UNESCO-IOC Tsunami Programme
Supporting “EW4ALL”

Rick Bailey
Head of Secretariat for
Intergovernmental Coordination Group
Indian Ocean Tsunami Warning & Mitigation System
(ICG/IOTWMS)

ESCAP Fourth Disaster Resilience Week:
Regional Learning Platform for Multi-hazard Early Warning Systems
24 July 2023
UNESCO-IOC Tsunami Programme

- **Pacific Tsunami Warning & Mitigation System** operational since 1965
- Following devastating 2004 Indian Ocean Tsunami, UN General Assembly gave mandate to UNESCO-IOC in 2005 to establish systems in Indian Ocean, Caribbean & adjacent regions, NE Atlantic and Mediterranean Seas
- 144 countries/countries around the world are Member States of the UNESCO-IOC Tsunami Programme
- **Intergovernmental Coordination Groups** established for all four systems
UNESCO-IOC Assembly/Executive Council
Intergovernmental Coordination Group
Indian Ocean Tsunami Warning & Mitigation System (IOTWMS)
Chair:
Prof. Dwikorita Karnawati (Indonesia)
Vice Chair: Dr. Yuelong Miao (Australia)
Vice Chair: Mr. Pattabhi Rama Rao (India)
Working Group for Tsunami & Other sea level related Warning & mitigation Systems (TOWS-WG)
[ICG Chairs, WMO, UNISDR, UNDP, IMO, IHO]

ICG Pacific Tsunami Warning & Mitigation System (PTWS)
IOC Secretariat, Tsunami Resilience Section
WMO, IHO, IMO, UNDRR, UNDP…

Task Team Tsunami Watch Operations
Task Team Disaster Management & Preparedness

ICG NE Atlantic & Mediterranean Seas (NEAMS-TWS)
Steering Group: Officers, WG Chairs/VCs, TT Chairs

WG1 Tsunami Risk, Community Awareness and Preparedness - DMOs,
Chair: Dr. Harkunti Rahayu (Indonesia)

WG2 Tsunami Detection, Warning & Dissemination
Chair: Dr. Karyono (Indonesia)

WG3 Tsunami Ready Implementation
Chair: Ms. Suci Anugrah (Indonesia)
Task Team – IOWAVE23
Chair: Mrs. Weniza (Indonesia)

RWG North-West Indian Ocean
Chair: Dr. Mohammad Mokhtari (Iran)
Task Team – Scientific Tsunami Hazard Assessment of the Makran Subduction Zone
Chair: to be elected

Tsunami Warning & Mitigation Global Governance
UN Ocean Decade
Tsunami Programme
Science Committee

NEAMTWS North-Eastern Atlantic, Mediterranean and connected seas Tsunami Warning and Mitigation System
CENALT, France
Centre d’Alerte aux Tsunamis
IPMA, Portugal
Instituto Portugues do Mar e da Atmosfera
INGV, Italy
Istituto Nazionale di Geofisica e Vulcanologia
KOERI, Turkey
Kandilli Observatory and Earthquake Research Institute
NOA, Greece
National Observatory of Athens

The services provided by the US National Tsunami Warning Center to the USA are outside the framework of the IOC coordinated tsunami warning systems

CARIBE-EWS Tsunamis and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions
PTWC, USA
Pacific Tsunami Warning Center

PTWS Pacific Tsunami Warning and Mitigation System
NWPTAC/JMA, Japan
Northwest Pacific Tsunami Advisory Center / Japan Meteorological Agency

PTWC, USA
Pacific Tsunami Warning Center

SCSTAC/NMEFC, China
South China Sea Tsunami Advisory Center / National Marine Environmental Forecasting Center of P. R. China

IOTWMS
Indian Ocean Tsunami Warning and Mitigation System
InaRTSP, Indonesia
Indonesian Regional Tsunami Service Provider
ITEWC, India
Indian Tsunami Early Warning Centre
JATWC, Australia
Joint Australian Tsunami Warning Centre
UNESCO-IOC Assembly/Executive Council

Global Coordination
Working Group for Tsunami & Other sea level related Warning & mitigation Systems (TOWS-WG)
[4x ICG Chairs, WMO, UNISDR, UNDP, IMO, IHO]

UN Ocean Decade
Tsunami Programme
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ICG Caribbean & Adjacent Seas (CARIBE-EWS)

ICG Pacific Tsunami Warning & Mitigation System (PTWS)

ICG NE Atlantic & Mediterranean Seas (NEAMS-TWS)

Tsunami Resilience Section

IOC Secretariat
**UNESCO TWMS Member States also priority EW4ALL**

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<tr>
<th>PTWS</th>
<th>IOTWMS:</th>
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<tbody>
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<td>Cambodia</td>
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<td>CARIBE-EWS</td>
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<tr>
<td>Haiti</td>
<td>EW4ALL priority</td>
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<td>Barbados</td>
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<td>Antigua&amp; Barbuda</td>
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<td>Guatemala</td>
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ICG Work Programmes

Working groups and task teams work across all four pillars

**Pillar 1**
Disaster risk knowledge
Systematically collect data and undertake risk assessments
- Are the hazards and the vulnerabilities well known by the communities?
- What are the patterns and trends in these factors?
- Are risk maps and data widely available?

**Pillar 2**
Detection, observations, monitoring, analysis and forecasting of hazards
Develop hazard monitoring and early warning services
- Are the right parameters being monitored?
- Is there a sound scientific basis for making forecasts?
- Can accurate and timely warnings be generated?

**Pillar 3**
Warning dissemination and communication
Communicate risk information and early warnings
- Do warnings reach all of those at risk?
- Are the risks and warnings understood?
- Is the warning information clear and usable?

**Pillar 4**
Preparedness and response capabilities
Build national and community response capabilities
- Are response plans up to date and tested?
- Are local capacities and knowledge made use of?
- Are people prepared and ready to react to warnings?
PILLAR I: TSUNAMI RISK ASSESSMENT

Tsunami Hazard Assessment

- Underpin better understanding of the risk and guide for preparedness by authorities and communities
- Guidelines and tools developed by UNESCO-IOC
- Probabilistic Tsunami Hazard Assessments (PTHA), such as being developed by UNESCAP funded NWIO Project, replacing deterministic original versions.
- Hazard and inundation maps underpin evacuation planning
• **Coordinated detection networks** of seismic and sea level stations, GNSS, deep-ocean tsunameters, cables....

• **Tsunami Service Providers (TSPs)** provide tsunami threat information to **National Tsunami Warning Centres (NTWCs)**

• NTWCs issue warnings to their at-risk communities

• NTWCs operate within **multi-hazard** environments

• TSP **operations ISO compliant**: ISO 9001, ISO 22328-3

• TSP and NTWC **performance monitoring** against KPIs

• Threat information now being provided for **non-seismic source tsunami**, eg volcanoes, landslides,…

• **Maritime products for NAVAREAs** to be trialed in 2023 and implemented in 2024

• Competency training framework being developed **NTWCs**
National Tsunami Warning Chains and SOPs

- Timeline driven national tsunami warning chains involve National Tsunami Warning Centres (NTWCs), Disaster Management Organisations (DMOs at national, provincial, and local level), other national authorities, and Broadcast Media.
- Standard Operating Procedures (SOPs) developed for each link.
- SOP Training Workshops to enhance capability.
- Routine communication tests between TSPs and NTWCs (email, GTS, SMS, Fax).
- National tsunami warning chains and SOPs routinely tested every two years, including community level, in UNESCO-IOC Tsunami Wave Exercises for each system/ocean basin (e.g., Exercise IOWave23 Oct23).

If national warning chains don’t work..... warnings won’t get to “ALL”
PILLAR IV: COMMUNITY AWARENESS & PREPAREDNESS

UNESCO-IOC Tsunami Ready Recognition Programme

Part of the end-to-end tsunami early warning and mitigation system with a particular focus on community awareness and preparedness.

Community performance-based programme as an active collaboration of the public (community), community leaders, local and national emergency management agencies and the national tsunami warning centre.

1. The community has designated and mapped tsunami hazard zones.
2. The community has information of the estimate number of people that live in the tsunami hazard zone.
3. The community has an inventory of available economic, infrastructural, political and social resources to reduce tsunami risk at the community level.
4. The community has a public display of tsunami information.
5. The community has easily understood tsunami evacuation maps as determined to be appropriate by local authorities in collaboration with communities.
6. Development and distribution of outreach and public education materials
7. Hold at least three outreach or education activities annually
8. Conduct a biennial tsunami community exercise.
9. Has a tsunami emergency operations plan (EOP) for the community.
10. Has the capacity to manage emergency response operations during a tsunami.
11. Has redundant and reliable means to receive 24-hour official tsunami alerts
12. Has redundant and reliable means to disseminate 24-hour official tsunami alerts to the public.

Based on 12 Indicators
Developed from best practices and lessons learnt worldwide.
Capacity Building

- Guided by **comprehensive Capacity assessments, including expert team field surveys** (eg Pacific Island Countries in 2011, Indian Ocean in 2005, 2018, planned 2024).

- Supported by UNESCO-IOC **Ocean Teacher Global Academy** (eg Tsunami Ready online courses, training centres in Hawaii, India, Indonesia..)

- Member State support for IOC-UNESCO Tsunami Information Centre (TICs) for each TWMS/ocean basin (eg ITIC and CTIC by USA, IOTIC by Indonesia)

- Support for IOC-UNESCO **Secretariat field offices** (eg Australia, USA)

- UN Economic and Social Commission for Asia and the Pacific (ESCAP) funding of capacity building projects, such as in North-West Indian Ocean (NWIO) region

- Support of capacity building in community preparedness, such as Japan’s support for schools programme being developed by **UNDP**

- Support by **Member State aid programmes** (eg US Aid, AusAID, JICA …)

- ……
Stretch Goals

- **UN Ocean Decade 2021-2030**
- **Safe Ocean Outcome**
  - UNESCO-IOC Tsunami Programme
    - **Goal 1**: Enhance existing tsunami detection systems and utilise new technologies to enhance tsunami warning accuracy and timeliness
    - **Goal 2**: 100% at-risk coastal communities are prepared and resilient to the tsunami threat through implementation of the UNESCO-IOC Tsunami Ready Recognition Programme or similar national initiatives

Eg Instrumentation of sub-sea communication cables
Summary

- **UNESCO-IOC Tsunami Programme** provides tsunami threat information to 144 countries/territories globally, including 18 of the 30 priority countries listed by EW4ALL.
- Activities are coordinated and **implemented across the 4-pillars of EW4ALL**
- In efforts to **ensure national tsunami warnings reach all in the community**, UNESCO-IOC supports and works with its Member States to:
  1. **Understand** the tsunami hazard and asses the risk
  2. Implement tsunami detection systems and provide tsunami threat information to National Tsunami Warning Centres (NTWCs) to issue sovereign national tsunami warnings to at-risk communities
  3. **Maintain** robust, timeline driven national tsunami warning chains supported by Standard Operating Procedures (SOPs) for all participating national authorities, and which are regularly tested and exercised.
  4. **Enable** at-risk communities to be prepared and resilient to the tsunami threat through community engagement through UNESCO-IOC Tsunami Ready Recognition Programme or similar national initiatives
- **UNESCO-IOC will collaborate with partners and support EW4ALL initiative by continuing to provide support for maintenance and development of regional tsunami warning systems and national warning chains, and by helping prepare at-risk communities.**
THANK YOU