



*On the Job Training on
Tsunami Inundation Modelling and Mapping and Development of Tsunami Hazards Maps for
Implementation of UNESCO-IOC Tsunami Ready Pilot Sites in Madagascar, Maldives, Seychelles and Sri Lanka
Hyderabad – India, 16–21 March 2026*

Tsunami Inundation Modelling and Mapping

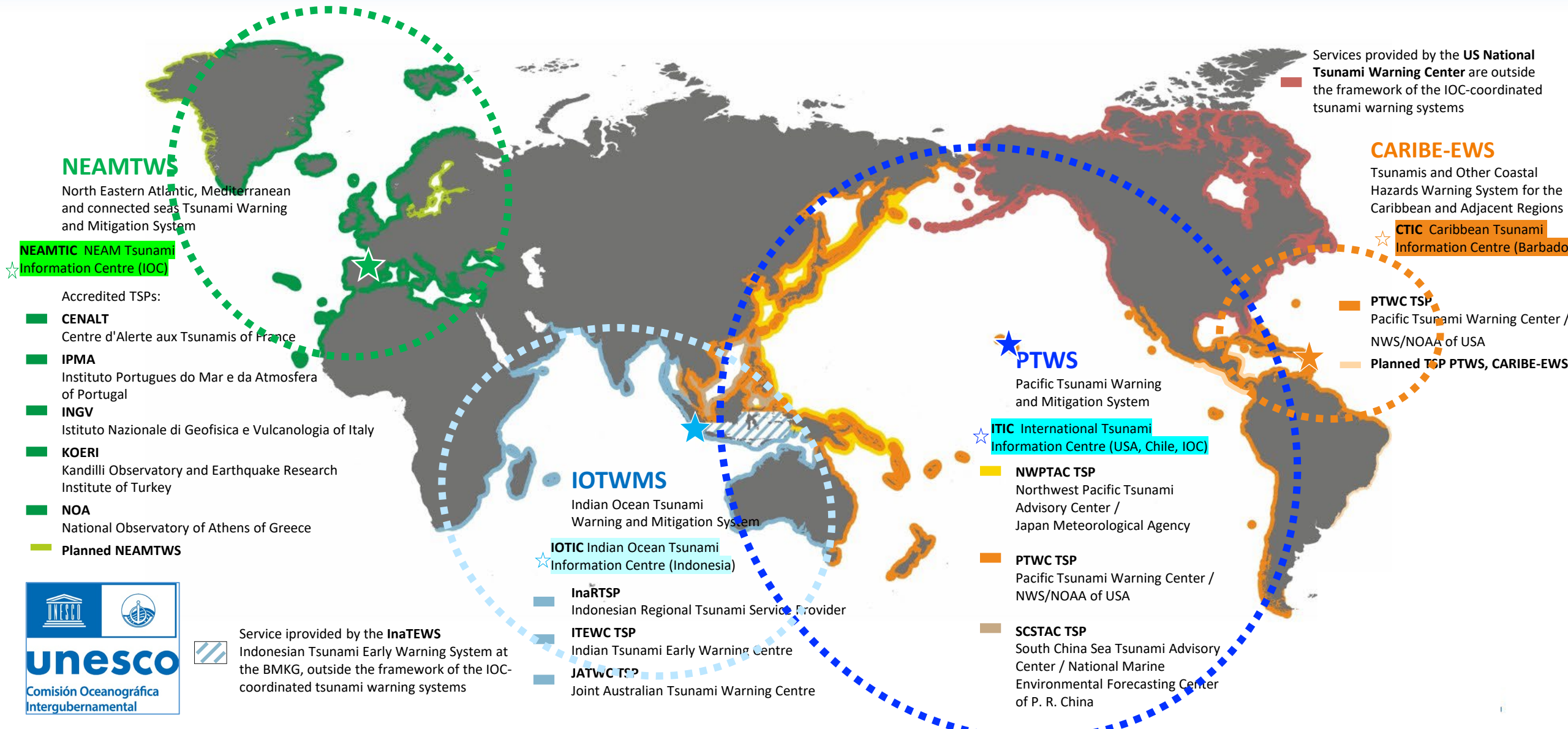
TIMM #: Overview of TIMM Training

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GLOBAL TSUNAMI WARNING AND MITIGATION SYSTEM

Intergovernmental Oceanographic Commission of UNESCO

<https://tsunami.ioc.unesco.org/>



NEAMTWS

North Eastern Atlantic, Mediterranean and connected seas Tsunami Warning and Mitigation System

NEAMTIC NEAM Tsunami Information Centre (IOC)

Accredited TSPs:

- CENALT**
Centre d'Alerte aux Tsunamis of France
- IPMA**
Instituto Portugues do Mar e da Atmosfera of Portugal
- INGV**
Istituto Nazionale di Geofisica e Vulcanologia of Italy
- KOERI**
Kandilli Observatory and Earthquake Research Institute of Turkey
- NOA**
National Observatory of Athens of Greece
- Planned NEAMTWS**



Service provided by the **InaTEWS** Indonesian Tsunami Early Warning System at the BMKG, outside the framework of the IOC-coordinated tsunami warning systems

IOTWMS

Indian Ocean Tsunami Warning and Mitigation System

IOTIC Indian Ocean Tsunami Information Centre (Indonesia)

- InaRTSP**
Indonesian Regional Tsunami Service Provider
- ITEWC TSP**
Indian Tsunami Early Warning Centre
- JATWC TSP**
Joint Australian Tsunami Warning Centre

PTWS

Pacific Tsunami Warning and Mitigation System

ITIC International Tsunami Information Centre (USA, Chile, IOC)

- NWPTAC TSP**
Northwest Pacific Tsunami Advisory Center / Japan Meteorological Agency
- PTWC TSP**
Pacific Tsunami Warning Center / NWS/NOAA of USA
- SCSTAC TSP**
South China Sea Tsunami Advisory Center / National Marine Environmental Forecasting Center of P. R. China

Services provided by the **US National Tsunami Warning Center** 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

CTIC Caribbean Tsunami Information Centre (Barbado)

- PTWC TSP**
Pacific Tsunami Warning Center / NWS/NOAA of USA
- Planned TSP PTWS, CARIBE-EWS**

The Key Elements

Risk Assessment and Reduction

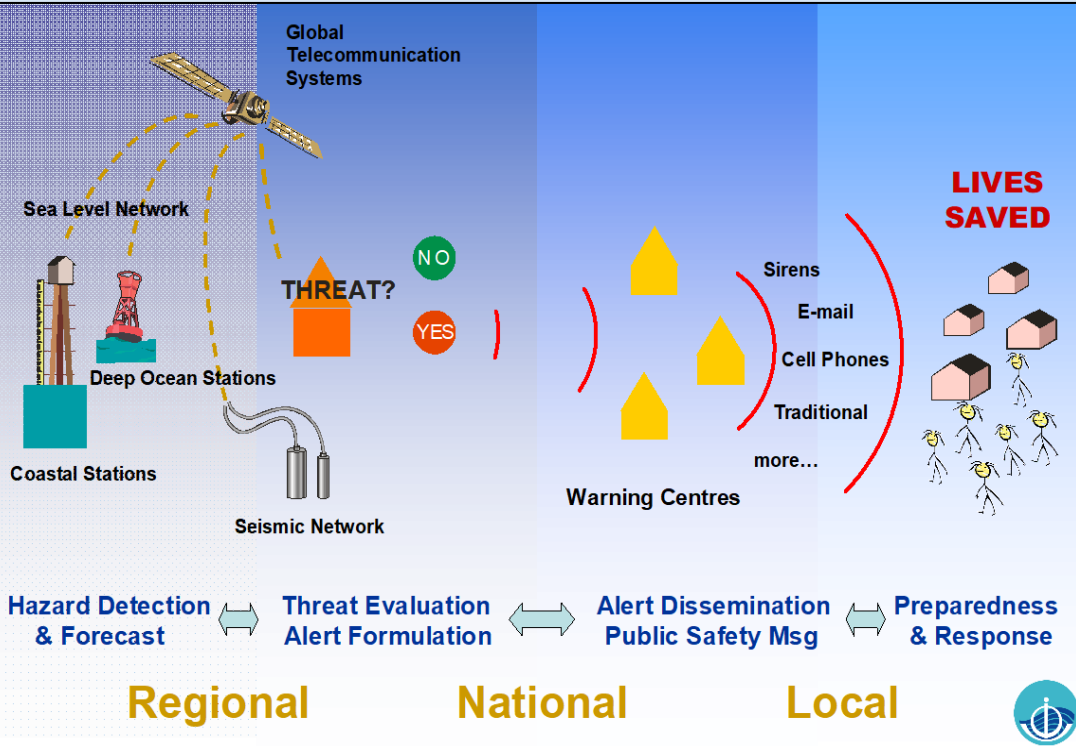
Systematically collect data and undertake risk assessments

Detection, Warning and Dissemination

Develop hazard detection, monitoring and warning services
Communicate threat information and early warnings

Awareness and Response

Build national and community response capabilities



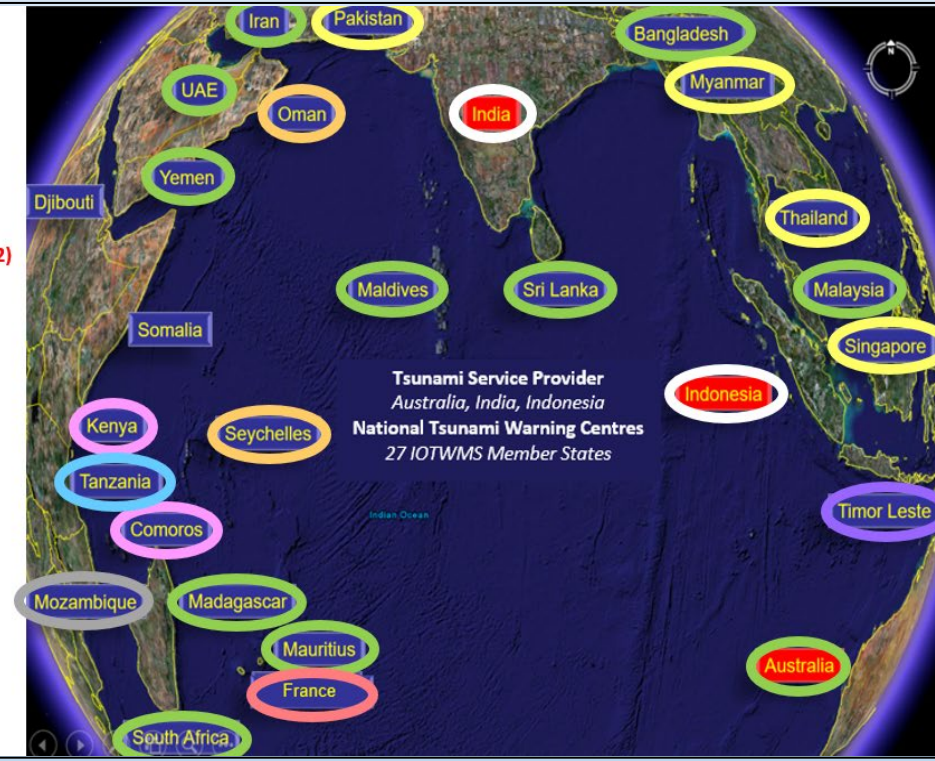
Member State Engagement

- Exercise IOWave23 (20)
- Standard Operating Procedure Training (17)
- TEMPP Training (17)
- Capacity Assessment of Tsunami Preparedness (22)
- TRRP Implementation (2)

LEGEND	
	All above activities
	IOWave, SOPs, TEMPP, CATP
	IOWave, TEMPP, CATP
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	IOWave, CATP
	TEMPP, SOPs
	TEMPP, CATP
	IOWave
	CATP

Regional Collaborations

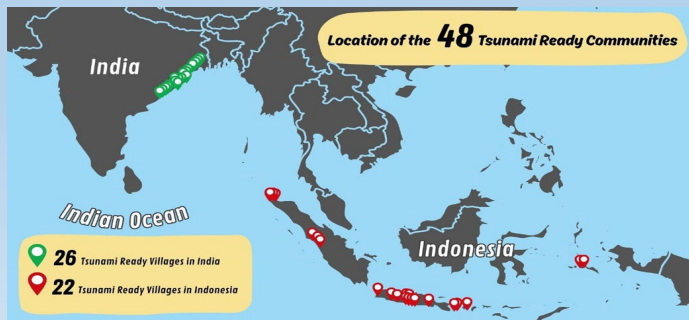
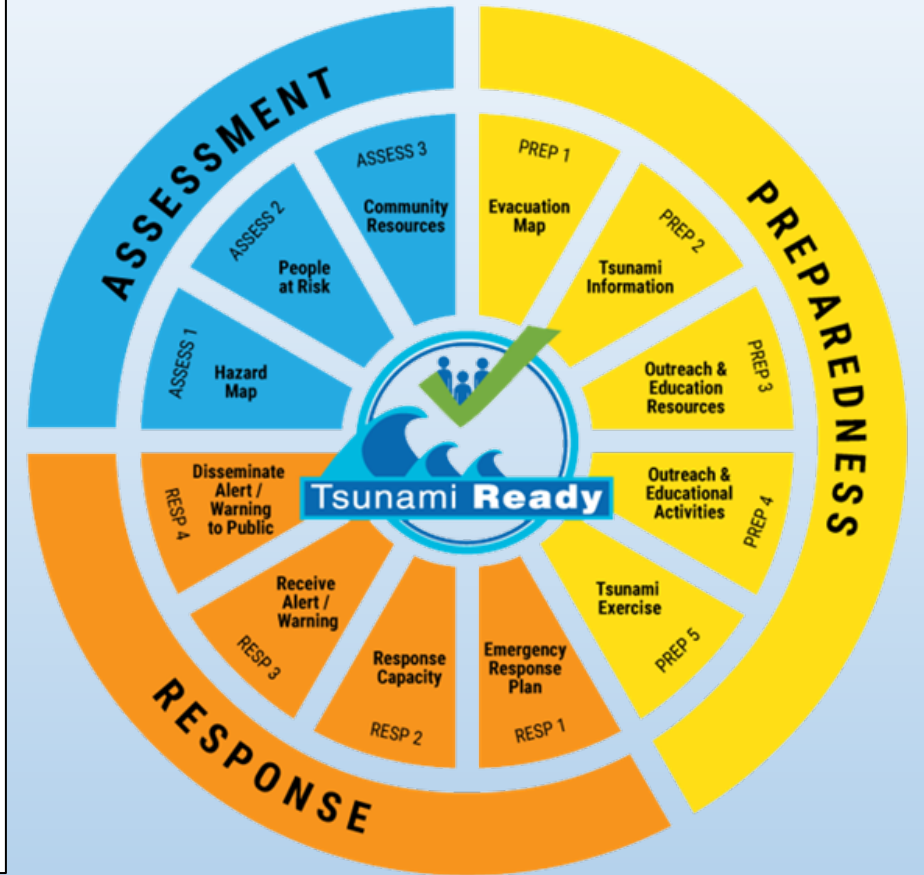
- IOCAFRICA (10)
- SIDS (6)
- Other ICGs (3)
- IOGOOS (14)
- IOCINDIO (9)
- WMO PTC (11)



Tsunami Ready Recognition Programme



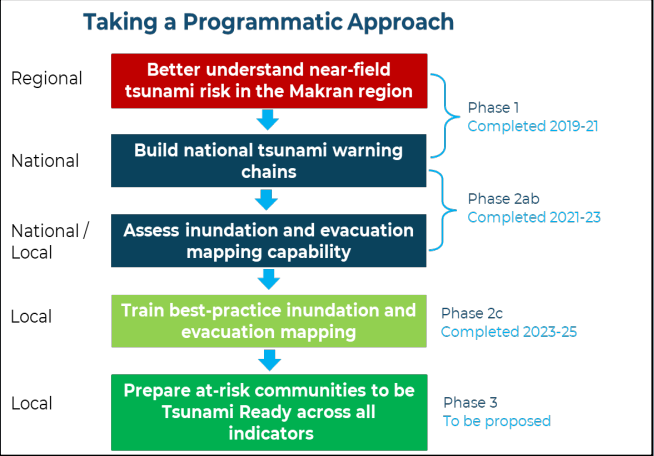
- Community **performance-based recognition programme** that facilitates tsunami preparedness as an active collaboration of the **community, community leaders, and national and local emergency management agencies.**
- **Structured and systematic approach** for community preparedness.
- **12 Indicators** of Assessment, Preparedness, and Response
- **TEMPP & TRRP Trainings**
- **19 National Tsunami Ready Focal Points**
- **4 National Tsunami Ready Boards** - India, Indonesia, Maldives and Seychelles
- **56 IOTWMS Communities** - 26 in India and 30 in Indonesia
- **100 Communities from 39 Countries**



Strengthening tsunami warning in the North-West Indian Ocean through regional cooperation: Phase 3

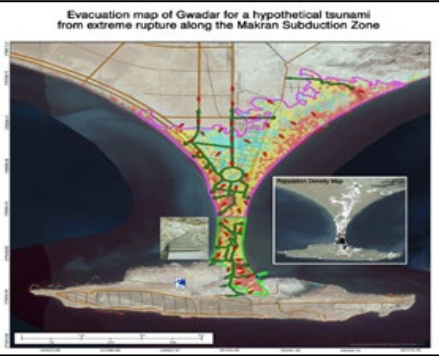
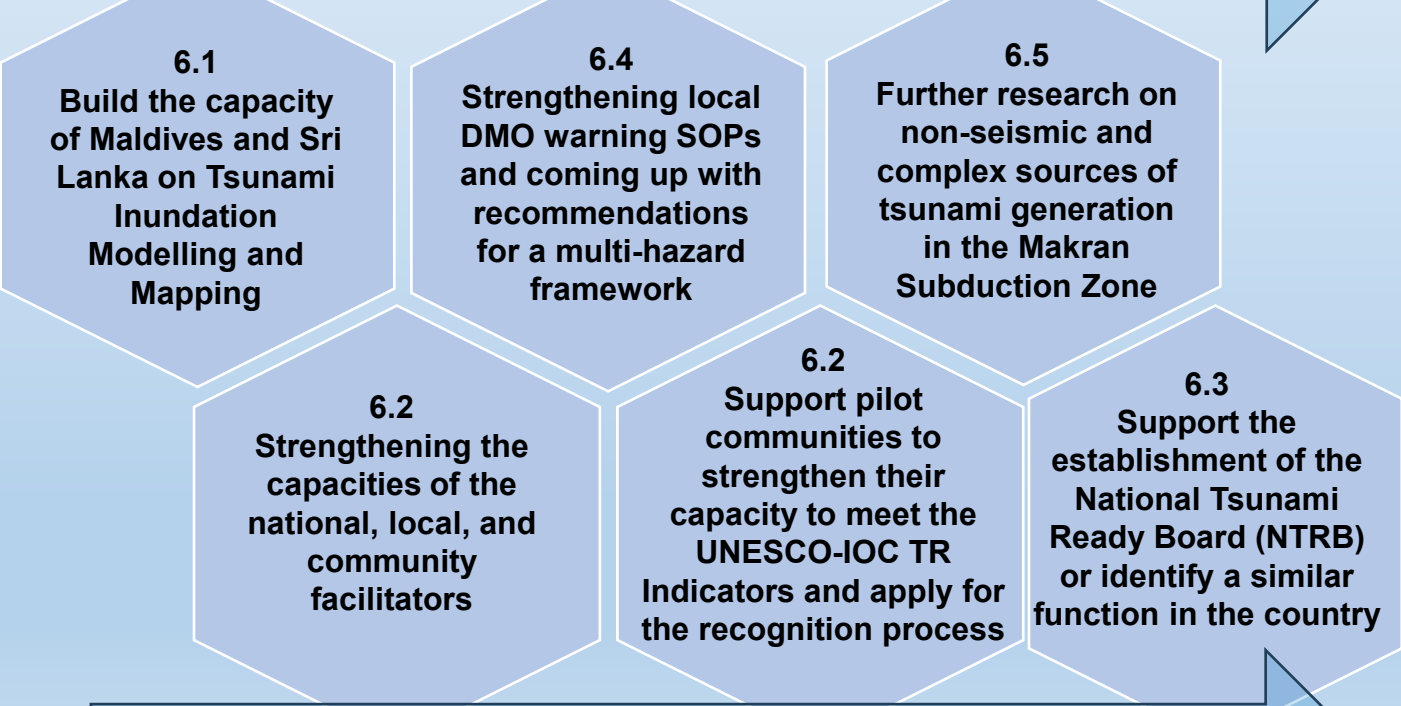


TRUST FUND FOR TSUNAMI, DISASTER AND CLIMATE PREPAREDNESS



Objective 6: Improved community capacities for tsunami preparedness and response that are in line with the set of indicators of the UNESCO Tsunami Ready Recognition Programme

Support the strengthening of Tsunami Ready Indicators



Pilot communities

- India:** Purakkad; Alappad / Okha; Pingleshwar
- Iran:** Chabahar, Jask
- Pakistan:** Gwadar, Karachi
- Maldives:** Diffushi, Fuvahmulah
- Sri Lanka:** Ambalangoda
- Oman:** Alhail North
- UAE:** Fujairah

Support for the planning and implementation of Tsunami Ready indicators in pilot communities

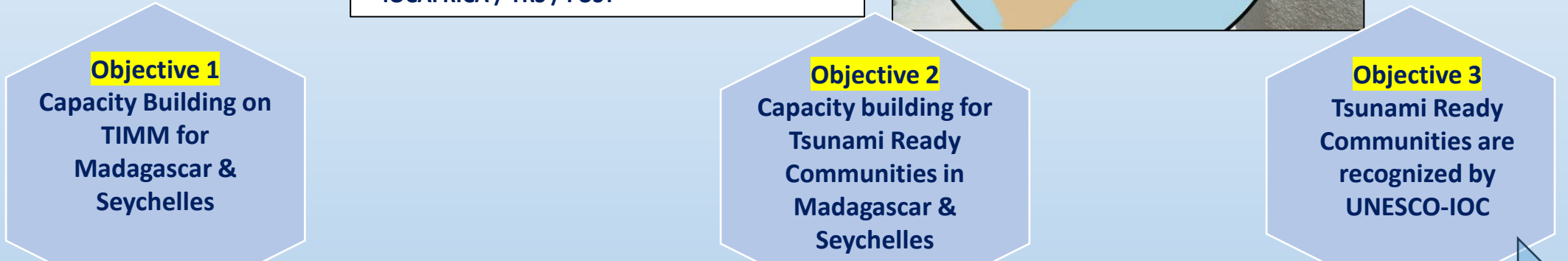
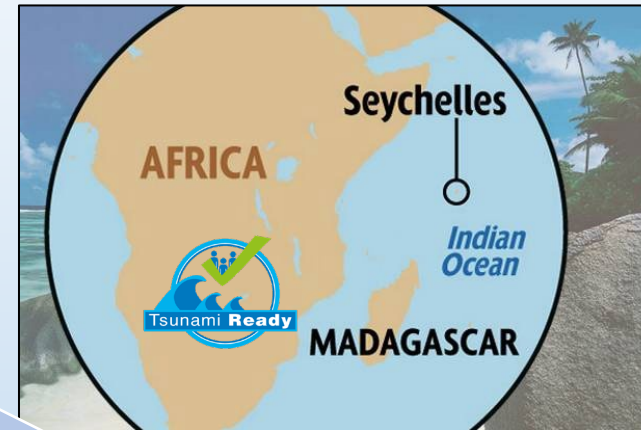


Strengthening Community Resilience to Ocean Hazards through implementation of Tsunami Ready in Indian Ocean SIDS and Africa

Complements the Projects on Strengthening Sea Level Monitoring and Data Management in East Africa for Coastal Resilience and Community Safety (SEAMARCS) - Kenya, Madagascar, Mozambique, Seychelles

- Project duration: 18 Months
- Budget: ~ USD 50,000
- Funding Agency: Flanders UNESCO Science Trust Fund (FUST)

- IOTIC & IOTWMS Secretariat
- IOTWMS Working Group – 3
- TNCs / TRFPs / Stakeholders / Coastal Communities - Madagascar, Seychelles
- IOCAFRICA / TRS / FUST



Support for the planning and implementation of Tsunami Ready indicators in pilot communities



Project Partners

TNCs / NTWCs / TWFPs / TRFPs / DMOs / Research Institutions / Academia / Community Reps

- India – INCOIS, NDMA, LDMO – OSDMA, KSDMA, GSDMA, MSDMA, A&N DMA
- Iran – INIOAS, NDMO, IIEES, LDMO, Uni of Hormozgan, Uni of Chabahar
- Maldives – NDMA, MMS, Island & Atoll Councils, Maldives National University
- Oman – DGMET, NCCD, LDMO, PACDA, SQU
- Pakistan – PMD, NDMA, NED University of Engineering & Technology
- Sri Lanka – DMC, DOM, Uni of Colombo, Uni of Moratuwa
- UAE – NCM, National Emergency Crisis and DMA

IOTWMS Secretariat, IOTIC, UNESCO Offices (Jakarta, Islamabad, New Delhi, Tehran, Doha)

WG-NWIO, WG-3, TSPs, C2Cs, OTGA - STCs

TNCs / NTWCs / TWFPs / TRFPs / DMOs / Research Institutions / Academia / Community Reps

- Madagascar – IOGA, CNRO
- Seychelles – DRDM, SMA

IOTWMS Secretariat, IOTIC, UNESCO Offices (Jakarta, Islamabad, New Delhi, Tehran, Doha)

WG-NWIO, WG-3, TSPs, C2Cs, OTGA - STCs

Implementation Plan

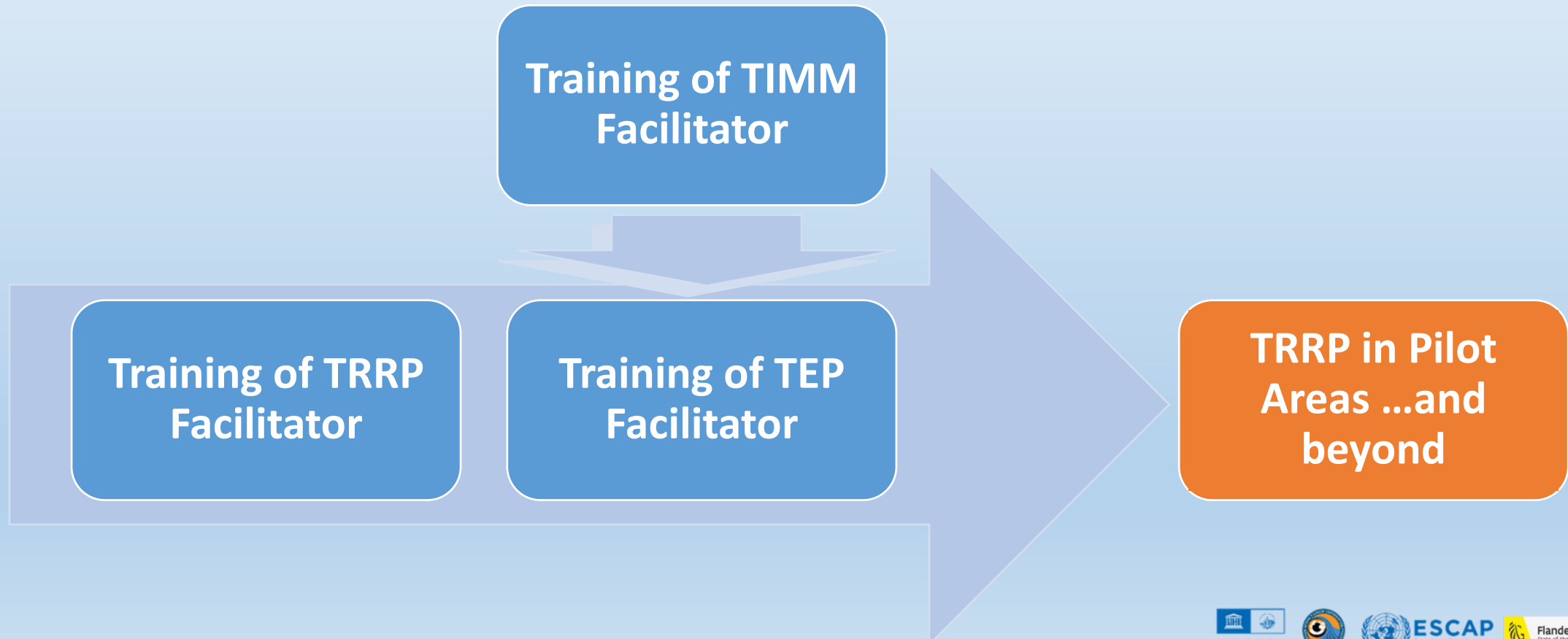
- 1 On-the-Job training for 2 experts from Maldives and Sri Lanka in India – Mid March 2026
- 2A Tsunami Ready Facilitators Training in Bali (5 Countries) – Mid May 2026
- 2B Support for Tsunami Ready Community Capacity Building (2 x 5 Countries)
- 2C National Consultants (5)
- 2D International Consultant (1) – TRRP Support
- 3 NTRBs Established (5)
- 4A SOP Workshop in India (5 Countries) - Mid August
- 4B International Consultant (1) – Local DMO Tsunami + Multi Hazard SOPs
- 5 International Consultant (1) - Non-seismic source tsunamis in Makran

Tsunami Ready Recognition Process for 10 Communities (5 Countries)

- On-the-Job training for 2 experts from Madagascar and 2 experts from Seychelles – Mid March 2026
- Facilitation for National Tsunami Ready Training in Madagascar (Venue and Meeting Package) - Mid May 2026
- Support for Tsunami Ready Community Capacity Building (1 each in Seychelles and Madagascar)
- **Tsunami Ready Recognition Process for 2 Communities (2 Countries)**

Overall Workprocess

Strengthening TRRP Capacities in the Indian Ocean region



TIMM, TEMPP and TR Indicators

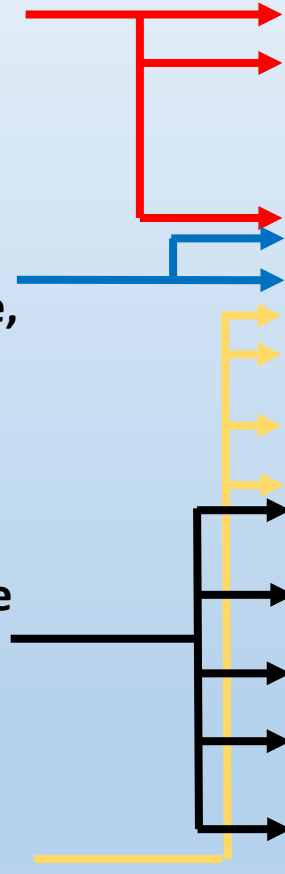
Tsunami Inundation
Modelling and Map

Tsunami Evacuation
Mapping, Plans, Route,
Signage

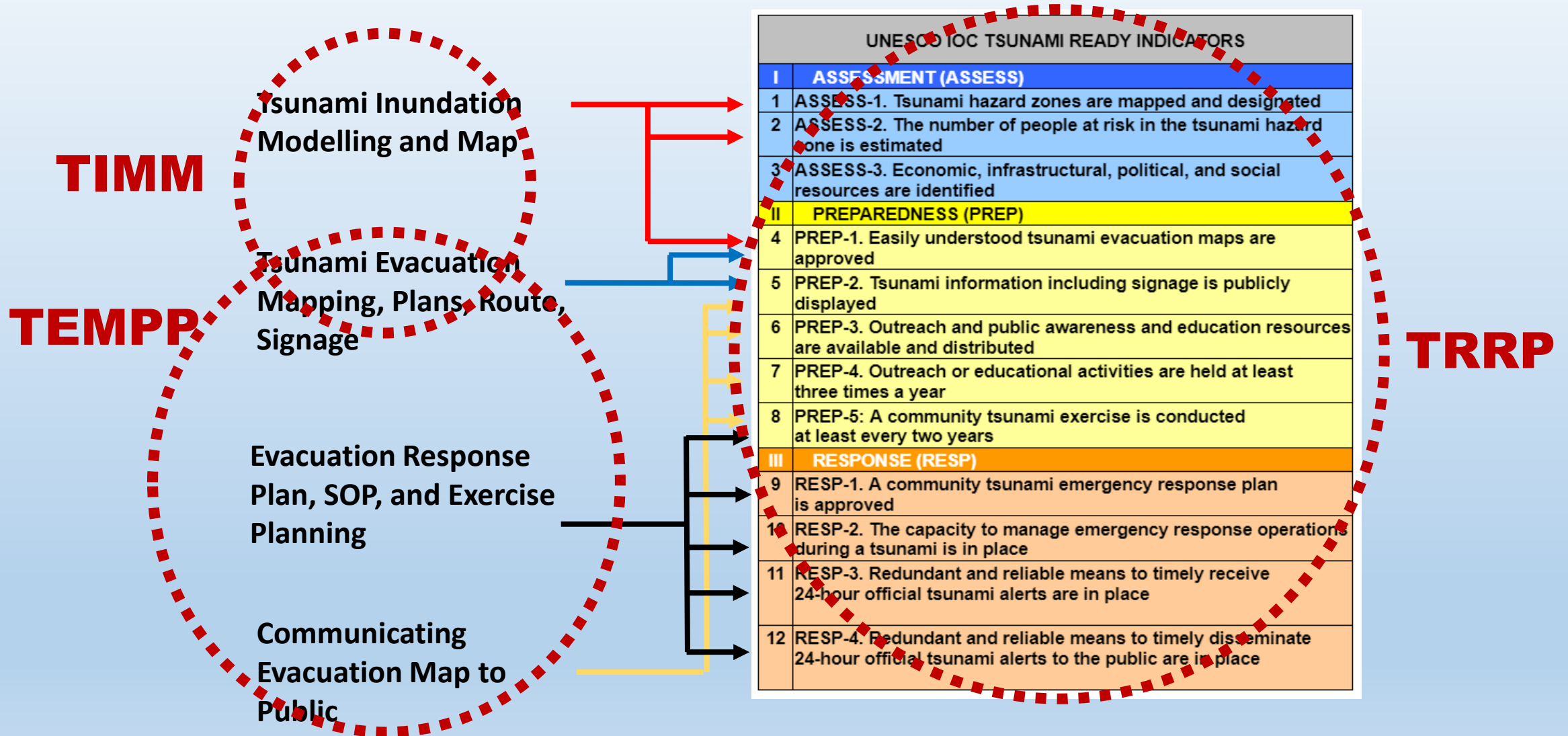
Evacuation Response
Plan, SOP, and Exercise
Planning

Communicating
Evacuation Map to
Public

UNESCO IOC TSUNAMI READY INDICATORS	
I	ASSESSMENT (ASSESS)
1	ASSESS-1. Tsunami hazard zones are mapped and designated
2	ASSESS-2. The number of people at risk in the tsunami hazard zone is estimated
3	ASSESS-3. Economic, infrastructural, political, and social resources are identified
II	PREPAREDNESS (PREP)
4	PREP-1. Easily understood tsunami evacuation maps are approved
5	PREP-2. Tsunami information including signage is publicly displayed
6	PREP-3. Outreach and public awareness and education resources are available and distributed
7	PREP-4. Outreach or educational activities are held at least three times a year
8	PREP-5: A community tsunami exercise is conducted at least every two years
III	RESPONSE (RESP)
9	RESP-1. A community tsunami emergency response plan is approved
10	RESP-2. The capacity to manage emergency response operations during a tsunami is in place
11	RESP-3. Redundant and reliable means to timely receive 24-hour official tsunami alerts are in place
12	RESP-4. Redundant and reliable means to timely disseminate 24-hour official tsunami alerts to the public are in place



TIMM, TEMPP and TR indicators



Objective of TIMM

Training of facilitators

Strengthen the **conceptual and practical capacities** of professionals from Indian Ocean institutions as **technical resource persons and facilitators** in tsunami evacuation plan development processes for the Tsunami Ready pilot areas and beyond

V. Programme:

(Sunday): Arrival in INCOIS and settle in INCOIS Guest House.

Day 1 (Monday): Orientation, Tsunami Science Refresher & Data Foundations

- Opening
- Introduction to inundation modelling concepts
- Review of pilot sites and available datasets
- DEM development, integrating bathymetry & topography
- Data quality control and initial grid generation

Day 2 (Tuesday): Scenario Development & Model Input Preparation

- Selecting credible tsunami sources
- Historical and synthetic scenarios
- Preparing model inputs and parameters
- Finalizing grids and boundary conditions

Day 3 (Wednesday): Model Setup, Execution & Sensitivity Analysis

- Model setup, grid nesting, and boundary conditions
- Running simulations
- Conducting sensitivity analyses
- Troubleshooting model performance

Day 4 (Thursday): Inundation Mapping & Hazard Products

- Extraction of inundation layers
- Developing flood depth, velocity, and arrival-time maps
- Hazard classification
- GIS map styling, layout, and metadata standards

Day 5 (Friday): Development of Tsunami Hazard Map & Way Forward

- Review and refinement of outputs
- Integrate multi-scenario results (worst-case, credible, buffering, etc.).
- Apply GIS processing and cartographic standards (symbology, color coding, legend design, metadata, etc.).
- Incorporate exposure and local context (street, landmarks, critical infrastructure, etc.).

Day 6 (Saturday): Presentation and Way Forward

- Country presentations and peer feedback
- Roadmap for completing hazard maps and meeting TRRP milestones
- Depart for home country

(Sunday): Depart for home country.

Trainer Team and Participants

10 Facilitators

1. Mahendra R S
2. Patanjali Kumar Ch
3. Siva Srinivas K
4. Gaurav Khairnar
5. Ajay Kumar B
6. Vicki Ferrini
7. Madeliene Young
8. Srinivasa Kumar Tummala
9. Nora Huaia Gale
10. Ardito Marzoeki Kodijat



Participants

17 Participants
5 Countries



#	Country	Name	Email
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3	Seychelles	Adam Bahati Shindo	a.shindo@meteo.sc Baya09@hotmail.com
4	Seychelles	Dave Roseline	mdroseline@mluh.gov.sc
5	Seychelles	Doreen Ikula	doreen.ikula@meteo.sc ; chathura@dmc.gov.lk
6	Sri Lanka	Chathura Liyana Arachchiege	dirpreparednessplanning@dmc.gov.lk
7	Sri Lanka	Nadarajah Sooriyarajah	tnsooriyarajah@gmail.com ;
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17	India	Santosh Kumar	s.gundu.ra@incois.gov.in

About the Training




- Joint Learning
- Hands-on with real cases
- Process knowledge
- Thematic knowledge
- Facilitation skills
- Presentations
- Group Works
- Peer Feedback

Important to know

- Respect each other
- On-time management
 - Start on time – Finish on time
 - Mindful to the allocated time for presentations
- Ask Questions
 - Straightforward and to the point.
- Daily feedback
- Reference documents
- All PPT will be shared after the training
- Have Fun

Daily Evaluation

To know how things are going and what can be improved

			
Relevance of content			
My learning			
Group work			
Training method			
Workshop logistics			

Thank you