to the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocumentRe cord&docID=208 33), 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
Q69	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
Q70	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
Q71	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
Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
Q73	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
Q74	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 Massages and forwards to the stakeholders
Q75	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)
Q76	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 Multi Hazard Early Warning Center (NMHEWC)
Q77	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, War	ning and Dissemination
	Dissem	ination
Q78	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
Q79	10b) How is the warning situation terminated?	Cancellation message
Q80	10c) What website is used for display of	http://dss.met.gov.om/

10c) What website is used for display of	http://dss.met.gov.om/
national threat status during events?	
Please provide the URL.	

	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
	Stand	dard C	Dperating Procedu	ires		
Q81	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.				n rows), e drop down	
	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 Yes Centre (EOC)		Yes	Yes	No	
	Receiving information from the NTWC	Yes	No	No	No	

	Response Criteria / decision making	Yes		Yes	Yes	No
Q82	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?		l ri devi thi e resp	s support equired to elop/improve is aspect of tsunami mergency ponse 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
Q83	11c) Would your country be v share your SOPs with the IO other countries?	villing to	c t	Yes		
Q84	11d) For each emergency res methods for emergency resp	sponse onse ar	organ e avai	isation listed b lable? (select	elow, which commu all that apply)	unication
	National DMOs			Telephone, F	Fax, Email, SMS	
	Local DMOs			Telephone, Fax, Email		
	General Public			SMS, Siren, Other		
	Coastal Communities			SMS, Siren, Other		
	Media			Telephone, E	Email, SMS	
	PART IV: Standard Ope Tsunam	rating i Exer	Proc cises,	edures, Eva Public Awa	cuation Infrastru reness	cture,
	E	vacuat	ion Ir	nfrastructure	•	
Q85	12a) Does your country have and detail specific areas). Ple	the foll ease us	owing e the s	evacuation inf scroll bar belov	frastructure? (select w to view the entire	t all that apply table.
	Evacuation shelter			Yes		
	Vertical evacuation structure			No		
	Natural or artificial hill for vert evacuation	ical		No		
	Evacuation signage			No		

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

	Exhibitions	xhibitions Yes	
		One time	
	Competitions or other ways of highlighting tsunami safety	No	
	Tsunami Exercise	Yes	
		Two times	
Q94	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	Provision of general tsunami materials Customization of general ma community,	awareness
	do not require support, please leave blank.	Development of tsunami awa	areness
		programmes, activities or ca	mpaigns,
		or experts to your country's a	activities
Q95	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No	
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	Yes	
	Please list the names	AlSawadi area	
Q97	13h) For those communities that participate ranking of their performance against the IC (very good)	ed in the IOTR initiative, pleas DTR indicators, using the scale	e provide a general a 1 (very poor) to 5
	Have a community tsunami risk reduction p	olan	3 (Fair)
	Have designated and mapped tsunami haz	zard zones	4 (Good)
	Have a public display of tsunami information	on	4 (Good)
	Produce easily understood tsunami evacua appropriate by local authorities in collabora	ation maps as determined ation 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 exe	ercise	4 (Good)
	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		4 (Good)
			4 (Good)
	Have redundant and reliable means for a 2 EOC if activated) to receive official tsunam	24-hour warning point (and i threats / information	5 (Very good)
	Have redundant and reliable means for a 2 EOC to receive official tsunami alerts to the	24-hour warning point and/or e public	5 (Very good)

	PART V: Narrative
Q98	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.		
Q99	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.		
Q100	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:	http://www.pmd.gov.pk/		
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? 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.	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	
Q33	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	City Level	
Q34	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	
Q35	4g) For each of the data types listed below (in rows), answer t Select Yes / No / Don't know from the drop down menu.	he two questions (in colu	mns).
		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
Q36	 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 H Assessment, (PTHA), H Inundation map	azard azard map,
Q37	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	
Q38	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the improve capacity in the following areas of tsunami hazard ass	priority level in your coun essment?	try to
	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 coa cities.	stal areas's
Q39	4k) On a scale of 1 (No capacity) to 5 (Very good), what capacitation training and/or consultancy on tsunami hazard assessment to	city does your country hav other countries?	ve to give
	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

	PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines						
	Risk Assessment						
Q40	5a) Has your country undertaken a tsunami risk assessment?	No					
Q41	5b) What type of risk assessment?	Respondent skipped this question					
Q42	5c) What hazards have been considered in your multi- hazard risk assessment? (select all that apply)	Respondent skipped this question					
Q43	5d) Who did the tsunami risk assessment in your country?	Respondent skipped this question					
Q44	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Respondent skipped this question					
Q45	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					
Q46	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Respondent skipped this question					
Q47	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Respondent skipped this question					
Q48	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					
Q49	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					
Q50	5k) On a scale of 1 (No capacity) to 5 (Very good) what capac training and/or consultancy on tsunami risk assessment to oth	ity does your country have to give ner 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 gives the names of any indiv your country that could provide this	iduals / institutions in training / consultancy	Nil						
PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines									
	Policies								
Q51	6a) Does your country have a national tsunami policy? For each of the four disaster n phases listed below, select standalone policy / multi hazard policy / policy not availab comments box to detail the specific name of the policy (if available). In what form is the policy?								
	Prevention and mitigation		Multi hazard inclu	uding tsunami					
	Preparedness		Multi hazard inclu	Multi hazard including tsunami					
	Emergency response		Multi hazard including tsunami						
	Rehabilitation and reconstruction		Multi hazard inclu	uding tsunami					
	What is the name of policy? (if availa	able):	National Earthqu Frame work.	ake & Tsunami					
Q52	 2 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						
	PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines								
		Plans							
Q53	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 & T	sunami Framewor	rk					
Q54	7b) Are your country's tsunami disas based on hazards and risk assessm	ster risk reduction plans ents?	Yes						
	PART II: Hazard Assessment	, Risk Assessment, Po	olicies, Plans, G	uidelines					
Guidelines									

Q55	 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	
Q56	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	Guidelines not available	
	Proparodnoss	Guidelines not available	
		Guidelines not available	
	Emergency response		
	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					
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes				
Q58	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				
Q59	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				
Q60	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				
Q61	9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	Computers, Internet, Landline Phone, Mobile Phone or Cell Phone, Fax				
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local				
Q63	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
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=207 96)?	No
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=207 96), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)	NIL
Q66	9j) Does the organisation have access to national or internation	onal sea level networks?
	Please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS)):	No
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=208 33)?	No
Q68	 9I) When compared to the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=208 33), 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
Q69	9m) What other observing networks are operated by your cou warning?	ntry and used for tsunami early
	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
Q70	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
Q71	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
Q72	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
Q73	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)
Q74	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- sessional period?	
Q75	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
Q76	9t) Did your country's NTWC and/or TWFP participate in the Tsunami Drill (e.g. IOWave) conducted in the inter-sessional period?	No
Q77	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 Dis	semination
	Dissemination	
Q78	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
Q79	10b) How is the warning situation terminated?	After confirmation of no threat by second Bulletin
Q80	10c) What website is used for display of national threat status during events? Please provide the URL.	http://www.pmd.gov.pk/

	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
	Stan	dard O	perating Procedures			
Q81	11a) For each of the (upstreat the four questions (in column	ergency response issues ect a yes/no response usi	listed below (in ing the drop dow	rows), consider /n 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	No	Yes	

Q82		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 aspects the second secon	t of	Is support required to develop/impro this aspect o 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
Q83	3 11c) Would your country be willing to share your SOPs with the IOTIC and other countries?			Ye	S		
Q84	11d) For each emergency response organisation listed below, which communication method for emergency response are available? (select all that apply)			tion methods			
	National DMOs			Tel	ephone, Fax, Ema	ail, SMS, Siren	
	Local DMOs			Tel	ephone, Fax, SMS	S, Siren	
		General Public			Telephone, SMS, Siren		
		Coastal Communities			Telephone, SMS, Siren		
		Media			Telephone, Fax, SMS		
		PART IV: Standard Operating Tsunami Exe	g Proce rcises,	edures, Evac Public Awar	uati enes	on Infrastructur ss	e,
		Evacua	ation In	frastructure			
Q85	12a det	a) Does your country have the follow ail specific areas). Please use the sc	ing evac croll bar	cuation infrastru below to view t	uctur he e	e? (select all that a ntire table.	apply and
	Evacuation shelter				No		
	Ve	rtical evacuation structure		No			
	Natural or artificial hill for vertical evacuation			Yes			
	Eva	acuation signage			Yes		
	Oth	ner (please specify)			No response Gwadar areas		
Q86	12 eva	b) Is your evacuation infrastructure ir acuation plan?	ntegrated	d in the	Res	spondent skipped t	his question

	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
	Tsunami Exercises					
Q87	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines				
Q88	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				
Q89	12c) What kind of tsunami exercise activities have been under times during the inter-sessional (between ICG Meetings) period	taken in your country and how many d?				
	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				
	PART IV: Standard Operating Procedures, Evac Tsunami Exercises, Public Awar	uation Infrastructure, eness				
	Public Awareness					
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office				
Q91	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Leaflets or flyers, Posters				
Q92	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				
Q93	13d) Do you undertake the following tsunami awareness activ	ities?				
	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				
Q94	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
Q95	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	No
Q97	13h) For those communities that participated in the IOTR initia ranking of their performance against the IOTR indicators, usin good)	ative, please provide a general g the scale 1 (very poor) to 5 (very
	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	

Q98	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 Sub	oduction zone.		
Q99	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.			
Q100	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:	www.weather.gov.sg/warning- regional-seismic-information/			
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? 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.	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	

Q30	4b) What type of hazard assessment has been carried out?		Single ha tsunami A assessme	Single hazard assessment on tsunami AND multi-hazard assessment including tsunami	
Q31	4c) What type of multi-hazard assessment has been carried out? (select all that apply)		Tsunami,	Tsunami, Earthquakes, Flooding	
Q32	4d) Who did the tsunami hazard assessment in your country? (select all that apply)		National /	National Agency National / Local University	
	Please specify the name(s) of the agencie	es:	Meteorolo Singapor	ogical Service e	
Q33	4e) At what level was the tsunami hazard carried out? (select all that apply)	assessment	National	National Level	
	Other (please specify):				
Q34	4f) Which coastal areas have been mapped hazard? Please include the names of the and an approximation of the percentage r	ed for tsunami Region / City napped.	Whole of offshore i	Singapore, including slands	
Q35	4g) For each of the data types listed below Select Yes / No / Don't know from the dro	w (in rows), answ p down menu.	er the two	questions (in columns).	
		Was this data u tsunami haz assessmer		ls 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):	ed (please specify):			
Q36	4h) What products do you have from the tassessment? (select all that apply)	tsunami hazard	Determin Analysis,	Deterministic Tsunami Hazard Analysis, Inundation map	
	Probabilistic Tsunami Hazard Assessmer	nt (PTHA)			
	Field Studies on Tsunami Impacts				
	Guidelines (please specify below)				
Q37	4i) On a scale of 1 (Very poor) to 5 (Very rate your country's capability to undertake hazard assessment	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment			
Q38	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?			level in your country to nt?	
	Probabilistic Tsunami Hazard Assessme	nt (PTHA)	Low priority		
	Deterministic Tsunami Hazard Analysis		High priority		
	Field Studies on Tsunami Impacts		Low prior	ity	
	Hazard map		Low prior	ity	
	Inundation map		Low prior	ity	
	Evacuation map		Low prior	ity	
Q39	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	
PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines			
	Risk Assessment		
Q40	5a) Has your country undertaken a tsunami risk assessment?	Yes	
Q41	5b) What type of risk assessment?	Single risk assessment on tsunami AND multi-hazard risk assessment including tsunami	
Q42	5c) What hazards have been considered in your multi- hazard risk assessment? (select all that apply)	Tsunami, Flooding	
Q43	5d) Who did the tsunami risk assessment in your country?	National Agency	
Q44	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	National Level	
Q45	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	
Q46	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Low risk at coastal areas	
Q47	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	
Q48	5i) On a scale of 1 (Very poor) to 5 (Very good), please rat undertake tsunami risk assessment	e your country's capability to	
	Capability to undertake tsunami risk assessment	Good	
Q49	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is t improve capacity in the following areas of tsunami risk ass	he priority level of your country to essment?	
	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	
Q50	5k) On a scale of 1 (No capacity) to 5 (Very good) what ca give training and/or consultancy on tsunami risk assessme	pacity does your country have to nt to other countries?	

	Tsunami risk assessment at national level			Good	
	Tsunami risk assessment a	No capacity	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 Assess	olicies, Plan	s, Guidelines		
		Policies			
Q51	6a) Does your country have management phases listed available. Use the commer In what form is the policy?	e a national tsunami p I below, select standa Its box to detail the sp	oolicy? For lone policy becific nam	each of the for / multi hazard ne of the policy	our disaster d policy / policy not y (if available).
	Prevention and mitigation			Standalone	tsunami only
	Preparedness			Standalone	tsunami only
	Emergency response			Standalone	tsunami only
	Rehabilitation and reconstr	ruction		Multi hazard	including tsunami
	What is the name of policy	? (if available):		National tsu	nami response plan
Q52	 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? 				ster management y not available. Use e).
	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 poli	cy applies locally
	PART II: Hazard Assess	ment, Risk Assess	sment, Po	olicies, Plan	s, Guidelines
		Plans			
Q53	 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 				disaster risk d below, select nts box to detail the view the entire table.
		National level	Loc	al level	Community level
	Prevention and mitigation	Standalone tsunami only	Local pla available	n is not	Community plan is not available
	Preparedness	Standalone tsunami only	Local pla available	n is not	Community plan is not available
	Emergency response	Standalone tsunami only	Local pla available	n is not	Community plan is not available
	Rehabilitation and reconstruction	Multi hazard including tsunami	Local pla available	n is not	Community plan is not available
	What is the name of the pla	National poli and commun	cy applies at local nity levels		

Q54	7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?	Yes		
	PART II: Hazard Assessment, Risk Assessment, Po	olicies, Plans, Guidelines		
	Guidelines			
Q55	 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		
Q56	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		

	PART III: Detection, Warning and Dissemination				
	Detection and Warning				
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes			
Q58	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			
Q59	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			
Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes			
Q61	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)
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
Q63	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
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=207 96)?	Yes
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=207 96), 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
Q66	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
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=208 33)?	Yes
Q68	9I) When compared to the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=208 33), 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
Q69	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)	
Q70	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
Q71	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
Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
Q73	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).
Q74	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
Q75	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:	
Q76	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
Q77	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:	
	PART III: Detection, Warning and Dis	semination
	Dissemination	r
Q78	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
Q79	10b) How is the warning situation terminated?	Via the same modes used for dissemination of alerts/warnings
Q80	10c) What website is used for display of national threat status during events? Please provide the URL.	www.weather.gov.sg/warning- regional-seismic-information/

	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness				
Standard Operating Procedures					
Q81	81 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	No	
	Receiving information from the NTWC	Yes	No	No	No	
	Response Criteria / decision making	Yes	No	No	No	
Q82	11b) For each of the (downstream consider the four questions (in comenus.	n) eme olumns)	rgency response iss . Select a yes/no re	sues listed below (sponse using the	(in rows), drop down	
	Does your SOP address this asp tsunami emergency response	ect of	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	No	No	No	
	Community evacuation procedures	No	No	No	No	
	Communication with NTWC	Yes	No	No	No	
	Communication with Local Government	No	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	
Q83	11c) Would your country be willin with the IOTIC and other countrie	ig to sh s?	are your SOPs	No		
Q84	11d) For each emergency respor methods for emergency response	nse org e are av	anisation listed belo vailable? (select all t	w, which commur that apply)	nication	
	National DMOs		Telephone, Fax	x, Email, SMS, Sir	en	
	Local DMOs Telephone, Fax, Email, SMS, Siren			en		
	General Public Telephone, Fax, Email, SMS, Siren			en		
	Coastal Communities Telephone, Fax, Email, SMS, Siren			en		
	Media		Telephone, Fax	x, Email		
	PART IV: Standard Opera Tsunami E	ting P xercis	rocedures, Evacuses, Public Aware	uation Infrastru eness	cture,	
	Evacuation Infrastructure					

Q85	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		
Q86	12b) Is your evacuation infrastructure integrated in the evacuation plan?	No		
	PART IV: Standard Operating Procedures, Evac Tsunami Exercises, Public Awar	euation Infrastructure, reness		
	Tsunami Exercises			
Q87	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines		
Q88	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level		
Q89	 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		
	National taunami drill/avaraiga	Once every two years		
		Once every two years		
	Indian Ocean Wave exercise	Yes		
		Once every two years		
	Local tsunami exercise	Yes		
		Once every two years		
	PART IV: Standard Operating Procedures, Evac Tsunami Exercises, Public Awar	uation Infrastructure, reness		
	Public Awareness			
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	National Tsunami Warning Centre		
Q91	13b) What tsunami related education and awareness materials do you have? (select all that apply)	Other		
	Other (please specify):	Website		
Q92	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		
Q93	13d) Do you undertake the following tsunami awareness a	ctivities?		
	World Tsunami Awareness Day	No		
	Global Disaster Risk Reduction Day	ΝΟ		

	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
Q94	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):	
Q95	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:	
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	No
	Please list the names	
Q97	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
	Have designated and mapped tsunami hazard zones	question
	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			
Q98	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		
Q99	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements		
→	Upgrading central monitoring and processing system for collating, integrating, and assessing seismic and tsunami data		
Q100	Upload Documents	Respondent skipped this question	


NATIONAL REPORT OF SOUTH AFRICA¹

	PART I: Basic Information				
Q3	TNC Name:	Dr Mmaphaka Tau			
Q4	Position:	Deputy Director General			
Q5	Organization	National Disaster Management Centre			
Q6	Telephone Number:	0128484601			
Q7	E-mail Address:	MmaphakaT@ndmc.gov.za			
Q8	Fax Number:	+27 123676042			
Q9	Postal Address:	Riverside Office Park, 1290 Heuwel Rd, Centurion Central, Centurion, 0046			
Q10	NTWC Agency Name:	South African Weather Services			
Q11	NTWC URL (web link) for tsunami warnings:	http://www.weathersa.co.za/			
Q12	NTWC Agency Contact or Officer in Charge (person):	Chief Forecaster: Disaster Risk Reduction (DRR) South African Weather Service			
Q16	Postal Address:	Eco Glades block 1b, Eco Park, Cnr Olievenhoutbosch and Ribbon Grass Streets, Centurion, 0157, Private Bag X097 Pretoria 0001			
Q17	3a) Is your Tsunami Warning Focal Point (TWFP) agency the same as your National Tsunami Warning Centre (NTWC) agency? The TWFP is the 24 x 7 point of contact	No			
	(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.				
Q18	TWFP Agency Name (if different from the NTWC Agency):	Same as NTWC			
Q23	Postal Address:	Eco Glades block 1b, Eco Park, Cnr Olievenhoutbosch and Ribbon Grass Streets, Centurion, 0157, Private Bag X097 Pretoria 0001			
Q24	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

¹ 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.

	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 ass	Multi-hazard assessment including tsunami			
Q31	4c) What type of multi-hazard assessment has been carried out? (select all that apply)	Tsunami, Droug	ht, Floodi	ng		
	Other (please specify):	Windstorms and	snow			
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:	SA Weather Ser Geoscience	vices and	Council for		
Q33	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)	Regional Level				
	Other (please specify):	Not provided				
Q34	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.				
Q35	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 tsunami h assessm		sed for ard nt?	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		
Q36	4h) What products do you have from the tsunami hazard assessment? (select all that apply) Hazard map, Inundation map Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below)					
Q37	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessmentGood					
Q38	4j) On a scale of 1 (Not a priority) to 5 (Essen improve capacity in the following areas of tsue	tial), what is the p nami hazard asse	riority lev ssment?	el in your country to		
Probabilistic Tsunami Hazard Assessment (PTHA) Medium			edium priority			
	Deterministic Tsunami Hazard Analysis		High priority			

1			
	Field Studies on Tsunami Impacts	Medium priority	
	Hazard map	High priority	
	Inundation map	High priority	
	Evacuation map	High priority	
Q39	4k) On a scale of 1 (No capacity) to 5 (Very good), what capaci give training and/or consultancy on tsunami hazard assessment	ty does your country have to t 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	
	PART II: Hazard Assessment, Risk Assessment, Polici	ies, Plans, Guidelines	
	Risk Assessment		
Q40	5a) Has your country undertaken a tsunami risk assessment?	No	
Q41	5b) What type of risk assessment?	Respondent skipped this question	
Q42	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Respondent skipped this question	
Q43	5d) Who did the tsunami risk assessment in your country?	Respondent skipped this question	
Q44	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Respondent skipped this question	
Q45	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	
Q46	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Respondent skipped this question	
Q47	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Respondent skipped this question	
Q48	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate you undertake tsunami risk assessment	ur country's capability to	
	Capability to undertake tsunami risk assessment	Good	
Q49	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the p improve capacity in the following areas of tsunami risk assess	riority level of your country to nent?	
	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 Low priority level				ý		
Q50	5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does y give training and/or consultancy on tsunami risk assessment to other co				country have to ries?		
	Tsunami risk assessment at	Poor					
	Tsunami risk assessment at regional level				Poor		
	Tsunami risk assessment at city level				Poor		
	Tsunami risk assessment at	Poor					
	Tsunami risk assessment at level	community / neighbourhoo	d	Poor			
	PART II: Hazard Assessi	ment, Risk Assessment, F	olicies	, Plans, Gui	idelines		
		Policies					
Q51	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 r 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 no	ot available		
	Preparedness			Policy is not available			
	Emergency response	se Policy is not available					
	Rehabilitation and reconstru	Policy is not available					
	What is the name of policy? (if available):				Not provided		
Q52	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				ot available		
	Preparedness			Policy is no	ot available		
	Emergency response			Policy is not available			
	Rehabilitation and reconstru	ction		Policy is not available			
	PART II: Hazard Assessn	nent. Risk Assessment.	Polici	es. Plans.	Guidelines		
		Plans		, ,			
Q53	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 Lo		Loc	al level	Community level		
	Prevention and mitigation	Multi hazard including tsunami	Multi h includi tsunar	hazard Multi hazard ling including			
	Preparedness	Multi hazard including tsunami	Multi h includi	nazard ng ni	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 I includ tsunai	nazard ing mi	Multi hazard including tsunami		
	What is the name of the plar	n(s) (if available):		Seasonal (Seasonal h	Contingency Plans nazard Forecast		
Q54	7b) Are your country's tsuna based on hazards and risk a	mi disaster risk reduction pl ssessments?	ans	Yes			
	PART II: Hazard Assessn	nent, Risk Assessment,	Polici	es, Plans,	Guidelines		
		Guidelines					
Q55	8a) Does your country have national tsunami DRR guidelines? phases, select standalone guidelines / multi hazard guidelines the comments box to detail the specific name of the guidelines In what form are the guidelines?				the four lifecycle not available. Use).		
	Prevention and mitigation			Guidelines not available			
	Preparedness			Guidelines not available			
	Emergency response Rehabilitation and reconstruction				Guidelines not available		
					not available		
	What is the name of guidelines? (if available):			Not provided			
Q56	8b) Does your country have local tsunami DRR guidelines? For phases, select standalone guidelines / multi-hazard guidelines the comments box to detail the specific name of the guidelines In what form are the guidelines?			r each of the / guidelines (if available)	four lifecycle not available. Use).		
	Prevention and mitigation			Guidelines	not available		
	Preparedness			Guidelines	not available		
	Emergency response			Guidelines	not available		
	Rehabilitation and reconstru	ction		Guidelines	not available		
	What is the name of guidelines? (if available):				Not provided		

	PART III: Detection, Warning and Dissemination					
	Detection and Warning					
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes				
Q58	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				
Q59	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				
Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes				

Q61	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, G (WMO Global Telecommunication Sys UPS (Uninterruptable F Supply)	
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National
Q63	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
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=207 96)?	Yes
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=207 96), 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
Q66	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
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=208 33)?	Yes
Q68	9l) When compared to the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=208 33), 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
Q69	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
Q70	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	Νο

Q71	9o) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?	No	
Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes	
Q73	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)	
Q74	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 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.	
Q75	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	
Q76	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):	SA Weather Services Council for Geosciences National Disaster Management Centre	
Q77	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 Dissen	nination	
	Dissemination		
Q78	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	
Q79	10b) How is the warning situation terminated?	ninated? A media statement is produced	
Q80	10c) What website is used for display of national threat status during events? Please provide the URL.	There are no national websites. The organisations	

oper-	rating via the SOP use
infor	rmation from the other
TSP	9 websites (India,
Aust	tralia, Indonesia).

	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness							
	Standard	l Ope	rating Procedure	es				
Q81	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.					ws), consider 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 emergenc y response?	Is support required to develop infrastructur e for this aspect of tsunami emergency response?		
	24/7 Emergency Operation Centre (EOC)	No	Yes		Yes	Yes		
	Receiving information from the NTWC	Ye s	No		No	No		
	Response Criteria / decision making	Ye s	Yes		Yes	Yes		
Q82	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/improv e 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 infrastructur e for this aspect of tsunami emergency response?		
	Warning dissemination	Ye s	No		No	No		
	Evacuation call procedures	No	Yes		Yes	Yes		
	Community evacuation procedures	No	Yes		Yes	Yes		
	Communication with NTWC	Ye s	No	No		No		
	Communication with Local Government	Ye s	No		No	No		
	Media arrangements	Ye s	Yes	No		No		

	Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	No	Yes	Yes	No	
Q83	11c) Would your country be willing the IOTIC and other countries?	to sha	re your SOPs with	Yes		
Q84	11d) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)					
	National DMOs			Telephone, Fax	k, Email, SMS	
	Local DMOs			Telephone, Fax	k, Email, SMS	
	General Public			SMS		
	Coastal Communities			Telephone, Em	ail, SMS	
	Media			Telephone, Em	ail, SMS	
	PART IV: Standard Operatin Tsunami Ex	ng Pro ercise	ocedures, Evacu es, Public Aware	ation Infrastruct	ure,	
	Evacu	ation	Infrastructure			
Q85	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.				that apply le.	
	Evacuation shelter			No		
	Vertical evacuation structure			Yes		
	Many coastal high rise build close to the co and can be us people.				owns have ngs that are astal areas ed to evacuate	
	Natural or artificial hill for vertical ev	/acuat	ion	Yes All three coasta have vertical ev based on the n topography of s although the dis these areas co	al regions vacuation ational South Africa stances to uld vary	
	Evacuation signage			No		
	Other (please specify)			No response		
				There is limited each of the coa for tsunami rela tsunami inform	l signage in astal regions ated warnings/ ation etc.	
Q86	12b) Is your evacuation infrastructu evacuation plan?	re inte	grated in the	No		
	PART IV: Standard Operatin Tsunami Ex	ng Pro ercise	ocedures, Evacu es, Public Aware	ation Infrastruct	ure,	
	Ts	unam	i Exercises			
Q87	12a) Are tsunami exercises incorpo policies and guidelines? (select all	rated that ap	within national oply)	National guidel	ines	

Q88	12b) At what levels were the exercises conducted during the inter-sessional (between ICG Meetings) period? (select all that apply)	National level
Q89	12c) What kind of tsunami exercise activities have been undert many times during the inter-sessional (between ICG Meetings)	aken in your country and how 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 habour authority
	National tsunami drill/exercise	No
	Indian Ocean Wave exercise	Yes annually
	Local tsunami exercise	No
	PART IV: Standard Operating Procedures, Evacuat Tsunami Exercises, Public Awarene	ion Infrastructure, ess
	Public Awareness	
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	Local Disaster Management Office
Q91	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
Q92	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
Q93	13d) Do you undertake the following tsunami awareness activit	ies?
	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
Q94	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
Q95	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No

Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) initiative?	No
Q97	13h) For those communities that participated in the IOTR initiati ranking of their performance against the IOTR indicators, using (very good)	ive, please provide a general the scale 1 (very poor) to 5
	Have a community tsunami risk reduction plan	Respondent skipped this
	Have designated and mapped tsunami hazard zones	question
	Have a public display of tsunami information	
	Produce easily understood tsunami evacuation maps as determined appropriate by local authorities in collaboration with communities	1
	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	t
	Have redundant and reliable means for a 24-hour warning point and/or EOC to receive official tsunami alerts to the public	t

	PART V: Narrative				
Q98	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 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				
Q99	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements				
 Complete a full hazard mapping exercise with the relevant models that has for South Africa. 					
2. Use the hazard mapping product to compile an indicative risk assessment for 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				

Q100	Upload Documents	Respondent skipped this
		question



NATIONAL REPORT OF SRI LANKA

	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, Bauddhaloka 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? 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.	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.			

Q32	4d) Who did the tsunami hazard assessment in your country? (select all that apply)		National / Consultan	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		
Q33	4e) At what level was the tsunami hazard carried out? (select all that apply)	assessment	National Level, Village Level		
	Other (please specify):		National, District and GN level		
Q34	4f) Which coastal areas have been mapped hazard? Please include the names of the and an approximation of the percentage results.	ed for tsunami Region / City napped.	All 14 coa scale of hi inundatior	stal districts with the igh, moderate and low and proximity analysis	
Q35	4g) For each of the data types listed below Select Yes / No / Don't know from the dro	w (in rows), answ p down menu.	er the two o	questions (in columns).	
		Was this data tsunami ha assessme	used for izard ent?	Is this data publicly available?	
	Bathymetry	Yes		Don't know	
	Seismo-tectonic model	Not provid	ded	Not provided	
	Topography	Yes		Don't know	
	Land Cover	Not provid	ded	Not provided	
	Infrastructure details	Yes	Don't know		
Q36	 4h) What products do you have from the tassessment? (select all that apply) Probabilistic Tsunami Hazard Assessment Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below) 	What products do you have from the tsunami hazard essment? (select all that apply) pabilistic Tsunami Hazard Assessment (PTHA) d Studies on Tsunami Impacts ard map, Inundation map, delines (please specify below)		Probabilistic Tsunami Hazard Assessment (PTHA), Field Studies on Tsunami Impacts, Hazard map, Inundation map, Evacuation map	
Q37	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment		Poor		
Q38	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?			evel in your country to t?	
	Probabilistic Tsunami Hazard Assessmer	nt (PTHA)	Essential		
	Deterministic Tsunami Hazard Analysis		High prior	ity	
	Field Studies on Tsunami Impacts		High priority		
	Hazard map		Essential		
	Inundation map		Essential		
	Evacuation map		Essential		
	What other areas of capacity in tsunami h assessment require improvement?	azard	Needed to conduct si national d	 develop guideline to uch assessments at istrict and GN levels 	
Q39	4k) On a scale of 1 (No capacity) to 5 (Ve give training and/or consultancy on tsunar	ry good), what ca mi hazard assess	pacity does ment to oth	s your country have to her countries?	
	Probabilistic Tsunami Hazard Assessmer	nt (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
	PART II: Hazard Assessment, Risk Assessment, Po	olicies, Plans, Guidelines
	Risk Assessment	
Q40	5a) Has your country undertaken a tsunami risk assessment?	No
Q41	5b) What type of risk assessment?	Respondent skipped this question
Q42	5c) What hazards have been considered in your multi- hazard risk assessment? (select all that apply)	Respondent skipped this question
Q43	5d) Who did the tsunami risk assessment in your country?	Respondent skipped this question
Q44	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Respondent skipped this question
Q45	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
Q46	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Respondent skipped this question
Q47	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Respondent skipped this question
Q48	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate undertake tsunami risk assessment	e your country's capability to
	Capability to undertake tsunami risk assessment	Poor
Q49	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is t improve capacity in the following areas of tsunami risk asso	he priority level of your country to essment?
	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

Q50	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 a	at national level		Poor	
	Tsunami risk assessment a	at regional level		Poor	
	Tsunami risk assessment a	at city level		Poor	
	Tsunami risk assessment a	at village level		Poor	
	Tsunami risk assessment a level	at community / neighbo	urhood	Poor	
	Other (specify below)			Poor	
	PART II: Hazard Assess	ment, Risk Assessr	nent, Po	olicies, Plan	s, Guidelines
		Policies			
Q51	6a) Does your country have management phases listed available. Use the commer In what form is the policy?	e a national tsunami po I below, select standalo hts box to detail the spe	licy? For one policy cific nam	each of the fo / multi hazard ne of the policy	our disaster d policy / policy not y (if available).
	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 Ma of 2005 and Managemen	nagement Act No 13 Disaster it policy
Q52	 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). 			ster management sy not available. Use e).	
	Prevention and mitigation			Multi hazard	including tsunami
	Preparedness			Multi hazard including tsunami	
	Emergency response			Multi hazard including tsunami	
	Rehabilitation and reconstr	ruction		Multi hazard	including tsunami
	PART II: Hazard Assess	ment, Risk Assessr	nent, Po	olicies, Plan	s, Guidelines
		Plans			
Q53	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		disaster risk d below, select nts box to detail the view the entire table.		
		National level	Loc	cal level	Community level
	Prevention and mitigation	National plan is not available	Local pl availabl	an is not e	Community plan is not available
	Preparedness	Multi hazard including tsunami	Multi ha includin	izard g tsunami	Multi hazard including tsunami
	Emergency response	Multi hazard including tsunami	Multi ha includin	izard g tsunami	Multi hazard including tsunami

	Rehabilitation and reconstruction	National plan is not available	Local p availabl	an is not e	Community plan is not available
	What is the name of the pla	an(s) (if available):		What is the name of the plan(s) (if available): Disaster Management plans	
Q54	7b) Are your country's tsun plans based on hazards ar	ami disaster risk reduc nd risk assessments?	tion	Yes	
	PART II: Hazard Assess	ment, Risk Assessr	nent, Po	olicies, Plan	s, Guidelines
	-	Guidelines	1		
Q55	8a) Does your country hav phases, select standalone the comments box to detai In what form are the guidel	ve national tsunami DRR guidelines? For each of the four lifecycle guidelines / multi hazard guidelines / guidelines not available. Use il the specific name of the guidelines (if available). elines?			
	Prevention and mitigation	vention and mitigation Guidelines not available		ble	
	Preparedness Multi ha		hazard guidelines including tsunami		
	Emergency response Multi ha		zard guidelin	es including tsunami	
	Rehabilitation and reconst	ruction	Guidelir	elines not available	
	What is the name of guidel (if available):	ines?	Disaster preparedness plans, plans and guidelines		ss plans, response
Q56	8b) Does your country hav phases, select standalone the comments box to detai	e local tsunami DRR gu guidelines / multi-haza I the specific name of th ines?	R guidelines? For each of the four lifecycle nazard guidelines / guidelines not available. Use of the guidelines (if available).		
	Prevention and mitigation		Guidelir	nes not availa	ble
	Preparedness Multi h		Multi hazard guidelines including tsu		es including tsunami
	Emergency response	Emergency response Multi h		zard guidelin	es including tsunami
	Rehabilitation and reconst	ruction	Guidelir	nes not availa	ble
	What is the name of guidel (if available):	ines?	Disaste plans a	r preparednes nd guidelines	ss plans, response

	PART III: Detection, Warning and Dissemination				
	Detection and Warning				
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes			
Q58	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			
Q59	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			

Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
Q61	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
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
Q63	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
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=207 96)?	Yes
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=207 96), 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
Q66	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
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=208 33)?	Yes
Q68	9I) When compared to the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=208 33), 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
Q69	9m) What other observing networks are operated by your of warning?	country and used for tsunami early
	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

Q70	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
Q71	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
Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
Q73	9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?	< 6.5M - Information 6.5 < M < 7.5 - Information (if it is threat - Watch) 7.0 < M < 7.5 - Watch / Alert / Warning 7.6 < M < 7.8 - Alert / Warning 7.8 < M - Warning Color code Information - white Watch - yellow Alert - amber Warning - red
Q74	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?	1.NTWC is able to run ComMIT model for the construction of tsunami inundation maps 2.Those information is able to provide NDMC authorities
Q75	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
Q76	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
Q77	9u) After the December 26 2004 tsunami and until now, wa damaging tsunami? If Yes, what was your national responsif warnings were issued by your NTWC in a timely manner,	as your country impacted by any se to each event (please comment , if public were evacuated, etc.)
	Please indicate below your national response to each event:	No
	PART III: Detection, Warning and Dis	semination
	Dissemination	
Q78	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
Q79	10b) How is the warning situation terminated?	Issuing tsunami threat clear message
Q80	10c) What website is used for display of national threat status during events? Please provide the URL.	www.meteo.gov.lk; www.dmc.gov.lk

	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
	Standa	rd Oper	rating Procedure	S		
Q81	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	
Q82	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.					
Q83	11c) Would your country be willing to share your SOPs with the IOTIC and other countries? Yes					
Q84	11d) For each emergency respor methods for emergency response	ise orgai e are ava	nisation lis ailable? (se	ted belo elect all	w, which communi that apply)	cation
	National DMOs			Teleph	one, Fax, Email	
	Local DMOs			Teleph	one, Fax, Email	
	General Public			SMS, S	Siren, Other	
	Coastal Communities			SMS, S	Siren, Other	
	Media			Teleph	one, Fax, Email, O	ther
	Other communication methods (please specify)			Via we	bsites & Social me	dia (Facebook)
	PART IV: Standard Operat Tsunami E	ing Pro	ocedures es, Public	, Evacı : Aware	uation Infrastruc	ture,
	Eva	cuation	Infrastru	ucture		
Q85	12a) Does your country have the and detail specific areas). Please	following use the	g evacuati scroll bar	on infras below to	structure? (select a view the entire tal	ll that apply ble.
	Evacuation shelter				Yes	
	Vertical evacuation structure				Yes	
	Natural or artificial hill for vertical	evacuat	ion		Yes	
	Evacuation signage				Yes	
Q86	12b) Is your evacuation infrastructer evacuation plan?	ture inte	grated in t	he	Yes	
	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
	ſ	sunam	i Exercis	es		
Q87	12a) Are tsunami exercises incor policies and guidelines? (select a	porated Il that ap	within nation	onal	National guidelines	6
Q88	12b) At what levels were the exer the inter-sessional (between ICG (select all that apply)	cises co Meeting	onducted d s) period?	uring	National level, Villa Community/Neighl School level	age level, oourhood level,
	Other (please specify):				National, district, d GN level also hosp drills	livisional and bital and school
Q89	12c) What kind of tsunami exercimany times during the inter-session	se activit onal (be	ties have b tween ICC	een und Meetin	dertaken in your co gs) period?	untry and how
	Organization table top exercise				Yes 1	
	Inter-organization table top exerc	ise			Yes 1	
	National tsunami drill/exercise				Yes 1	

	Indian Ocean Wave exercise	Yes This time	
	Local tsunami exercise	Yes 100 drills	
	PART IV: Standard Operating Procedures, Evac Tsunami Exercises, Public Awar	uation Infrastructure,	
	Public Awareness		
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	National Disaster Management Office	
Q91	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	
Q92	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	
Q93	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	
Q94	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	
Q95	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	
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	Respondent skipped this question	

Q97	7 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 (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			
Q98	8 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			
Q99	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			
Q100	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? 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.	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		

I			Not provide d		
	Please specify the name(s) of the agencies:		Not provid	Not provided	
Q33	4e) At what level was the tsunami hazard assessment carried out? (select all that apply)		Regional I	_evel	
	Other (please specify):		Not provided		
Q34	4f) Which coastal areas have been mapp hazard? Please include the names of the and an approximation of the percentage	ed for tsunami Region / City mapped.	Responde	ent skipped this question	
Q35	4g) For each of the data types listed belo Select Yes / No / Don't know from the dro	w (in rows), answe op down menu.	er the two o	questions (in columns).	
		Was this data u tsunami haz assessme	ised for zard nt?	Is this data publicly available?	
	Bathymetry	Don't kno	W	No	
	Seismo-tectonic model	Yes		Yes	
	Topography	Don't kno	W	No	
	Land Cover	Yes		Yes	
	Infrastructure details	Yes		Yes	
Q36	 4h) What products do you have from the assessment? (select all that apply) Probabilistic Tsunami Hazard Assessmen Field Studies on Tsunami Impacts Hazard map, Inundation map, Guidelines (please specify below) 	What products do you have from the tsunami hazard essment? (select all that apply) babilistic Tsunami Hazard Assessment (PTHA) d Studies on Tsunami Impacts zard map, Inundation map,		lies on Tsunami Hazard map	
Q37	4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment		Good		
Q38	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority lev improve capacity in the following areas of tsunami hazard assessment?			evel in your country to t?	
	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		
Q39	4k) On a scale of 1 (No capacity) to 5 (Ve give training and/or consultancy on tsuna	ery good), what ca mi hazard assess	pacity does ment to oth	s your country have to ner countries?	
	Probabilistic Tsunami Hazard Assessme	Moderate			
	Deterministic Tsunami Hazard Analysis	Deterministic Tsunami Hazard Analysis			
	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		
	PART II: Hazard Assessment, Risk Assessment, Po	blicies, Plans, Guidelines	
	Risk Assessment		
Q40	5a) Has your country undertaken a tsunami risk assessment?	Yes	
Q41	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami	
Q42	5c) What hazards have been considered in your multi- hazard risk assessment? (select all that apply)	Tsunami, Drought, Flooding	
Q43	5d) Who did the tsunami risk assessment in your country?	National/local University	
Q44	5e) At what level was the tsunami risk assessment carried out? (select all that apply)	Regional Level	
	Other (please specify):	Not provided	
Q45	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	
Q46	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Respondent skipped this question	
Q47	5h) What products do you have from the tsunami risk assessment? (select all that apply)	Guidelines Action Plan	
Q48	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	
Q49	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is t improve capacity in the following areas of tsunami risk asso	he priority level of your country to essment?	
	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	
Q50	5k) On a scale of 1 (No capacity) to 5 (Very good) what cap give training and/or consultancy on tsunami risk assessme	pacity does your country have to nt 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)		

	PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines				
		Policies			
Q51	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).				ur disaster policy / policy not (if available).
	Broventian and mitigation			Multi bozord i	
	Prevention and mitigation			Multi hazard i	ncluding tsunami
	Preparedness			Multi bazard i	ncluding tsunami
	Emergency response			Multi bozord i	
	Rehabilitation and reconstr	ruction		wulli nazaru i	ncluding tsunami
	What is the name of policy	? (if available):		Not provided	
Q52	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. Us the comments box to detail the specific name(s) of the policy (if available). In what form is the policy?				er management not available. Use
	Prevention and mitigation			Multi hazard i	ncluding tsunami
	Preparedness			Multi hazard i	ncluding tsunami
	Emergency response			Multi hazard including tsunami	
	Rehabilitation and reconstr	ruction		Multi hazard including tsunami	
	PART II: Hazard Assess	ment, Risk Assess	ment, Po	licies, Plans	, Guidelines
		Plans			
Q53	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 th specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire tak			disaster risk below, select ts box to detail the riew the entire table.	
		National level	L	.ocal level	Community level
	Prevention and mitigation	National plan is not available	Local availa	plan is not ble	Community plan is not available
	Preparedness	National plan is not available	Local availa	plan is not able	Community plan is not available
	Emergency response	National plan is not available	Local availa	plan is not able	Community plan is not available
	Rehabilitation and reconstruction	National plan is not available	Local availa	plan is not able	Community plan is not available
Q54	7b) Are your country's tsun plans based on hazards ar	ami disaster risk redu nd risk assessments?	ction	Yes	
	PART II: Hazard Assess	ment, Risk Assess	ment, Po	licies, Plans	, Guidelines
		Guideline	S		
Q55	8a) Does your country have phases, select standalone the comments box to detai	e national tsunami DR guidelines / multi haza I the specific name of	R guidelin ard guidelin the guideli	es? For each o nes / guidelines nes (if availabl	of the four lifecycle s not available. Use e).
	Prevention and mitigation		Multi boa	ard quidelines	including teunomi
	Prenaredness		Multi haz	ard guidelines	including tsunami
1	i ichaicailess				3

	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	
Q56	Q56 8b) Does your country have local tsunami DRR guidelines? For each of the four lifect phases, select standalone guidelines / multi-hazard guidelines / guidelines not availat 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			
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes		
Q58	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		
Q59	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		
Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes		
Q61	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)		
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local		
Q63	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		
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic	Yes		

	database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=207 96)?	
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=207 96), 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
Q66	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
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=208 33)?	Respondent skipped this question
Q68	9I) When compared to the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=208 33), 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
Q69	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
Q70	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	No
Q71	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
Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
Q73	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
Q74	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
Q75	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
Q76	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
Q77 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
	PART III: Detection, Warning and Diss	semination
	Dissemination	
Q78	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
Q79	10b) How is the warning situation terminated?	Respondent skipped this question
Q80 10c) What website is used for display of national threat status during events? Please provide the URL.		Respondent skipped this question

	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness				
	Standa	rd Ope	erating Procedur	es	
Q81 11a) For each of the (upstream) emergency response issues listed below (in rows), c the four questions (in columns). Select a yes/no response using the drop down menu					ows), consider n 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
Q82 11b) For each of the (downstream) emergency response issues listed below (in roconsider the four questions (in columns). Select a yes/no response using the drop menus.					in rows), drop down
	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
Q83	11c) Would your country be willin with the IOTIC and other countrie	ng to sha es?	are your SOPs	Yes	
Q84	11d) For each emergency responder for emergency response are avai	nse orga ilable? (nisation listed belo select all that apply	ow, which commur y)	ication methods
	National DMOs			Telephone, Fax, Email	
	Local DMOs			Telephone, Fax, Email	
	General Public Te		Telephone, Fax, Email		
	Coastal Communities			Siren	
	Media Te		Telephone, Fax, E	Email	
	PART IV: Standard Opera Tsunami E	ting Pr Exercis	ocedures, Evac es, Public Awar	uation Infrastru eness	cture,
	Eva	cuatior	n Infrastructure		
Q85	12a) Does your country have the and detail specific areas). Please	e followir e use the	ng evacuation infra e scroll bar below t	structure? (select a o view the entire ta	all that apply able.
	Evacuation shelter			Respondent skipp	ed this question
	Vertical evacuation structure				
	Natural or artificial hill for vertical	ficial hill for vertical evacuation			
	Evacuation signage				
	Other (please specify)				
Q86	12b) Is your evacuation infrastructure integrated in the evacuation plan?		Respondent skipp	ed this question	
	PART IV: Standard Opera Tsunami E	ting Pr Exercis	ocedures, Evac es, Public Awar	uation Infrastru eness	cture,
	-	F sunan	ni Exercises		
Q87	12a) Are tsunami exercises incompolicies and guidelines? (select a	rporated all that a	within national pply)	National policy	
Q88	12b) At what levels were the exe the inter-sessional (between ICG (select all that apply)	rcises c Meeting	onducted during gs) period?	City level	

Q89	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	
	PART IV: Standard Operating Procedures, Evacu Tsunami Exercises, Public Aware	ation Infra ness	astructure,
	Public Awareness		
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	National Dis Office	aster Management
Q91	13b) What tsunami related education and awareness anaterials do you have? (select all that apply)	Leaflets or f visual or ora	lyers, Video, or other Il media
Q92	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	
Q93	13d) Do you undertake the following tsunami awareness act	ivities?	
	World Tsunami Awareness Day	Not provide	b
	Global Disaster Risk Reduction Day	Yes	
	Public tsunami preparedness outreach	Not provided	
	School and/or children awareness	No	
	Exhibitions I	Not provided	
	Competitions or other ways of highlighting tsunami safety	Not provide	b
	Tsunami Exercise	Not provide	b
Q94	13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or	Provision of general tsunami awareness materials	
	enhance public awareness in your country. If you do not require support, please leave blank.	Development of tsunami awareness programmes, activities or campaigns,	
	Participation/sup international age to your country's		n/support by l agencies or experts ntry's activities
Q95	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 provide	b
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	No	
Q97	13h) For those communities that participated in the IOTR init ranking of their performance against the IOTR indicators, us (very good)	e communities that participated in the IOTR initiative, please provide a general ir performance against the IOTR indicators, using the scale 1 (very poor) to 5	
	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

	PART V: Narrative		
Q98	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		
Q99	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements		
→	Not provided		
Q100	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:	http://122.155.1.141/in.ndwc-9.283/		
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? 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.	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:	 Department of Mineral Resources 2. The Thai Meteorological Department 3. Department of Marine and Coastal Resources 4. Department of Fisheries Department of Disaster Prevention and Mitigation Chulalongkorn University 7. Burapha university 8. Kasetsart university 9. Prince of Songkla University UNISDR 11.ADPC 	
Q33	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	
Q34	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.	Thailand Tsunami hazard There are 509 tsunami hazard places in 6 provinces along Andaman sea 102 sub-districts and 27 Districts.	
		 Ao Luk Muang Krabi Nuea Khlong Khlong Thom Muang Krabi 2. Trang Province 5 Districts below	
		 Yan Takhao Si Kao Kantang Pa Lian Hat Samran 	
		 3. Phang Nga Province 7 Districts below Khura Buri Ta Kua Pa Ta Kua Thung Thai Muang Thap Put Muang Phang Nga Ko Yao 	
		 4.Phuket Province 3 Districts below Tha Lang Muang Phuket Krathu 	
		 5.Ranong Province 3 Districts below Kapoe Suk Samran Muang Ranong 	
		 6.Satun Province 4 Districts below Tha Phae Thung Wa Langu Muang Satun 	
		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.	

	An approximation of the percentage mapped is 100%				
Q35	4g) For each of the data type Select Yes / No / Don't know	es listed bel	s listed below (in rows), answer the two questions (in columns). from the drop down menu.		
		Was this haza	data used for tsunami ard 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	
Q36	 4h) What products do you hat the tsunami hazard assessment (select all that apply) Probabilistic Tsunami Hazard Assessment (PTHA) Field Studies on Tsunami Im Hazard map, Inundation map Guidelines (please specify between the select of the sel	ave from lent? d pacts o, elow)	Probabilistic Tsunami H Deterministic Tsunami I Studies on Tsunami Im Inundation map, Evacus (please specify below)	lazard Assessment (PTHA), Hazard Analysis, Field pacts, Hazard map, ation map, Guidelines	
Q37	4i) On a scale of 1 (Very poo (Very good), please rate you country's capability to undert tsunami hazard assessment	or) to 5 Fair ur take			
Q38	4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your improve capacity in the following areas of tsunami hazard assessment?		iority level in your country to sment?		
	Probabilistic Tsunami Hazaro Assessment (PTHA)	d	High priority		
Deterministic Tsunami Hazard Analysis		High priority			
	Field Studies on Tsunami Im	npacts	High priority		
	Hazard map		High priority		
	Inundation map		Essential		
	Evacuation map		Essential		
Q39	4k) On a scale of 1 (No capa give training and/or consultation	icity) to 5 (\ ncy on tsun	/ery good), what capacit ami hazard assessment	y does your country have to to other countries?	
	Probabilistic Tsunami Hazard Assessment (PTHA)		Moderate		
	Deterministic Tsunami Haza Analysis	rd	Moderate		
	Field Studies on Tsunami Im	npacts	Moderate		
	Hazard map		Moderate		
	Inundation map		Moderate		
	Evacuation map		Moderate		
	Please provide the name(s) contact detail(s) of any indivi	and 1.Geoinformatics Center iduals / Technology (AIT) 2. Sch Technology. AIT 3.Civil		er, Asian Institute of hool of Engineering & Engineering, Chulalongkorn	
institutions in your country that could provide this training / consultancy					

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

Risk Assessment						
Q40	5a) Has your country undertaken a tsunami risk assessment?	Yes				
Q41	5b) What type of risk assessment?	Single risk assessment on tsunami AND multi- hazard				
		risk assessment including tsunami				
Q42	5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)	Tsunami, Cyclone, Drought, Earthquakes, Epidemics, Flooding, Landslide				
Q43	5d) Who did the tsunami risk assessment in your country?	National Agency, International Agency, National/local University, National/International Consultant				
Q44	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				
Q45	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				
Q46	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	Respondent skipped this question				
Q47	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)				
Q48	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami risk assessment	Good				
Q49	5j) On a scale of 1 (Not a priority) to 5 (E improve capacity in the following areas	Essential), what is the priority level of your country to 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				
Q50	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 Tsunami risk assessment at city level		Moderate			
			Mod	lerate		
	Tsunami risk asses level	ssment at village	Moo	lerate		
	Tsunami risk asses community / neighl	ssment at bourhood level	Mod	lerate		
	Other (specify belo	ow)	Mod	lerate		
	Please gives the na individuals / institut that could provide consultancy	ames of any tions in your country this training /	Asia Dep Mini	an Disaster Preparedness partment of Disaster Preve istry of Interior Thailand	Center (ADPC) ention and Mitigation,	
Р	ART II: Hazard A	ssessment, Risk	Asse	essment, Policies, Pla	ins, Guidelines	
		Po	olici	es		
Q51	6a) Does your cou management phas available. Use the In what form is the	ntry have a national ts es listed below, selec comments box to deta policy?	suna et sta ail th	mi policy? For each of the ndalone policy / multi haz e specific name of the po	e four disaster ard policy / policy not licy (if available).	
	Prevention and mit	tigation	Star	dalone tsunami only		
	Prenaredness	ligation	Star	dalone tsunami only		
	Emergency respor		Star	dalone tsunami only		
	Rehabilitation and	reconstruction	Mult	ti bazard including tsunan	ni	
	What is the name of policy? (if available):		Tsunami Prevention and Mitigation Master Plan (2015-2019)			
Q52	 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. U the comments box to detail the specific name(s) of the policy (if available). In what form is the policy? 			saster management licy not available. Use ble).		
	Prevention and mit	tigation	Standalone tsunami only			
	Preparedness		Standalone tsunami only			
	Emergency respor	ise	Multi hazard including tsunami			
	Rehabilitation and	reconstruction	Mul	ti hazard including tsunan	ni	
Р	ART II: Hazard A	ssessment, Risk /	Asse	essment, Policies, Pla	ins, Guidelines	
		F	Plan	S		
Q53	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.				mi disaster risk sted below, select nents box to detail the to view the entire	
		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	Multi hazard including tsunami	
	Rehabilitation and reconstruction			Multi hazard including tsunami	Multi hazard including tsunami	
	What is the name available):	of the plan(s) (if 1. 2. 3. 4. th		 Tsunami Risk Mitigation Strategy for Thailand, Disaster Risk Reduction, Risk Reduction from Geo hazard : Tsunami Emergency action plan and Incident Plan are in the process 		
Q54	7b) Are your count disaster risk reduc hazards and risk a	ry's tsunami Yes tion plans based on ssessments?		′es		
Р	ART II: Hazard A	ssessment, Risk /	Ass	essment, Policies, Pla	ans, Guidelines	
		Gui	ideli	ines		
Q55	8a) Does your country have national tsur phases, select standalone guidelines / m the comments box to detail the specific n In what form are the guidelines?			nami DRR guidelines? For each of the four lifecycle nulti hazard guidelines / guidelines not available. Use name of the guidelines (if available).		
	Prevention and mitigation			ndalone tsunami guideline	es	
	Preparedness Emergency response		Star	ndalone tsunami guideline) S	
			Mul	ti hazard guidelines inclue	ding tsunami	
	Rehabilitation and	reconstruction	Mul	ti hazard guidelines inclue	ding tsunami	
	What is the name of guidelines? (if available):		 Tsunami Risk Mitigation Strategy for Thailand, Disaster Risk Reduction, 			
			3. Risk Reduction from Geo hazard: Tsunami			
			4. N (for	4. National disaster Risk Management Plan (2015) (for guideline)		
Q56	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. U the comments box to detail the specific name of the guidelines (if available).				of the four lifecycle lines not available. Use lable).	
	In what form are th		O (
	Prevention and mi	tigation	Star	ndalone tsunami guideline	<u> </u>	
	Preparedness		Star	ndaione tsunami guideline) S 	
	Emergency respon		Mul	ti hazara guidelines inclu	ling tsunami	
	Renabilitation 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

	-	
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes
Q58	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
Q59	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
Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes
Q61	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
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local
Q63	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
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocument Record&docID=207 96)?	Yes
Q65	9i) When compared to the IOTWMS seismic database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocument Record&docID=207 96), 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
Q66	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 http://www.ioc- sealevelmonitoring.org/ www.gts.tmd.go.th
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocument Record&docID=208 33)?	Yes
Q68	9I) When compared to the IOTWMS sea level database (http://www.ioc- tsunami.org/index.php? option=com_oe&task=viewDocument Record&docID=208 33), 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
Q69	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
Q70	9n) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?	No
Q71	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

Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
Q73 9q) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national		Advisory: An Earthquake occurred in Andaman Sea Magnitude 5.0-6.5 off the Andaman coast, Thailand. A Tsunami is not EXPECTED
	tsunami emergency, watch, alert, advisory or warning?	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 & follow further information.
		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 & follow further information.
		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.
Q74	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
Q75	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
Q76	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
Q77	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:	
	PART III: Detection, W	arning and Dissemination
	Disse	emination
Q78	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
Q79	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
Q80	10c) What website is used for display of national threat status during events? Please provide the URL.	http://122.155.1.141/in.ndwc-9.283/

	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness							
		Standa	ard Operating Proc	cedures				
Q81	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			
Q82	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	
Q83	11c) Would your count share your SOPs with other countries?	ry be will he IOTIC	ing to C and	Yes	Yes		
Q84	11d) For each emerger methods for emergenc	ncy respo y respon:	onse org se are av	anisation liste vailable? (sel	ed below, which comr ect all that apply)	nunication	
	National DMOs			Fax, Email, SMS, Siren, Other (please specify below), Telephone			
	Local DMOs	S		Telephone, Fax, Email, SMS, Siren, Other (please specify below)			
	General Public	0		Siren, Other	(please specify below	v)	
	Coastal Communities			Siren, Other (please specify below)			
	Media			Telephone, Fax, Email, SMS, Other (please specify below)			
	Other communication r (please specify)	nethods		Social Media, Website, Radio, Applications and Broadcast Alert System			
	PART IV: Standar Ts	d Opera unami I	ating Pr Exercis	ocedures, l es, Public /	Evacuation Infrast Awareness	ructure,	
		Eva	cuation	n Infrastruc	ture		
Q85	12a) Does your country and detail specific area	/ have th s). Pleas	e followi se use th	ng evacuation e scroll bar b	n infrastructure? (sele elow to view the entir	ect all that apply e 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 stru	ucture		Yes			
				1. Krabi Prov Province 4. Satun Provir	vince 2.Trang Provinc Phuket Province 5. Rance	e 3. Phang Nga anong Province 6.	

	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		
Q86	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes		
	PART IV: Standard Operating Pr Tsunami Exercis	ocedures, Evacuation Infrastructure, es, Public Awareness		
	Tsunan	ni Exercises		
Q87	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy, National guidelines		
Q88	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		
Q89	12c) What kind of tsunami exercise active many times during the inter-sessional (b	vities have been undertaken in your country and how 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		
	PART IV: Standard Operating Pr Tsunami Exercis	ocedures, Evacuation Infrastructure, es, Public Awareness		
	Public	Awareness		
Q90	13a) Who is responsible for tsunami public awareness programmes in your country?	Many organizations such as NDMO, LDMO, NTWC and international organizations		
Q91	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		
Q92	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		
Q93	13d) Do you undertake the following tsu	nami 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		
Q94	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 genera Customization of ge community, Develo programmes, activit Participation/suppor experts to your cour	I tsunami awareness materials, eneral materials to country or pment of tsunami awareness ties or campaigns, rt by international agencies or ntry's activities	
Q95	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	
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	No		
Q97	13h) For those communities that particip ranking of their performance against the (very good)	pated in the IOTR ini IOTR indicators, us	tiative, please provide a general ing the scale 1 (very poor) to 5	
	Have a community tsunami risk reduction	n plan	Respondent skipped this question	
	Have designated and mapped tsunami I	nazard zones		
	Have a public display of tsunami informa	ation		
	Produce easily understood tsunami eva determined appropriate by local authorit with communities	cuation maps as ies in collaboration		
	Develop and distribute outreach and pul materials	blic education		
	Hold at least three outreach or educatio annually	nal activities		
	Conduct an annual tsunami community	exercise		
	Address tsunami hazards in the commu Operations Plan (EOP)			
	Commit to support the Emergency Oper (EOC) during a tsunami incident, if an E activated			
	Have redundant and reliable means for point (and EOC if activated) to receive or threats / information			
	Have redundant and reliable means for point and/or EOC to receive official tsun public	a 24-hour warning ami alerts to the		

Q98	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.					
→	Thailand Tsunami Early Warning System					
	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.					
	Global Telecommunications System: GT provide the information from Indian Oce	S fully operational to TMD and NDWC. There is also an and Pacific Ocean.				
	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.					
	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.					
	Tsunami Public and Community Awarer	less and Preparedness				
	LDMO along Andaman Provinces have with some support from NDMO.	the tsunami exercised by themselves very regular				
	Tsunami evacuation maps, routes and s Provinces and will be upgrade for the sn	ignage have been installed along Andaman nart signage (This project is in process)				
	The education sectors have created tsur	nami awareness in the curriculum for schools.				
Q99	15) Please provide a brief summary of p system improvements	lans for future tsunami warning and mitigation				
→	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.					
	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.					
Q100	Upload Documents	Respondent skipped this question				



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? 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.	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		

Q33	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 Adiministrativo)			
Q34	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		
Q35	4g) For each of the data types listed below Select Yes / No / Don't know from the drop	(in rows), answe down menu.	er the two qu	uestions (in columns).	
		Was this data tsunami h assessm	a used for azard nent?	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.		
Q36	4h) What products do you have from the tsu assessment? (select all that apply) Probabilistic Tsunami Hazard Assessment Field Studies on Tsunami Impacts Hazard map, Inundation map,	What products do you have from the tsunami hazard essment? (select all that apply) babilistic Tsunami Hazard Assessment (PTHA) d Studies on Tsunami Impacts zard map, Inundation map,		Deterministic Tsunami Hazard Analysis	
Q37	4i) On a scale of 1 (Very poor) to 5 (Very go rate your country's capability to undertake t hazard assessment	Guidelines (please specify below) 4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami bazard assessment		Fair	
Q38	 4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your cour improve capacity in the following areas of tsunami hazard assessment? 			vel in your country to	
	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		
Q39	39 4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have give training and/or consultancy on tsunami hazard assessment to other countries?			your country have to er countries?	
	Probabilistic Tsunami Hazard Assessment	(PTHA)	Poor		
	Deterministic Tsunami Hazard Analysis				

	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.	
	PART II: Hazard Assessment, Risk Assessment, Po	olicies, Plans, Guidelines	
	Risk Assessment		
Q40	5a) Has your country undertaken a tsunami risk assessment?	Yes	
Q41	5b) What type of risk assessment?	Multi-hazard risk assessment including tsunami	
Q42	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	
Q43	5d) Who did the tsunami risk assessment in your country?	International Agency	
	Please specify the name(s) of the agency(ies):	UNDP	
Q44	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)	
Q45	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	
Q46	5g) How many Cities / Municipalities / Regencies are at risk from tsunami?	11 municipalities have a coast line, the others not	
Q47	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	
Q48	5i) On a scale of 1 (Very poor) to 5 (Very good), please rate undertake tsunami risk assessment	e your country's capability to	
	Capability to undertake tsunami risk assessment	Fair	
Q49	5j) On a scale of 1 (Not a priority) to 5 (Essential), what is the improve capacity in the following areas of tsunami risk asse	ne priority level of your country to essment?	
	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		
Q50	5k) On a scale of 1 (No capacity) to 5 (Very good) what cap give training and/or consultancy on tsunami risk assessme	bacity does your country have to nt 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		
	PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines			
	Policies			
Q51	6a) Does your country have a national tsunami policy? For management phases listed below, select standalone policy available. Use the comments box to detail the specific nam In what form is the policy?	each of the four disaster / multi hazard policy / policy not e of the policy (if available).		
	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		
Q52	6b) Does your country have local tsunami policies? For eac phases listed below, select standalone policy / multi hazard the comments box to detail the specific name(s) of the polic In what form is the policy?	ch of the disaster management I policy / policy not available. Use cy (if available).		
	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.		

	PART II: Hazard Assessment, Risk Assessment, Policies, Plans, Guidelines				
		Plans			
Q53	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.		
Q54	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			
Q55	8a) Does your country ha phases, select standalone the comments box to deta	ve national tsunami DRR of e guidelines / multi hazard ail the specific name of the	guidelines? For each of guidelines / guidelines guidelines (if available)	the four lifecycle not available. Use).	
	In what form are the guid	elines?			
	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		
Q56	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).			four lifecycle not available. Use).	
	Prevention and mitigation	1	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

	PART III: Detection, Warning and Dissemination			
	Detection and Warning			
Q57	9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?	Yes		
Q58	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		
Q59	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		
Q60	9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?	Yes		
Q61	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)		
Q62	9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	National, Local		
Q63	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		
Q64	9h) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=207 96)?	Yes		
Q65	 9i) When compared to the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=207 96), 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		
Q6 6	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
Q67	Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=208 33)?	Yes
Q68	 9I) When compared to the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php? option=com_oe&task=viewDocumentRecord&docID=208 33), 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
Q6 9	9m) What other observing networks are operated by your country and used for tsunami early warning?	Respondent skipped this question
Q70	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
Q71	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
Q72	9p) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami watches, advisories, alerts and/or warnings?	Yes
Q73	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
Q74	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
Q75	9s) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	No
Q76	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
Q77	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					
Q78	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				
Q79	10b) How is the warning situation terminated?	Email, sms, phone call, public alert system.				
Q80	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						
Q81	11a) For each of the (upstreat the four questions (in column	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		
Q82	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	
Q83	11c) Would your country be w with the IOTIC and other court	villing to htries?	share your SOPs	Yes		
Q84	11d) For each emergency rest for emergency rest	ponse o available	rganisation listed bel ? (select all that app	ow, which commur ly)	ication methods	
	National DMOs			Telephone, Emai	l, SMS, Siren	
	Local DMOs			Telephone, Emai	I, SMS	
	General Public			Telephone, Emai	I, SMS	
	Coastal Communities			Telephone, Emai	I, SMS	
	Media			Telephone, Emai	I, SMS	
	PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
	Evacuation Infrastructure					
Q85	12a) Does your country have and detail specific areas). Ple	the follo ase use	wing evacuation infra the scroll bar below	ng evacuation infrastructure? (select all that apply e scroll bar below to view the entire table.		
	Evacuation shelter		Yes Two dedicate and Covalima	dedicated shelters completed in Viqueque Covalima Municipalities, along the Dili - ro road corridor a range of dual purposed ties are available in Dili there is potential to e government and Church facilities outside		
			Ainaro road c facilities are a utilise govern the risk area	orridor a range of c wailable in Dili ther ment and Church fa	lual purposed e is potential to acilities outside	
	Vertical evacuation structure		Ainaro road c facilities are a utilise govern the risk area Yes There is poter Plaza shoppir center, howey place yet	orridor a range of d available in Dili there ment and Church fa ntial to utilise the m ng center as a vertion ver there is no form	Aual purposed e is potential to acilities outside nulti-story Timor cal evacuation al agreement in	
	Vertical evacuation structure Natural or artificial hill for vert evacuation	ical	Ainaro road c facilities are a utilise govern the risk area Yes There is poter Plaza shoppin center, howev place yet Yes Timor-Leste, which could b all vulnerable	orridor a range of o available in Dili there ment and Church fa ntial to utilise the m ng center as a verti- ver there is no form Dili, has a number the formalised as eva municipalities.	Audition point in a second point of the poin	
	Vertical evacuation structure Natural or artificial hill for vert evacuation Evacuation signage	ical	Ainaro road c facilities are a utilise govern the risk area Yes There is pote Plaza shoppin center, howev place yet Yes Timor-Leste, which could b all vulnerable Yes Limited signa Covalima how needs to be a	orridor a range of d available in Dili ther ment and Church fa ntial to utilise the m ng center as a verti- ver there is no form Dili, has a number the formalised as eva municipalities. ge is in place Vique vever this is an area ddressed	Aual purposed e is potential to acilities outside nulti-story Timor cal evacuation al agreement in of natural hills acuation point in eque and a that urgently	

Q86	12b) Is your evacuation infrastructure integrated in the evacuation plan?	Yes			
PART IV: Standard Operating Procedures, Evacuation Infrastructure, Tsunami Exercises, Public Awareness					
	Tsunami	Exercises			
Q87	12a) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)	National policy	/		
Q88	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 coordin funded Schoo awareness pro municipalities	nated and Japanese Government I Tsunami Exercise and the ogram conducted in 6 school in 3 during 2018		
Q89	12c) What kind of tsunami exercise activitie many times during the inter-sessional (betw	s have been un een ICG Meetir	dertaken in your country and how ngs) 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		
	PART IV: Standard Operating Proc Tsunami Exercises	edures, Evac , Public Awar	uation Infrastructure, eness		
	Public Av	wareness			
Q90	13a) Who is responsible for tsunami public a programmes in your country?	awareness	National Disaster Management Office		
Q91	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		
Q92	13c) Would your country be willing to share education and awareness materials with the Ocean Tsunami Information Centre (IOTIC) countries?	these Indian and other	Yes		
Q93	13d) Do you undertake the following tsunan	ni awareness ad	ctivities?		
	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		
Q94	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 awareness Customiza materials to community Developme awareness activities o Participation	of general tsunami materials, tion of general o country or ', ent of tsunami programmes, r campaigns, on/support by	
		to your cou	al agencies or experts intry's activities	
Q95	13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?	No	,	
Q96	13g) Are any communities in your country piloting the Indian Ocean Tsunami Ready (IOTR) intiative?	No		
Q97	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	
	Have designated and mapped tsunami hazard zones		this question	
	Have a public display of tsunami information			
	Produce easily understood tsunami evacuation maps as de appropriate by local authorities in collaboration with commu	termined Inities		
	Develop and distribute outreach and public education mate			
	Hold at least three outreach or educational activities annua	lly		
	Conduct an annual tsunami community exercise			
	Address tsunami hazards in the community's Emergency O Plan (EOP)	perations		
	Commit to support the Emergency Operations Centre (EOC tsunami incident, if an EOC is open and activated	C) during a		
	Have redundant and reliable means for a 24-hour warning EOC if activated) to receive official tsunami threats / inform			
	Have redundant and reliable means for a 24-hour warning and/or EOC to receive official tsunami alerts to the public	ooint		

	PART V: Narrative
Q98	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.		
→	Some material in Bahasa Indonesia been translate	ed to Tetun language.	
Q99	15) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements		
•	 Integration of the Viqueque and Covalima evacuation center in to Tsunami awareness and evacuation planning. 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. Integration of Tsunami hazard mapping and evacuation planning and community awareness 		
	in to municipal disaster management plan and policy		
Q100	Upload Documents	Respondent skipped this question	

IOC Technical Series

No.	Title	Languages
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 Interealibration 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

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 Bathymerographs 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 1'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 th 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 th 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 th 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 th 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 th 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 th 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 	EF
70	Interdisciplinary geoscience studies of the Gulf of Cadiz and Western Mediterranean Basin (14 th 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 nd 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 th 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 (electronic only)	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 th 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.	Cancelled	
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	Electronic publication

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	Under preparation
92. 93.	27 February 2010 Chile Earthquake and Tsunami Event – Post-Event Assessment of PTWS Performance (Pacific Tsunami Warning System). 2010 Exercise CARIBE WAVE 11 / LANTEX 11—A Caribbean Tsunami Warning	E only
	Vol. 1 Participant Handbook / Exercise 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 Vol. 3 Supplement: Media Reports. 2011	E only 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 Vol. 1 Exercise Manual. 2011 Supplement: Bulletins from the Regional Tsunami Service Providers Vol. 2 Exercise Report. 2013	E only
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. Vol. 1 Exercise Manual. 2012 Vol. 2 Evaluation Report. 2014	E only
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. Vol. 1: Exercise Manual. 2012 Vol. 2: Evaluation Report. 2013	E only
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 rd 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	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	In preparation
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 — Cancelled	(see IOC/INF-1340)

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	E only
128.	Exercise Indian Ocean Wave 2016: An Indian Ocean-wide Tsunami Warning and Communications Exercise, 7–8 September 2016 Vol 1: Participant Manual Vol. 2: Exercise Report	E only
129	What are Marine Ecological Time Series telling us about the Ocean – A status report	E only
130	Tsunami Watch Operations – Global Service Definition Document	E only
131	Exercise Pacific Wave 2017. A Pacific-wide Tsunami Warning and Enhanced Products Exercise, 15-17 February 2017. Volume 1: Exercise Manual Volume 2: Exercise Report	E only
132.	2nd March 2016 Southwest of Sumatra Earthquake and Tsunami Event Post- Event Assessment of the Performance of the Indian Ocean Tsunami Warning and Mitigation System; <u>Supplement</u> : Tsunami Service Provider Bulletins and Maps	E only
133.	Exercise CARIBE WAVE 17. A Caribbean and Adjacent Regions Tsunami Warning Exercise, 21 March 2017 (Costa Rica, Cuba and Northeastern Antilles Scenarios). Volume 1: Participant Handbook Volume 2: Final Report	E only
134.	Tsunami Exercise NEAMWave17 – A Tsunami Warning and Communication Exercise for the North-eastern Atlantic, the Mediterranean, and Connected Seas Region, 31 October – 3 November 2017 Volume 1: Exercise Instructions. 2017 Volume 2: Evaluation Report. 2018 Supplement: Evaluation by Message Providers and Civil Protection Authorities	E only
135.	User's Guide for the Pacific Tsunami Warning Center Enhanced Products for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (CARIBE-EWS), October 2017	E only
136.	Exercise CARIBE WAVE 18. Tsunami Warning Exercise, 15 March 2018 (Barbados, Colombia and Puerto Rico Scenarios). Volume 1: Participant Handbook. 2017 Volume 2: Final Report	E only
137.	The Ocean is losing its breath: declining oxygen in the world's ocean and coastal waters	(under preparation)
138.	Exercise Indian Ocean Wave 2018: An Indian Ocean-wide Tsunami Warning and Communication Exercise, 4–5 September 2018 Volume 1: Exercise Manual & Supplements Volume 2: Exercise Report. 2019	E only
139.	Exercise Pacific Wave 2018. A Pacific-wide Tsunami Warning and Enhanced Products Exercise, September to November 2018. Volume 1: Exercise Manual. Volume 2: Summary Report	E only
140	Analysis of transboundary Water Ecosystems and Green and Blue Infrastructures: Intercontinental Biosphere Reserve of the Mediterranean: Andalusia (Spain) – Morocco	EFS
141	Exercise Caribe Wave 2019. A Caribbean and Adjacent Region Tsunami Warning Exercise, 14 March 2019. Volume 1: Participant handbook. Volume 2: Summary Report	E only

142	Users' Guide for the Northwest Pacific Tsunami Advisory Center (NWPTAC) – Enhanced Products for the Pacific Tsunami Warning System. 2019	E only
143	Capacity Assessment of Tsunami Preparedness in the Indian Ocean, Status Report, 2018 + Supplement: National Reports	E only
144	Indian Ocean Tsunami Warning and Mitigation System (IOTWMS): Medium Term Strategy, 2019–2024	E only
145	IOTWMS Users Guide for National Tsunami Warning Centres	(under preparation)
146	Definition of Services provided by the Tsunami Service Providers of the IOTWMS	E only
147	The Global Ocean Observing System 2030 Strategy (IOC Brochure 2019-5)	(See GOOS Report 239)
148	Ejercicio TSUNAMI-CA 19. Un simulacro de tsunami para Centroamérica, 19 de agosto de 2019. Volumen 1, Manual para participantes.	S only
149	User's Guide for the South China Sea Tsunami Advisory Center (SCSTAC) products for the South China Sea Tsunami Warning and Mitigation System	E only
150	Limitations and Challenges of Early Warning Systems: A Case Study from the 28 September 2018 Palu-Donggala Tsunami	E, Bahasa
151	Exercise CARIBE WAVE 20. Tsunami Warning Exercise, 19 March 2020 (Jamaica and Portugal). Volume 1: Participant Handbook	E only
152	Technical Report on the status of coastal vulnerability in central African countries (ICAM Dossier N° 9)	E, F
153	Exercise Indian Ocean Wave 2020: An Indian Ocean-wide Tsunami Warning and Communication Exercise, 6–20 October 2020. Volume 1: Exercise Manual Supplement 1: TSP Bulletins for Scenario 1 South of Java Supplement 2: TSP Bulletins for Scenario 2 Andaman Islands Supplement 3: TSP Bulletins for Scenario 3 Off Coast of Pakistan Volume 2: Exercise Report	E only