



ICG/IOTWMS-XIII/1s
Bali, Indonesia
28 Nov – 1 Dec 2022
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INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

**THIRTEENTH SESSION OF THE INTERGOVERNMENTAL COORDINATION GROUP
FOR THE INDIAN OCEAN TSUNAMI WARNING AND MITIGATION SYSTEM**

Bali, Indonesia
28 November – 1 December 2022

EXECUTIVE SUMMARY

The Thirteenth Session of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWMS-XIII) was held in Bali, Republic of Indonesia, under the Chairpersonship of Professor Dwikorita Karnawati. The session was attended by 54 delegates from 17 Member States in the Indian Ocean region, 4 staff from United Nations agencies (including 3 from UNESCO and 1 from UNESCAP), and an additional 10 observers from 5 Member States (Australia, Germany, Indonesia, Iran and Oman). The adopted meeting agenda is attached as Annex A.

The ICG reviewed the progress made during the intersessional period and considered the reports and recommendations from its Chair, Working Groups and Task Teams, the IOC-UNESCO Secretariat for the ICG/IOTWMS, and the IOC-UNESCO Indian Ocean Tsunami Information Centre (IOTIC). The ICG considered the IOTWMS Medium-term Strategy (2019–2024), IOWave20 Exercise Report, 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean (2020), Tsunami Service Provider Service Definition Document (2019), National Tsunami Warning Centre User Guide, and Tsunami Service Provider (TSP) Status Reports from Australia, India and Indonesia. The ICG also received, considered and noted reports of the 13th, 14th and 15th meetings of the IOC-UNESCO Working Group on Tsunami and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG). Central to many of the discussions was the response to the Covid-19 pandemic, the ICG considered two further and important documents: 1) Guidelines for Tsunami Warning Services, Evacuation and Sheltering and 2) Impacts on IOTWMS Monitoring Networks and Tsunami Service Providers. The documentation for the session is available at <http://www.ioc-unesco.org/iotwms13>.

The ICG noted the speech on 23 March 2022 of UN Secretary-General, António Guterres, where he announced the United Nations would spearhead new action to ensure every person on Earth is protected by early warning systems within five years (2017);

The ICG further noted the UN Ocean Decade Tsunami Programme extensive goal to achieve the outcome of 100% of at-risk communities resilient and prepared for tsunamis;

The ICG further noted the efforts of the IOC-UNESCO TOWS-WG to develop a better understanding of the threat from tsunamis generated by non-seismic and complex sources and develop guidance on best practices to monitor and warn for such events;

The ICG further noted the importance of seismic data for timely and accurate determination of tsunami threats by Tsunami Service Providers, and the progress made in bilateral exchange of seismic data among some Member States; and **urged** Member States, especially in the North-West Indian Ocean region, to provide all relevant seismic data in real-time to TSPs and other Member States.

The ICG encouraged Member States to continue reviewing their tsunami warning chains with a view to minimizing the number of steps, and clear authorization of responsibilities amongst stakeholders, especially for near-field tsunami threats.

The ICG encouraged Member States to enhance community preparedness for near-field tsunamis, including for tsunamis generated by non-seismic and complex sources, with emphasis also on self-evacuation based on natural signs.

The ICG encouraged Member States to emphasise to Disaster Management Organisations (DMOs) and Broadcasting Media the role they also play with national Tsunami Warning Centres (NTWCs) in strengthening the national warning chain to ensure optimal community response, and to stress the importance that all agencies participate in regional tsunami governance and technical forums.

The ICG noted the successful conduct of IOWave 20 by Member States, the IOC-UNESCO Tsunami Ready recognition of two villages in India and one village in Indonesia, and the Indian Ocean Tsunami Ready Workshop in Bali, Indonesia 22–26 November 2022, and **encouraged** all Member States to consider implementing the Tsunami Ready Recognition Programme (TRRP) for vulnerable communities leading to IOC-UNESCO recognition.

The ICG noted the successful outcomes of Phase 1, Phases 2a and 2b of the UNESCAP funded project “Strengthening tsunami early warning in the North-West Indian Ocean through regional cooperation”, and **further noted** efforts to develop a Phase 2c of the project involving training in inundation and evacuation mapping in support of implementation of the IOC-UNESCO TRRP in the region.

The ICG endorsed the new Terms of Reference of the Indian Ocean Tsunami Information Centre (IOTIC), including addition of the World Tsunami Awareness Day (WTAD) task.

The ICG decided to conduct an IOWave exercise in September-October 2023

The ICG decided to continue:

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 Team on Scientific Tsunami Hazard Assessment of the Makran Subduction Zone.

Steering Group

The ICG decided to establish new:

Working Group 3 on Tsunami Ready Implementation

Task Team on IOWAVE23

The ICG decided to establish Tsunami Ready Focal Points (TRFPs) nominated by each Member State to enhance communication, coordination, and implementation of the TRRP or similar initiatives across the Indian Ocean.

The ICG decided to conduct two training workshops on Standard Operating Procedures (SOPs) in the intersessional period, with one to be conducted in the western Indian Ocean region and another in the eastern Indian Ocean, in the first half of 2023 and before IOWAVE23, subject to the availability of funding.

The ICG decided to continue to hold inter-sessional activities as integrated meetings to optimise resources, if available.

The ICG decided to again undertake a full Capacity Assessment of Tsunami Preparedness in the Indian Ocean in 2024 to evaluate progress of the IOTWMS since the Indian Ocean Tsunami of 2004, and also undertake a shorter assessment before each session of the ICG for review by Member States through an online questionnaire to continuously monitor progress after each intersessional period to help guide the work plans of the ICG/IOTWMS.

The ICG decided to extend the Tsunami Service Provider (TSP) services of the IOTWMS to include tsunamis generated by non-seismic and complex sources.

The ICG elected its officers for the next intersessional term commencing at the end of the session, whereby Prof. Dr Dwikorita Karnawati (Indonesia) was elected to continue as Chair, and Dr Yuelong Miao (Australia) and Mr Pattabhi Rama Rao Eluri (India) were elected as Vice-chairs.

The ICG acknowledged with appreciation the contribution and continued support of the Government of Australia for the IOC-UNESCO ICG/IOTWMS Secretariat and the support of the Government of Indonesia for the Indian Ocean Tsunami Information Centre (IOTIC).

The ICG decided to hold its 14th session in late 2024 to coincide with the 20th Commemoration of the Indian Ocean Tsunami of 2004 and **accepted with appreciation** the offer from the Government of the Republic of Indonesia to host it.

The ICG accepted with appreciation the offer from the Sultanate of Oman to host its 15th session in 2026.

The ICG expressed its gratitude to the Republic of Indonesia for the excellent host arrangements for its 13th session.

The ICG adopted Decisions ICG/IOTWMS-XIII.1 as attached in Annex B.

ANNEX A

Adopted Agenda

OPENING CEREMONY

- 1.1 WELCOME SPEECHES
- 1.2 ADOPTION OF AGENDA
- 1.3 DESIGNATION OF RAPPORTEUR
- 1.4 CONDUCT OF THE SESSION
- 1.5 ESTABLISHMENT OF SESSIONAL COMMITTEES

2. REPORTS ON INTERSESSIONAL ACTIVITIES

- 2.1 ICG CHAIRPERSON'S REPORT
- 2.2 IOC SECRETARIAT REPORT
- 2.3 TOWS-WG REPORT
- 2.4 UPDATE ON UN OCEAN DECADE
- 2.5 UN AND NON-UN ORGANISATIONS
- 2.6 REPORT OF THE INDIAN OCEAN TSUNAMI INFORMATION CENTRE (IOTIC)
- 2.7 UNESCAP NWIO PROJECT STATUS REPORT
- 2.8 IOTWMS OVERALL STATUS REPORT
- 2.9 REVIEW OF ICG/IOTWMS DECISIONS, RECOMMENDATIONS AND ACTIONS

3. REPORTS ON EARTHQUAKE AND TSUNAMI EVENTS DURING INTER-SESSIONAL PERIOD

4. IOTWMS TSUNAMI SERVICE PROVIDER & MONITORING NETWORKS REPORTS

- 4.1 STATUS REPORT ON EARTHQUAKE & SEA LEVEL MONITORING NETWORKS
- 4.2 TSP AUSTRALIA
- 4.3 TSP INDIA
- 4.4 TSP INDONESIA
- 4.5 UPDATE TO TSP SERVICES

5. SPECIAL SESSION ON “OUTCOMES FROM TSUNAMI READY INDIAN OCEAN COUNTRIES SYMPOSIUM”

- 5.1 SYMPOSIUM OUTCOMES
- 5.2 TSUNAMI READY RECOGNITION PROGRAMME OUTLINE
- 5.3 EXAMPLES OF TSUNAMI READY COMMUNITIES
- 5.4 TSUNAMI READY TOOLS
 - ONLINE TRAINING COURSE
 - ANIMATIONS

- TSUNAMI READY BOARDGAME

5.5 CERTIFICATION PROCESS

6. TASK TEAM REPORTS

6.1 INDIAN OCEAN WAVE

6.2 TSUNAMI PREPAREDNESS FOR A NEAR TSUNAMI HAZARD

6.3 SCIENTIFIC HAZARD ASSESSMENT OF THE MAKRAN SUBDUCTION ZONE

7. WORKING GROUP REPORTS

7.1 SUB-REGIONAL WORKING GROUP FOR THE NORTH-WEST INDIAN OCEAN

7.2 WORKING GROUP 1: TSUNAMI RISK, COMMUNITY AWARENESS & PREPAREDNESS

7.3 WORKING GROUP 2: TSUNAMI DETECTION, WARNING & DISSEMINATION

8. UN OCEAN DECADE TSUNAMI PROGRAMME

8.1 SAFE OCEAN LABORATORY SATELLITE ACTIVITIES

8.2 DRAFT SCIENCE & IMPLEMENTATION PLANS

8.3 IOTWMS STRATEGIC & IMPLEMENTATION PLANNING, INCLUDING ACHIEVING GOALS OF THE UN DECADE OF OCEAN SCIENCE FOR SUSTAINABLE DEVELOPMENT 2021–2030

9. POLICY MATTERS

9.1 TSUNAMI READY IMPLEMENTATION

9.2 CAPACITY DEVELOPMENT

9.3 EXPANSION OF IOTWMS SERVICES TO INCLUDE WARNING SERVICES FOR TSUNAMIS GENERATED BY NON-SEISMIC AND COMPLEX SOURCES

9.4 THINK TANK ON ISSUES RAISED IN THE MEETING AND NEW IDEAS

9.5 GOVERNANCE AND STRUCTURE OF THE ICG/IOTWMS

10. WORLD TSUNAMI AWARENESS DAY

10.1 WTAD 2021 & 2022 OUTCOMES

10.2 WTAD 2023

11. SESSIONAL REPORTING

11.1 SESSIONAL COMMITTEES MEET TO DISCUSS AND FINALISE REPORTS

11.2 SECRETARIAT DRAFT DECISIONS AND RECOMMENDATIONS

12. PROGRAMME AND BUDGET

13. ELECTION OF OFFICERS

14. OTHER BUSINESS

15. NEXT SESSION

15.1 CONFIRMATION OF DATE AND VENUE FOR ICG/IOTWMS-XIV

15.2 TARGET DATE AND VENUE ICG/IOTWMS-XV

16. ADOPTION OF DECISIONS AND RECOMMENDATIONS

17. CLOSE OF MEETING

ANNEX B

Decision ICG/IOTWMS-XIII.1

The Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWMS),

Having met for its 13th Session from 28 November – 1 December in Bali, Republic of Indonesia;

Recalling Resolution XXIII-12 that established the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWMS);

Acknowledging with appreciation the contribution and continued support of the Government of Australia for the IOC-UNESCO ICG/IOTWMS Secretariat Office since 2005 and the support of the Government of Republic of Indonesia for the IOC-UNESCO Indian Ocean Tsunami Information Centre (IOTIC) for the 5-year period starting 2017 – 2022 and agreement under negotiation to extend a further 5-years until 2027;

Acknowledging with appreciation the support from UNESCAP Trust Fund for Tsunami, Disaster and Climate Preparedness for the IOC-UNESCO project on “Strengthening tsunami early warning in the North-West Indian Ocean through regional cooperation”;

Having reviewed the progress made in the implementation of the IOTWMS since the 12th Session of the ICG/IOTWMS (9 – 12 March 2019, Kish Island, Islamic Republic of Iran);

Having considered the reports of:

1. ICG/IOTWMS Chair
2. IOC Secretariat
3. IOTIC
4. 14th and 15th Meetings of the ICG/IOTWMS Steering Group
5. 13th and 14th Meetings of the TOWS-WG
6. TSP Australia
7. TSP India
8. TSP Indonesia
9. IOWave20 Exercise
10. 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean (published 2020)
11. Task Team on Scientific Tsunami Hazard Assessment of the Makran Subduction Zone
12. Task Team on Tsunami Preparedness for a Near-Field Tsunami Hazard
13. Working Group 1 on Tsunami Risk, Community Awareness, and Preparedness
14. Working Group 2 on Tsunami Detection, Warning and Dissemination
15. Sub-regional Working Group for the North-West Indian Ocean
16. Working Group 2 TSP Service Definition Document update (V5 draft)
17. Working Group 2 NTWC User Guide
18. IOTWMS Medium Term Strategy (2019-2024)
19. Tsunami Ready Recognition Programme (TRRP)(published 2022)

Noting with appreciation the Member State reports provided by Australia, India, Indonesia, Madagascar, Oman, Pakistan, and the Seychelles;

Noting with appreciation the outcomes of the Working Group on Tsunamis and Other Hazards related to Sea-Level Warning and Mitigation Systems (TOWS-WG) in guiding the activities of the ICG and its Working Groups and Task Teams;

Recognizing the progress towards establishing National Tsunami Warning Centres (NTWCs) in all countries around the Indian Ocean since the Indian Ocean Tsunami of 26 December 2004;

Reaffirming that the IOTWMS is a coordinated network of national systems and capacities, and is part of a global network of early-warning systems for all ocean-related hazards;

Reaffirming further that each Member State has the responsibility to issue warnings within its respective territories;

Recalling the *Mauritius Declaration* adopted at the intergovernmental coordination meeting held at Grand Baie, 14–16 April 2005 to openly share and exchange tsunami-relevant real-time observational data in accordance with the IOC-UNESCO Oceanographic Data Exchange Policy;

Considering the outcomes of the 3rd UN World Conference on Disaster Risk Reduction (13–18 March 2015, Sendai, Japan), the Sendai Framework for Disaster Risk Reduction 2015–2030 (A/CONF.224/CRP.1);

Considering the WMO International Network for Multi Hazard Early Warning Systems (IN-MHEWS) initiative;

Taking into account the Summary Statement of the International Conference to commemorate the 10th anniversary of the Indian Ocean Tsunami: ‘The Indian Ocean Tsunami Warning and Mitigation System 10 years after the Indian Ocean Tsunami: Achievements, Challenges, Remaining Gaps and Policy Perspectives’ (24-25 November 2014, Jakarta, Indonesia; *IOC/BRO/2015/2*);

Noting the Summary Statement of the symposium ‘Advances in Tsunami Warning to Enhance Community Responses’ (12–14 February 2018, Paris, France) that identified the current status of operational tsunami warnings and community resilience and future avenues for improvement (*IOC/BRO/2015/2*);

Noting the decision by the UN General Assembly, as part of the Omnibus Resolution for Oceans and the law of the sea (A/RES/72/73), to “proclaim the United Nations Decade of Ocean Science for Sustainable Development for the 10-year period beginning on 1 January 2021;

Noting on 23 March 2022, UN Secretary-General, António Guterres, announced the United Nations would spearhead new action to ensure every person on Earth is protected by early warning systems within five years (2017);

Noting the follow-up action of Global Platform for Disaster Risk Reduction (GPDRR) in Bali, May 2022, with regards seven of the recommendations from Bali Agenda for Resilience (BAR), and **recognising** the importance of achieving the *sustainable resilience*, learning from Indonesia:

1. Sustainable resilience is locally led, built on local context and strongly supported by the State
2. Sustainable resilience can only be achieved when collaborations with passions take place among the “Pentahelix” Stakeholders (Government, community, business enterprise, academia and media)

3. Sustainable resilience will thrive upon the availability of adequate, predictable, and decentralized financing
4. Sustainable resilience will only be meaningful when everyone is involved, everyone has a role, and no one left behind
5. Sustainable resilience will progress exponentially when innovations and technology are backed by global resources a developed with local context,

Recalling IOC Resolution XXVI-6 on Data Buoy Vandalism: Impact and Responses, IOC Resolution XXVI-7 on Global Coordination of Early Warning and Mitigation Systems for Tsunamis and Other Sea-Level Related Hazards;

Acknowledging the contributions of seismic data through the CTBTO;

Reaffirming that participation in ICG activities should be self-funded by the Member States;

Encouraging Member States to promptly inform the Secretariat of all changes to the TNC/TWFP/NTWC contacts through official channels;

Noting the continued diminishing engagement by some Member States in the activities of the ICG/IOTWMS and **urging** all Member States to participate more actively;

Encouraging Member States to make voluntary contributions to the IOC Special Account set up for the ICG/IOTWMS to support activities identified in the Budget and Programme to underpin successful implementation of the IOTWMS and capacity development for Member States;

Noting with appreciation the efforts of Tsunami Service Provider (TSP)-India, TSP-Indonesia and TSP-Australia, including the issuing of public bulletins over the IOC Public Email List server and the GTS;

Noting the importance of the national status of tsunami warnings to be available on the TSP public websites and **urging** Member State National Tsunami Warning Centres to ensure national tsunami warning status is reported back to the TSPs in a timely manner via the agreed web reporting protocols during tsunami events, tests and exercises;

Noting that the IOC Executive Council #55, 13-17 June 2022, **instructs** all ICGs as part of their work plans to:

1. Encourage sea-level network operators to undertake regular and routine calibration of their sea-level monitoring instrumentation, following recommendations of IOC Manuals & Guides No #3 and No. 14 (Volumes I-V),
2. Routinely monitor the status of seismic and sea level related observing networks to identify and better help rectify gaps in coverage and free and open data exchange,
3. TSPs and National Tsunami Warning Centres (NTWCs) to identify all coastal areas or near-shore faults that could generate large earthquakes and submarine landslides and be prepared to issue warnings as appropriate,

Noting the importance of clarifying the earthquake and tsunami potential of the Makran Subduction Zone;

Encouraging Member States to continue to acquire new datasets such as the Global Navigation Satellite System (GNSS), seismic, paleo-tsunami and other geological data to enhance tsunami hazard assessment and the timeliness and accuracy of tsunami warnings in the North-West Indian Ocean;

Noting the importance of seismic data for timely and accurate determination of tsunami threats by TSPs, and the progress made in bilateral exchange of seismic data among some Member States;

Urging Member States, especially in the North-West Indian Ocean region, to provide all relevant seismic data in real-time to TSPs and other Member States;

Encouraging Member States to collect high-resolution coastal bathymetry and topography data to improve characterisation of tsunami and other coastal hazards and risks and promote sharing of this data to the extent possible;

Noting with concern the continued instances of tsunami buoy vandalism in the IOTWMS region, and **encouraging** Member States to promptly inform the IOC-UNESCO Secretariat such occurrences of tsunami buoy vandalism to facilitate incorporation in the Global Vandalism Report of the Data Buoy Cooperation Panel (DBCP);

Encouraging Member States to consider contributing any education or outreach materials related to data buoy vandalism to the DBCP for inclusion in a tool kit of regionally relevant materials to counter vandalism;

Noting the successful outcomes of Phase 1, Phases 2a and 2b of the UNESCAP funded project “Strengthening tsunami early warning in the North-West Indian Ocean through regional cooperation”, in particular:

1. A better understanding of the science of the Makran Source Zone
2. Development of a Probabilistic Tsunami Hazard Assessment (PTHA) to guide risk assessment and community awareness and support inundation modelling,
3. Strengthening of national tsunami warning chains and underpinning Standard Operating Procedures (SOPs),
4. Completion of a capacity gap analysis for Member States in inundation modelling and evacuation planning,

Further noting efforts to develop a Phase 2c of the NWIO UNESCAP project involving training in inundation and evacuation mapping in support of implementation of the IOC-UNESCO TRRP in the region;

Noting the role of IOTIC to facilitate, guide, and support Member States in the implementation of the IOC-UNESCO TRRP in coordination with the IOC-UNESCO Secretariat for the ICG/IOTWMS;

Recognizing the outcomes of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean (published 2020);

Noting with appreciation the work of the former work of the Task Team on Capacity Assessment of Tsunami Preparedness and the comprehensive nature and value of the assessment;

Noting the value of basin-wide tsunami exercises and drills and the successful conduct by Member States of Exercise IOWave20, despite the Covid pandemic;

Recognizing the valuable recommendations from the IOTWMS-IOTIC Post-IOWave20 Webinar, 11 - 12 November 2020, on Lessons Learnt during Exercise Indian Ocean Wave 2020;

Encouraging Member States to conduct further exercises and drills at the national level involving communities at least once per year;

Noting the piloting of the TRRP by India and Indonesia;

Encouraging all Member States to implement the TRRP in vulnerable communities with IOC-UNESCO recognition to meet the UN Ocean Decade Tsunami Programme goal of 100% at-risk communities resilient and prepared for tsunamis.

Recognizing the Palu and Sunda Strait tsunami events as being very complex from an early warning perspective and the current technical limitations of producing timely and accurate forecasts for tsunamis from near-field non-seismic and complex sources (e.g. aerial landslides, submarine landslides, volcanoes) and the value of in situ observations;

Further noting the efforts of the IOC-UNESCO TOWS-WG to develop a better understanding of the threat from tsunamis generated by non-seismic and complex sources and develop guidance on best practices to monitor and warn for such events;

Recognizing tsunamis generated by non-seismic and complex sources are often near-field threats where natural warnings signs are important to understand to facilitate effective community responses;

Encouraging all Member States to continue reviewing their national tsunami warning chains with a view to minimizing the number of steps and ensuring clear authorization of responsibilities amongst stakeholders, especially for near-field tsunami threats;

Encouraging Member States to emphasise to Disaster Management Organisations (DMOs) the role they play in strengthening the national warning chain to ensure optimal community response, and stress the importance that all agencies participate in regional tsunami governance and technical forums;

Encouraging Member States to enhance community preparedness for near-field tsunamis, with emphasis on self-evacuation based on natural signs, including tsunamis generated by non-seismic and complex source;

Encouraging NTWCs and DMOs to continue to develop and routinely review Standard Operating Procedures (SOPs) and provide copies to the IOC-UNESCO Secretariat for the ICG/IOTWMS;

Encouraging the continued involvement of national and international broadcast media in warning dissemination, SOP training activities, workshops, and exercises;

Noting with appreciation the successful outcomes of the Indian Ocean Tsunami Ready Workshop, 22 – 26 November 2022, in Bali, Indonesia, organised by IOC-UNESCO IOTIC, BMKG and IOC-UNESCO Secretariat, and **further noting** with funding provided by BMKG with support of the Government of Republic of Indonesia, ICG/IOTWMS Secretariat with support of the Government of Australia, and UNESCAP:

1. Training on the 12 Tsunami Ready indicators and processes for recognition
2. Promotion of Tsunami Ready communication tools;
3. Shared experiences of villages that have already, or are about to receive Tsunami Ready recognition
4. Field trip to a Tsunami Ready recognised village, Tanjung Bena.

Noting spatial planning for Disaster Risk Reduction (DRR) isn't covered under TRRP;

Urging Member States to ensure DRR based spatial planning is also taken into consideration at the city, province, and national level with respect to overall preparedness and sustainable resilience;

Urging Member States to consider nominating new participants to training activities and workshops to ensure that more in-country experts are trained and available to handle tsunami warning operations and emergency response to the tsunami threat;

Noting the establishment of the UN Ocean Decade Tsunami Programme (ODTP) and its two primary goals:

1. Improved accuracy and timelines of the tsunami warnings through enhance and new observing systems
2. 100% of at-risk Communities resilient and prepared for the tsunami threat

Noting the UN Secretary General's call that "every person on Earth is protected by early warning systems" and the UN Ocean Decade Goal by 2030 of 100% of at-risk communities resilient and prepared for tsunamis, **recognizes** the need to:

1. Provide guidance on tsunami hazard and risk assessment, including for tsunamis generated by non-seismic and complex sources
2. Develop guidelines on how to nationally initiate IOC-UNESCO TRRP and similar initiatives
3. Facilitate coordination and sharing of experiences between Member States through the establishment of Tsunami Ready Focal Points (TRFPs)
4. Assist with the sharing and development of community awareness materials, including for tsunamis generated by non-seismic and complex sources
5. Update Member States on IOC-UNESCO TRRP developments and other related initiatives
6. Identify capacity development and resource needs of Member States for implementing IOC-UNESCO TRRP

Noting the extensive task to achieve the outcome 100% of at-risk communities resilient and prepared for tsunamis, **further recognizing** the roles of the ICG/IOTWMS and its work plans are to support the capacity development of Member States to help them achieve this, depending on their risk assessment and national priorities;

Noting the success of Regional Working Group for North-West Indian Ocean in regional cooperation of Member States facing similar risks, resources and capacity;

Noting the establishment of the Science Committee of the UN ODTP, involving representatives of the ICG/IOTWMS and its efforts to develop a Draft Science Plan for review by each ICG in order to consider scope, objectives and identification and confirmation of Member States future commitments to supporting implementation of the plan;

Noting the future plans of the UN ODTP to hold a 2nd Symposium to follow on from the 1st Symposium "Advances in Tsunami Warning to Enhance Community Responses" (12–14 February 2018, Paris, France);

Noting the ICG/IOTWMS has plans to organise a symposium in 2024 to commemorate the 20th Anniversary of the Indian Ocean Tsunami of 2004;

Noting the annual success of the World Tsunami Awareness Day (WTAD) held on 5 November with the support of UNDRR and IOC-UNESCO in developing community awareness;

Urging Member States to advise IOC-UNESCO IOTIC and IOC-UNESCO ICG/IOTWMS Secretariat of their plans two months before the WTAD event each year, so that a more coordinated and targeted approach can be developed to further maximise outcomes.

Recognising the value of involvement of youth groups, such as U-INSPIRE, in aiding the capacity development of Member States and in support of engagement of communities in the TRRP.

Decides to:

1. Include the instructions from IOC Executive Council #55, 13-17 June 2022, and the recommendations from TOWS-WG XII, XIV and XV in the work plans of the ICG for the next inter-sessional period;
2. Extend the TSP services to include tsunamis generated by non-seismic and complex sources;
3. Adopt V5.0 of the IOTWMS Service Definition Document prepared by Working Group 2;
4. Continue with TSPs only sending notifications to the NTWCs of Member State to update on the availability of TSP bulletins on the registered user web sites;
5. Establish Tsunami Ready Focal Points (TRFPs) in each Member State to enhance communication, coordination, and implementation of the TRRP or similar initiatives across the Indian Ocean;
6. Undertake a full Capacity Assessment of Tsunami Preparedness in the Indian Ocean again in 2024 to evaluate progress of the IOTWMS since Indian Ocean Tsunami of 2004;
7. Undertake a shorter assessment before each session of the ICG for review by Member States through an online questionnaire to continuously monitor progress after each intersessional period and guide the work plans of the ICG/IOTWMS;
8. Organise a symposium in 2024 to commemorate the 20th Anniversary of the Indian Ocean Tsunami of 2004;
9. Continue existing Working Group 1 with modified Terms of Reference as attached in [Annex 1](#), with Chair Dr Harkunti Pertiwi Rahayu (Indonesia) and a Vice-chair to be confirmed by Circular Letter;
10. Continue existing Working Group 2 with modified Terms of Reference as attached in [Annex 2](#), with Chair Dr Karyono (Indonesia) and two Vice-chairs: Mr Robert Greenwood (Australia) and Mr. Padmanabham Jijavarapu (India);
11. Continue existing Sub-Regional Working Group for the North-West Indian Ocean with modified Terms of Reference as attached in [Annex 3](#), with Chair Dr Mohammad Mokhtari (Iran) and Vice-chair Ms Vijaya Sunanda Maneela (India);
12. Continue the Steering Group with Terms of Reference as attached in [Annex 4](#), with TSP Representatives and NTWC Representative to be confirmed;
13. Establish a new Working Group 3 with Terms of Reference as attached in [Annex 5](#), with Chair Ms Suci Dewi Anugrah (Indonesia) and Vice-Chair from Seychelles (to be confirmed);
14. Continue intersessional Task Team on Scientific Tsunami Hazard Assessment of the Makran Subduction Zone, reporting to the Sub-Regional Working Group for the North-West Indian Ocean with modified Terms of Reference as attached in [Annex 6](#), and with Chair and Vice-chair to be confirmed by Circular Letter;
15. Establish a new intersessional Task Team on Exercise Indian Ocean Wave 23 (IOWave23) reporting to the new Working Group 3 with Terms of Reference as attached in [Annex 7](#), and with Chair Ms Weniza (Indonesia) and Vice-chair Mr Ajay Kumar Bandela (India);

16. Endorse the new Terms of Reference of the Indian Ocean Tsunami Information Centre (IOTIC), including addition of the World Tsunami Awareness Day (WTAD) task, as attached in [Annex 8](#);
17. Continue to hold inter-sessional activities as integrated meetings to optimize resources if available;
18. Dissolve the IOWave20 Task Team;
19. Dissolve the Task Team on Tsunami Preparedness for a Near-field Tsunami Hazard.

Requests Working Group 1 to:

1. Address the recommendations of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean;
2. Follow up the recommendations contained in the IOWave20 Exercise Report;
3. Update the Probabilistic Tsunami Hazard Assessment (PTHA) for the whole Indian Ocean in collaboration with relevant experts from the Member States, based on recent PTHA developed for the North-West Indian Ocean under the UNESCAP funded project “Strengthening Tsunami Early warning in the North-West Indian Ocean Through Regional Cooperation”;
4. Develop community education materials in collaboration with IOTIC on the natural warnings signs for tsunamis generated by non-seismic and complex sources;
5. Develop guidance on Tsunami Ready indicators required for critical infrastructure (ports, harbours, airports, power stations, hospitals, etc.) to present to ICG and TOWS-WG Task Team Disaster Management & Preparedness (TT DMP) for consideration in the further development of the TRRP;
6. Noting the poor responses to the COVID-19 survey in 2021, provide a sub-nation case study to the 14th Session of the ICG to develop greater awareness of the issues and importance of preparedness to other Member States;
7. Noting the achievement of two Special Issues of IJDRB published in 2020 and 2021, discuss a possible topic for the next special issue related to warning and mitigation and UN ODTP that can include all ocean basins;
8. Noting the UN ODTP definition “The goal of an early warning system is the protection of life, as well as livelihoods”, and further noting one of the two main goals of the UN Ocean Decade is that 100% of communities at risk from tsunamis be prepared and resilient through programmes like Tsunami Ready or other similar programmes implemented by the Member States”. Working Group 1 needs to discuss the following issues:
 - a) What is Community?
 - b) How many Communities are at Risk from Tsunami?
Are public awareness and educational activities conducted?
 - c) Are public awareness and response tested and exercised?
 - d) Institutionalizing Tsunami Awareness and Response?

Requests Working Group 2 to:

1. Address the recommendations of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean;
2. Follow up the recommendations contained in the IOWave20 Exercise Report;
3. Investigate methods of detection and threat assessment of non-seismic and complex source tsunami events, including volcanoes and landslide events;
4. Explore possible new tsunami-detection technologies such as pressure sensors attached to undersea communications cables;
5. Extend the TSP services to include tsunamis generated by non-seismic and complex sources;
6. Adopt the updated IOTWMS TSP Service Definition Document (Version 5) and request the TSPs to conform to it;
7. Implement further the TOWS-WG request on TSP messages for the maritime community;
8. Assist the implementation of the IOC-UNESCO TRRP;
9. Replace the task to assist TSPs with the task to assist NTWCs with their implementing CAP, mobile applications, and social media for effective dissemination of national tsunami warning information;
10. Develop guideline of best practice to share with NTWCs about how to integrate tsunami into the multi-hazard early warning approach or system for mutual benefits;
11. Include an additional one-day session on Tsunami Warning Centre and Seismic Network Operations as part of all future Standard Operating Procedure (SOP) training;

Requests new Working Group 3 to:

1. Address the recommendations of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean;
2. Follow up the recommendations contained in the IOWave20 Exercise Report;
3. Provide guidance on tsunami hazard and risk assessment, including for tsunamis generated by non-seismic and complex sources in collaboration with Working Group 1;
4. Develop guidelines on how to nationally initiate IOC-UNESCO TRRP and similar initiatives;
5. Facilitate coordination and sharing of experiences between Member States on implementation of IOC-UNESCO TRRP through the Member State Tsunami Ready Focal Points (TRFPs);
6. Assist Working Group 1 and IOTIC with the sharing and development of community awareness materials, including for tsunamis generated by non-seismic and complex sources;
7. Collaborate with IOTIC to update Member States on IOC-UNESCO TRRP developments and other related initiatives;
8. Collaborate with IOTIC and Secretariat for ICG/IOTWMS to identify capacity development and resource needs of Member States for implementing IOC-UNESCO TRRP;
9. Support IOC-UNESCO Secretariat for the ICG/IOTWMS and IOC-UNESCO IOTIC conduct two training workshops on Standard Operating Procedures, including national warning chain development, in the intersessional period in first half of 2023 and before IOWAVE23, subject to the availability of funding, with one to be conducted in the western region of the Indian Ocean and the other to be conducted in the eastern region of the Indian Ocean.

Requests Regional Working Group for North-West Indian Ocean to:

1. Address the recommendations of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean;
2. Follow up the recommendations contained in the IOWave20 Exercise Report;
3. Support further strengthening of tsunami warning chains, improvement of SOPs of DMOs and Broadcast Media, and timelines in passing the information between multiple stakeholders;
4. Include complex sources in national tsunami early warnings;
5. Utilise proposed UNESCAP project Phase 2c to develop hazard, inundation and evacuation maps for agreed pilot areas in pathway towards Tsunami Read recognition;
6. Employ unified tsunami modelling approach developed by UNESCAP project;
7. Encourage all Member States to participate at full level (from issuing warnings to the evacuation of the public in selected regions, at least in tsunami-ready pilot areas) in upcoming drills (IOWave Exercise).

Requests Task Team Scientific Tsunami Hazard Assessment of the Makran Subduction Zone to:

1. Address the recommendations of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean;
2. Support making output from Probabilistic Tsunami Hazard Assessment (PTHA) V1.0 for NWIO region available to all Member States;
3. Begin work on PTHA V2.0 to include tsunami generated from other sources;
4. Explore the possibility of using GNSS and HF Radar data for enhancing national operational tsunami early warning systems;
5. Support more paleo-tsunami studies to help better understand the seismicity of the region, particularly the western Makran Trench;
6. Study the potential consequences of tsunamis generated by mud volcanoes and splay faults, as the near-source regions are becoming industrial hubs due to rapid development in the region;
7. Identify the optimal networks and improve regional data-sharing through bilateral and multilateral arrangements, while also sharing data with TSPs..

Requests new Task Team IOWAVE23 to:

1. Address the recommendations of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean;
2. Conduct Indian Ocean Wave Exercise (IOWave23) in 2023 noting suggestions from the post-IOWave20 lessons learnt workshop, including an increased focus on participation of Local Disaster Management Offices (LDMO) down to community level and exercising communities recognised or planning to be recognised under the TRRP or similar initiatives;
3. Explore mechanisms where resources are available for participation of international observers with expertise in tsunami warning in countries conducting community evacuations and implementing TRRP and similar initiatives during future IOWave exercises;

4. Conduct IOWAVE23 in Sept/Oct 2023, with three scenarios run one week apart and not on consecutive days, with at least one scenario with major tsunami impacts;
5. Include near-field tsunami scenarios, with scenarios for tsunami generated by non-seismic and complex sources;
6. Support pre- and post-IOWAVE workshops to facilitate planning, conduct, and review of Exercise. exercises in pandemic situation.
7. Encourage Member States to test/verify the UNESCO-IOC Tsunami Ready Indicators during the Exercise;
8. Develop guidelines and manual for conducting virtual table-top exercises.

Requests IOC-UNESCO Secretariat for the ICG/IOTWMS:

1. Follow up the recommendations contained in the IOWave20 Exercise Report;
2. In collaboration with IOC-UNESCO IOTIC, follow up the recommendations of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean, including share a summary table of Member States needs based on the assessment (and other more recent surveys) for Member State to review and provide feedback;
3. Review the previous Member State Survey for Capacity Assessment to develop a subset of questions for Member States to respond to in order to help prepare a status report of the IOTWMS at each ICG session;
4. Through a Circular Letter seek nominations from each Member State for a Tsunami Ready Focal Point (TRFP) to facilitate coordination and implementation of the TRRP and similar initiatives;
5. Survey Member States via Circular Letter, especially considering African States, SIDS and LDCs as high priority, to ascertain if other regional or sub-groups need to be established to facilitate capacity development and regional cooperation;
6. Consult with WMO on GTS issues with public notification of TSP bulletins to avoid relay of older notifications.

Requests the IOC-UNESCO IOTIC to:

1. Follow up the recommendations contained in the IOWave20 Exercise Report;
2. In collaboration with IOC-UNESCO Secretariat for ICG/IOTWMS, follow up the recommendations of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean;
3. In consultation with the IOC-UNESCO ICG/IOTWMS Secretariat, create a capacity development work plan for the intersessional period, where appropriate utilising the International Training Centre for Operational Oceanography (ITCOcean) operated by INCOIS in India, and the BMKG Training Center in Indonesia that serves as an OTGA Specialized Training Center (STC Indonesia), and STC ITIC in Hawaii;
4. In consultation with the IOC-UNESCO ICG/IOTWMS Secretariat create use the summary table of Member States capacity development requirements presented by IOC-UNESCO Secretariat to ICG/IOTWMS XIII to develop a capacity building work plan focusing on those areas most required by Member States, such as SOP training and community awareness.
5. In consultation with the IOC-UNESCO ICG/IOTWMS Secretariat and new Working Group 3 “Tsunami Ready Implementation”, continue to organize regional workshops such as the Indian

Ocean Tsunami Ready Workshop in Nov 2022 as platforms for sharing experience and lessons learnt on the implementation of IOC-UNESCO TRRP in the Indian Ocean.

6. In consultation with the IOC-UNESCO ICG/IOTWMS Secretariat, Working Group 1 and new Working Group 3, develop urgently an online webinar for TRFPs on tools and strategies for implementing Tsunami Ready, supported by a one-page brochure.

Requests IOC-UNESCO TOWS-WG to:

1. Complete and harmonise the KPI Framework for the global tsunami warning and mitigation system to facilitate monitoring and reporting of implementation of the IOTWMS and progress towards Member State goal of 100% of at-risk communities resilient and prepared for tsunamis;
2. Expand the TRRP to also include preparedness with respect to critical infrastructure;
3. Hold the 2nd Symposium in 2024 to coincide with the 20th Commemoration of the Indian Ocean Tsunami of 2004, taking care not to conflict with individual Member State commemorations;
4. Hold the 2nd Symposium together with the planned ICG/IOTWMS symposium in 2024 as one global symposium.

Requests Chair of ICG/IOTWMS to:

1. Discuss at the next TOWS-WG meeting the option of holding the 2nd TOWS-WG Symposium with the ICG/IOTWMS symposium in 2024 to mark the 20th Commemoration of the Indian ocean Tsunami of 2004 as one global symposium.

Requests the IOC-UNESCO Executive Secretary to:

1. Prepare the Executive Summary Report of the 13th Session of the ICG/IOTWMS within 30 days.

Elects Professor Dwikorita Karnawati as ICG/IOTWMS Chair with Mr E. Pattabhi Rao and Dr Yuelong Miao as Vice-chairs for the next intersessional term commencing at the end of the session;

Expresses its gratitude to the Government of the Republic of Indonesia for kindly hosting the 13th Session of the ICG/IOTWMS in Bali;

Accepts with appreciation the kind offer of the Government of the Republic of Indonesia to host the 14th Session of the ICG/IOTWMS in 2024;

Accepts with appreciation the kind offer of the Sultanate of Oma to host the 15th Session of the ICG/IOTWMS in 2026.

Financial Implications: Extrabudgetary only

Annex 1 to Decision ICG/IOTWMS-XIII.1

Working Group 1
Tsunami Risk, Community Awareness and Preparedness

Terms-of-Reference

Liaise with other working group(s) and task team(s) within the ICG/IOTWMS and with working groups from the other ocean basins through the TOWS-WG to:

1. Assist, develop and strengthen the overall capacity and capability of Member States in tsunami risk assessment and mitigation, community awareness and preparedness, including for tsunamis generated by non-seismic and complex sources.
2. Encourage Member States to mainstream tsunami Disaster Risk Reduction into sustainable development to help achieve resilient communities in the region.
3. Provide advice on any future development of IOC-UNESCO Tsunami Ready Recognition Programme.
4. Support implementation of IOWave Exercises.
5. Identify areas of priority for action following assessments, exercises, and real tsunami events.
6. Provide advice on user requirements and utility of tsunami warning products and services.
7. Provide advice to the IOC-UNESCO Indian Ocean Tsunami Information Centre (IOTIC) on educational, awareness and preparedness materials.
8. Promote collaboration among academia, research institutions and disaster management offices to encourage multidisciplinary and multi sectoral interaction in ensuring tsunami risk knowledge are streamlined to risk reduction strategies.

Activities may include:

1. Monitor, assess and routinely report to the Steering Group and ICG on the status of Tsunami Risk Assessments, Community Awareness and Preparedness in each Member State.
2. Seek resources and coordinate projects to develop guidelines and build capacity in Member States.
3. Support the organisation of workshops and symposiums for training and capability development.
4. Contribute to the conduct of regular exercises of the IOTWMS.
5. Encourage Member States to integrate tsunami risk assessment, community awareness and preparedness within national disaster risk reduction programmes for multi-hazards.
6. Stimulate and share information on best-practices between Member States.
7. Assist with development and application of guidelines on hazard, vulnerability and risk assessment and mitigation, exercises, and post-event surveys.
8. Work closely with Working Group 3 "Tsunami Ready Implementation", IOC-UNESCO IOTIC, and IOC-UNESCO Secretariat for the ICG/IOTWMS to help develop the capacity of Member States across the Indian Ocean to implement the IOC-UNESCO TRRP or similar initiatives.
9. Work closely with Working Group 2 "Tsunami Detection, Warning and Dissemination" and Working Group 3 "Tsunami Ready Implementation", IOC-UNESCO IOTIC and IOC-UNESCO Secretariat for ICG/IOTWMS to help develop effective national tsunami warning chains, warning products, services, Standing Operating Procedures, and warning chains.

10. Under the direction of the Steering Group, assist with national assessments of the IOTWMS performance after each exercise and real tsunami event.

The Working Group will be composed of members nominated by Member States with expertise in disaster management, an invited IOTIC representative, and other invited observers as required, with a chairperson and two vice-chairpersons to be elected by the ICG.

Annex 2 to Decision ICG/IOTWMS-XIII.1

Working Group 2
Tsunami Detection, Warning and Dissemination

Terms-of-Reference

Liaise with other working group(s) and task team(s) within the ICG/IOTWMS and with working groups from the other ocean basins through the TOWS-WG to:

1. Coordinate and strengthen the operational implementation of tsunami detection, warning and dissemination, including for tsunamis generated by non-seismic and complex sources.
2. Support the Tsunami Service Providers (TSPs) delivery of interoperable regional tsunami threat information products to Member States.
3. Support Member States in the development of their national tsunami warning capabilities.
4. Monitor the performance of key observational, warning and communication system components.
5. Support implementation of IOWave Exercises.
6. Identify areas of priority for action following assessments, communications tests, exercises, and real tsunami events.
7. Provide advice on further development of IOC-UNESCO TRRP.
8. Provide advice to the Indian Ocean Tsunami Information Centre (IOTIC) on educational materials about the warning systems and services.
9. In collaboration with IOC-UNESCO IOTIC and IOC-UNESCO Secretariat for ICG/IOTWMS, help strengthen the capacity and capability of Member States.

Activities may include:

1. Help coordinate and facilitate the development and operational implementation of tsunami detection, warning and dissemination systems and procedures within Multi-Hazard Early Warning System (MHEWS) frameworks and systems.
2. Monitor, assess and routinely report to the Steering Group and ICG on the performance of Tsunami Service Providers (TSPs), observational seismic and sea level monitoring networks, communication systems and procedures.
3. Consult with Working Group 1 "Tsunami Risk, Community Awareness and Preparedness" on the requirements and suitability of threat information and warning products.
4. Work closely with Working Group 1 "Tsunami Risk, Community Awareness and Preparedness", Working Group 3 "Tsunami Ready Implementation", IOC-UNESCO IOTIC and IOC-UNESCO Secretariat for ICG/IOTWMS, to help develop the capacity of Member States across the Indian Ocean to implement the IOC-UNESCO Tsunami Ready Recognition Programme (TRRP) or similar initiatives.
5. Work closely with Working Group 1 "Tsunami Risk, Community Awareness and Preparedness", Working Group 3 "Tsunami Ready Implementation", IOC-UNESCO IOTIC and IOC-UNESCO Secretariat for ICG/IOTWMS, to develop effective national tsunami warning chains, warning products, services, Standing Operating Procedures, and warning chains.
6. Monitor existing international and national arrangements and provision of real-time data required for tsunami monitoring and warning with regards to seismic, GNSS, sea level and other kinds of measurements and data exchange.
7. Undertake studies to determine warning requirements for seismic and sea level data.
8. Facilitate the ongoing development and benchmarking of tsunami modelling, forecast and verification systems.
9. Contribute to the conduct of regular exercises and communication tests of the IOTWMS.

10. In collaboration with Working Group 1 "Tsunami Risk, Community Awareness and Preparedness", Working Group 3 "Tsunami Ready Implementation", IOC-UNESCO IOTIC and IOC-UNESCO Secretariat for ICG/IOTWMS, help to develop, coordinate, and implement training and capacity building programmes for NTWCs, DMOs and Broadcast Media in the Tsunami Warning Services.
11. Develop and maintain relevant documentation, such as the IOTWMS Service Definition and IOTWMS NTWC Users Guide.

The Working Group will be composed of members nominated by Member States, Member State representatives for each ICG-designated TSP, at least two representatives of non-TSP National Tsunami Warning Centres, and invited observers, with a chairperson and one or two vice-chairpersons to be elected by the ICG.

Annex 3 to Decision ICG/IOTWMS-XIII.1

Regional Working Group
North-West Indian Ocean

Terms-of-Reference

Liaise with other working group(s) and task team(s) within the ICG/IOTWMS and with working groups from the other ocean basins through the TOWS-WG to:

1. In collaboration with IOC-UNESCO IOTIC and IOC-UNESCO Secretariat for the ICG/IOTWMS, evaluate capabilities and identify capacity building requirements of Member States in the region for providing end-to-end tsunami warning and mitigation services within the framework of the ICG/IOTWMS and within a multi-hazard framework
2. In collaboration Working Group 1 "Tsunami Risk, Community Awareness and Preparedness", promote and facilitate tsunami hazard and risk assessments and research in the region, including for tsunamis generated by non-seismic and complex sources.
3. In collaboration with Working Group 3 "Tsunami Ready Implementation", support implementation of IOC-UNESCO TRRP or similar activities across the region to help make at-risk communities resilient and prepared for tsunamis
4. In collaboration with Working Group 3 "Tsunami Ready Implementation", facilitate sharing of experiences between Member State Tsunami Ready Focal Points (TRFPs) on Tsunami Ready implementation
5. Facilitate cooperation in the establishment and upgrading of seismic, sea level and GNSS stations and networks and communication systems in the region
6. Facilitate the timely sharing of tsunami-related data and information in the region
7. Establish and maintain procedures for National Tsunami Warning Centres (NTWCs) across the region to exchange information on national tsunami warnings, observations, and impacts during events.
8. Support the implementation of IOWAVE Exercises and other similar drills across the region and encourage all Member States to participate at full level (from issuing warnings to the evacuation of the public in selected regions, at least in tsunami-ready pilot regions).

The Group will be composed of members representing NTWC and Tsunami Ready Focal Point from each of the Member States of India, Iran, Oman, Pakistan, United Arab Emirates, and Yemen in the North-West Indian Ocean region and invited observers, with a chairperson and vice-chairperson to be elected.

Annex 4 to Decision ICG/IOTWMS-XII.1

Steering Group

Terms-of-Reference

Coordinate and integrate the work of ICG/IOTWMS in the inter-sessional periods, as implemented through the ICG's various Working Groups and Task Teams to:

1. Oversee the execution of the Decisions and Recommendations of the ICG.
2. Monitor the overall performance of the IOTWMS.
3. Identify areas of priority for action following assessments, communications tests, exercises, and real tsunami events.
4. Ensure the IOTWMS is implemented in line with the guidance of the TOWS-WG for the harmonisation of global tsunami warning and mitigation systems.
5. Identify and assess resource requirements to support implementation of the IOTWMS.

Activities may include

1. Promote and enhance the institutionalisation of tsunami early warning systems, their implementation, exercises, and maintenance.
2. Develop and maintain the Medium-term Strategy and Outreach Plan.
3. Identify funding priorities for the ICG/IOTWMS Work Plans, including development of Programme and Budget for subsequent inter-sessional period for review by the ICG.
4. Oversee the planning and implementation of ocean wide tsunami exercises and drills.
5. Oversee performance assessment of IOTWMS for real tsunami events, with assistance of IOC-UNESCO IOTIC and ICG/IOTWMS Secretariat through post-event questionnaires to be completed by Member States, for finalisation and distribution within two months after the event.
6. Contribute to the work of the TOWS-WG to coordinate the most effective global implementation and harmonisation of tsunami warning and mitigation systems.

Membership of the Steering Group includes the ICG Chair and Vice Chairs, Chairs and Vice Chairs of the Working Groups, Member State representatives from each TSP and two other NTWCs. Invited observers include a representative from IOTIC, immediate past Chair of the ICG for one term, and other invited observers as required. The Chair of ICG/IOTWMS is the Chair of the Steering Group. The Steering Group will primarily work offline by correspondence, but will meet in person at least once a year if resources are available.

Annex 5 to Decision ICG/IOTWMS-XII.1

Working Group 3
Tsunami Ready Implementation

Terms-of-Reference

Liaise with other working group(s) and task team(s) within the ICG/IOTWMS and with working groups from the other ocean basins through the TOWS-WG to:

1. Monitor and evaluate the implementation Tsunami Ready Recognition Programme, National Warning Chains, and related activities to deliver tsunami resilient and prepared communities for the Indian Ocean
2. Provide guidance on tsunami hazard and risk assessment, including for tsunamis generated by non-seismic and complex sources.
3. Provide guidance to Member States on reviewing and enhancing national tsunami warning chains.
4. Provide guidance on how to nationally initiate IOC-UNESCO Tsunami Ready Recognition Programme (TRRP) and similar initiatives
5. Facilitate sharing of experiences between Member State Tsunami Ready Focal Points (TRFPs)
6. Update Member States on IOC-UNESCO TRRP developments and other related initiatives
7. Develop exercise tools and coordinate implementation of IOWAVE Exercises and other drills as required
8. In collaboration with IOC-UNESCO IOTIC and IOC-UNESCO Secretariat for ICG/IOTWMS, identify capacity development and resource needs of Member States to implement TRRP, national tsunami warning chains, and related activities
9. Assist with training programmes of Member States implemented by IOC-UNESCO IOTIC and coordinated by IOC-UNESCO ICG/IOTWMS Secretariat to facilitate enhanced national tsunami warning chains and at-risk communities becoming resilient and prepared for tsunamis
10. Provide an annual report on Tsunami Ready implementation to the Steering Group

Members: WG1 and WG2 and RWG-NWIO chairs, WG2 and WG1 tsunami warning chain relevant experts, ICG/IOTWMS TRRP and exercise experts, Member State Tsunami Ready Focal Points (TRFP), invited experts, IOTIC, Secretariat.

Annex 6 to Decision ICG/IOTWMS-XII.1

Task Team on Scientific Tsunami Hazard Assessment of the Makran Subduction Zone

Terms-of-Reference

Under the direction of the Regional Working Group North-West Indian Ocean:

1. Draft an agreement document for real-time exchange between Member States of seismic/sea-level/GNSS data in the Makran Subduction Zone (MSZ)
2. Specify optimal number and configuration of seismic/sea-level/GNSS and other observing networks needed for real-time tsunami warning in the MSZ
3. Investigate and report on the credible maximum earthquake magnitude in the Makran Subduction Zone and define a strategy to develop a unified hazard map
4. Investigate and report on the seismicity of the Makran Subduction Zone.
5. Review and report on the status of research into modelling of secondary non-seismic effects tsunamis in Makran for potential use in the IOTWMS

The Task Team will report to the RWG North-West Indian Ocean. Members of the Task Team will include WG-NWIO Member States (India, Iran, Oman, Pakistan, United Arab Emirates, Yemen), representatives of the 3 TSPs (Australia, India, Indonesia), and invited experts from international institutions involved in research of MSZ (GFZ, GTM, etc.)

Annex 7 to Decision ICG/IOTWMS-XII.1

Task Team on IOWave23

Terms-of-Reference

Under the direction of Working Group 3 “Tsunami Ready Implementation”:

1. Plan and coordinate the next IOWave Exercise (IOWave23), taking on-board suggestions from the post-IOWave20 lessons learnt workshop, including an increased focus on involving Local Disaster Management Offices (LDMOs) down to community level and implementation of IOTR.
2. Prepare the IOWAVE23 Exercise Manual in accordance with the Guideline on "How to Plan, Conduct and Evaluate Tsunami Exercises" (IOC Manuals and Guides No. 58) at least 6 months in advance of the exercise.
3. Prepare the Exercise Report for ICG/IOTWMS-XIV.

The Task Team will report to Working Group 3 and work in collaboration with Working Group 1, Working Group 2 and IOTIC, and be composed of members nominated by Member States and representatives from TSPs, with a chairperson and vice-chairperson.

Annex 8 to Decision ICG/IOTWMS-XIII.1

Indian Ocean Tsunami Information Centre

Terms-of-Reference

Goal of IOTIC

The overall goal of IOTIC is to support the IOC-UNESCO ICG/IOTWMS Member States in tsunami risk reduction for Indian Ocean at-risk communities through capacity building in tsunami hazard, awareness, preparedness, education, and mitigation measures.

Objectives

- Strengthening the Indian Ocean (national and regional) tsunami disaster risk reduction and emergency response capacity for an effective tsunami early warning system,
- Supporting preparedness against tsunamis of at-risk communities, especially through the implementation of IOC-UNESCO Tsunami Ready Recognition Programme (TRRP).
- Providing resources in tsunami risk reduction, educational, awareness, and preparedness for the Indian Ocean region.

Terms-of-Reference

1. Help reduce the overall tsunami risk across the Indian Ocean by working closely and in coordination with the IOC-UNESCO ICG/IOTWMS, it's Steering Group, Working Groups, Task Teams, IOC-UNESCO ICG/IOTWMS Secretariat, and the TOWS-WG Task Team on Disaster Management & Preparedness (TT DMP) to:
 - a. Contribute to the development of global guidelines in tsunami risk reduction and their implementation in the Indian Ocean.
 - b. Maintain close familiarity of the operations and needs of the Indian Ocean Tsunami Warning and Mitigation System and work closely with the Tsunami Service Providers (TSPs), National Tsunami Warning Centres (NTWCs), and Disaster Management Organisations (DMOs) to assist, as needed, with the socialization, promotion, and capacity building required for an effective tsunami emergency response.
 - c. In coordination with the IOC-UNESCO ICG/IOTWMS Secretariat and as needed, support the ICG/IOTWMS and it's Working Groups and Task Teams to conduct training programmes, workshops, and seminars.
 - d. In collaboration with the IOC-UNESCO ICG/IOTWMS Secretariat develop project proposals and assist with project implementation in support of the ICG/IOTWMS programmes and activities in the Indian Ocean Region.
 - e. Manage tsunami post-event performance surveys and compilation of reports in close collaboration with the IOC-UNESCO ICG/IOTWMS Secretariat under the overall direction of the ICG/IOTWMS Steering Group, assisted by the International Tsunami Information Center (ITIC), IOC-UNESCO Tsunami Unit, and teams of experts nominated by the UNESCO-IOC ICG/IOTWMS Steering Group as required
2. Help Member States of the IOC-UNESCO ICG/IOTWMS reduce their tsunami risk by:
 - a. Serving as the focal point under the guidance of the IOC-UNESCO ICG/IOTWMS to guide, facilitate, and process the implementation of the UNESCO/IOC Tsunami Ready Recognition Programme (TRRP) in the Indian Ocean.
 - b. Serving as the focal point under the guidance of the ICG/IOTWMS, in coordination with the IOC-UNESCO Secretariat, to guide, facilitate, support, and coordinate the activities of the World Tsunami Awareness Day (WTAD) in the Indian Ocean.
 - c. Assisting national stakeholders in the overall improvement of tsunami preparedness and effective tsunami emergency response through tsunami risk assessment, warning guidance and emergency response, education and awareness, tsunami mitigation, and the

- implementation of national initiatives to reach certification against the IOC-UNESCO Tsunami Ready indicators.
- d. Serving as an information resource providing for the development, publication, and distribution of resource materials on tsunami hazard, awareness, preparedness, and education for the Indian Ocean.
 - e. Serving as a technical resource and help foster research and its application to strengthen technical and institutional aspects of tsunami preparedness and tsunami emergency response to prevent loss of life and minimize damage to property.
3. Coordinate activities and exchange materials, resources, and information with other Tsunami Information Centres (TICs) of the other ocean basins (Caribbean Tsunami Information Centre (CTIC), International Information Centre (ITIC), and North-East Atlantic and Mediterranean Seas Tsunami Information Centre (NEAMTIC)) to ensure global consistency and potential use of derived products across all regions.
 4. Share information on programmes, activities, and events, as well as information on tsunami education, awareness, and preparedness resources by managing and maintaining the IOTIC Website and social media channels as platforms for information exchange

Governance

The IOTIC is an IOC-UNESCO entity operating under the overall authority of the Executive Secretary of IOC-UNESCO. The day-to-day management is performed by the IOC-UNESCO National Programme Officer stationed in Jakarta under the supervision of the Director of the UNESCO Office Jakarta and the Head of the IOC-UNESCO Tsunami Unit in Paris. The operational and implementation of programmes and activities of IOTIC is in close coordination with the IOC-UNESCO ICG/IOTWMS Secretariat in Perth. The IOTIC reports to each session of the IOC-UNESCO ICG/IOTWMS and to the inter-sessional meetings of the IOC-UNESCO ICG/IOTWMS Steering Group. IOTIC's activities and work plans are guided by and coordinated with the overall needs and requirements of the IOC-UNESCO ICG/IOTWMS, its Working Groups and Task Teams.