UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

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Intergovernmental Oceanographic Commission

Progress Report
Strengthening tsunami early warning in the North-west Indian Ocean region through regional cooperation

Phase 2a, 2b, 2c ➔ 3

25th Meeting of the Advisory Council to the Trust Fund for Tsunami, Disaster and Climate Preparedness
04 November 2024

Acknowledgement
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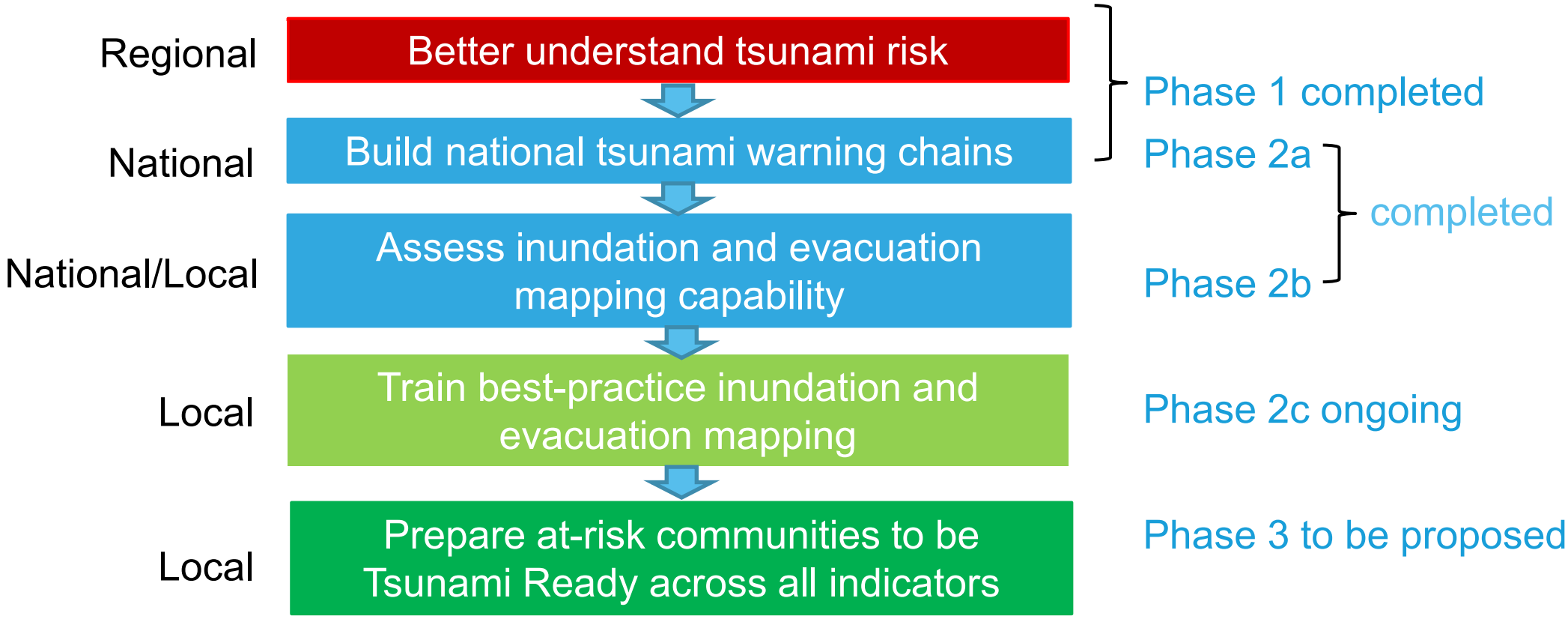
Objectives

Programmatic Approach



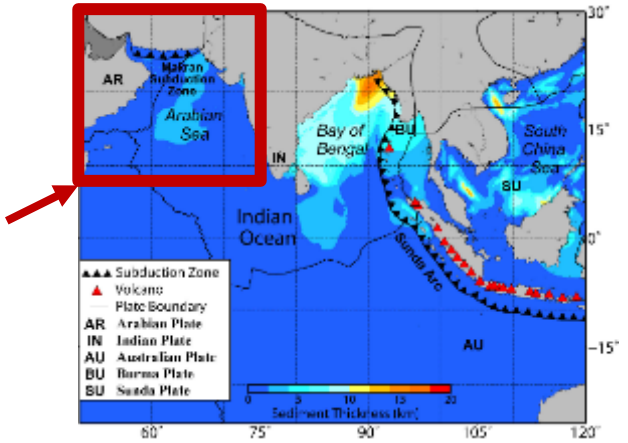
Risk Assessment

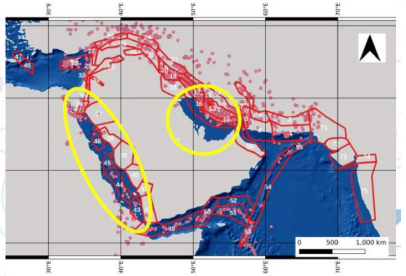
Phase 1 & 2a: Completed

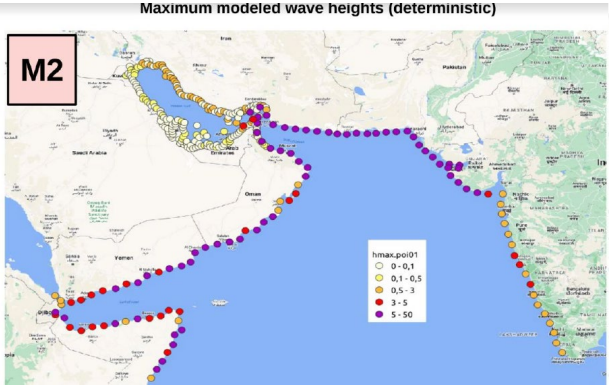
Hazard and risk assessments inform countries on preparedness required

Better understanding of the tsunami risk knowledge to inform and underpin warning and mitigation systems in the NWIO to enable appropriate and effective community responses to the tsunami threat.

- With additional in-kind support from global tsunami modelling experts from Germany (GFZ), Italy (INGZ), Norway (NGI), and India (INCOIS), a **Probabilistic Tsunami Hazard Assessment (PTHA)** has been completed for NW Indian Ocean
- Indian Centre for Ocean Information Services (INCOIS) will host output and make available for NWIO countries
- UNESCO-IOC Intergovernmental Coordination Group for Indian Ocean Tsunami Warning & Mitigation System (ICG/IOTWMS) will further utilize to include different source mechanisms and expand to whole of Indian Ocean





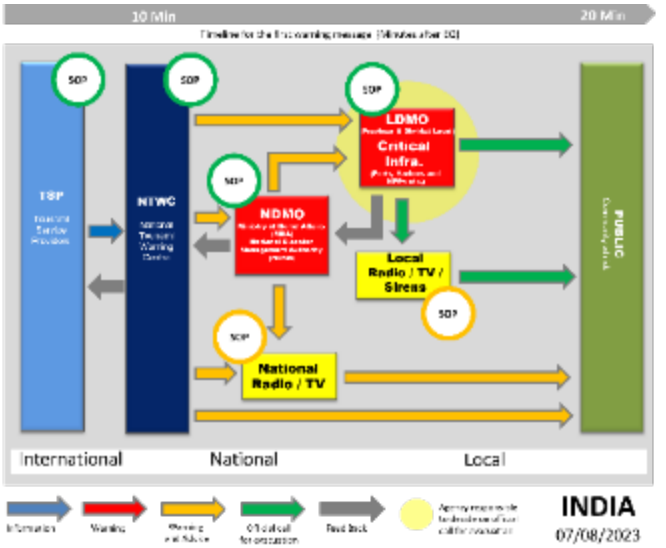


Tsunami Warning Chaing and SOP

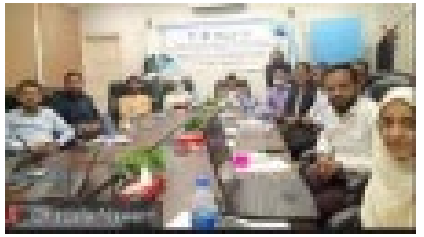
Phase 1 & 2a: Completed

Improvement of warning services at NTWC level and the organization of the national warning chains to assure timely warnings.

For at-risk communities to respond to the tsunami threat, the warnings must reach all in the community efficiently in the very short time available



- Each country has different authorities and links in the national tsunami warning chain, therefore the required national stakeholder relationships and working groups were established
- Every link in the national chains (National Tsunami Warning Centre (NTWC), Disaster Management Offices (DMOs), other relevant authorities, broadcast media, and public) and underpinning SOPs have been reviewed and revised through regional and national workshops
- UNESCO-IOC Intergovernmental Coordination Group for Indian Ocean Tsunami Warning & Mitigation System (ICG/IOTWMS) assists countries to test their warning chains and SOPs through tsunami warning exercises in each ocean basin every two years (IOWave24)



Gap Analysis

Phase 2b: Completed

Identify where national expertise exists and where capacity development is required

Inundation Mapping

- **Regional Working Group for Tsunami Inundation Modelling and Mapping (RWG-TIMM)** was established to help coordinate existing experts in the region and to provide a regional ongoing optimal mass
- **Global experts provided awareness of latest best-practices** and to help identify capacity building requirements
- **Regional workshop "Makran Subduction Zone Science Strengthening Tsunami Warning and Preparedness"** 14-16 November 2023 Abu Dhabi – UAE
- UNESCO-IOC Intergovernmental Coordination Group for Indian Ocean Tsunami Warning & Mitigation System (ICG/IOTWMS) will utilize the identified latest best practices to expand inundation mapping capability across the Indian Ocean

	India	Iran	Oman	Pakistan	UAE
Shallow Water Bathymetry	200 m Res. GEBCO	450 m Res. (15 arcsec GEBCO) Industry data	450 m Res. (15 arcsec GEBCO)?	Variable, 10 m in Pilot Regions	450 m Res. (15 arcsec GEBCO)
DEM	5-10m SRTM	30 m SRTM	SRTM	10 m SRTM	10 m High resolution Satellite Data
Land Use Information	Maps 1:5000	Not available	Not available	Not available	Basic map
Model Used	Tunami-N2 ADCIRC	ComMit GEOWAVE MIKE-21 Tunami-N2	COMCOT	GUITAR TOAST GeoClaw	ComMIT
Type of Studies	Deterministic	Deterministic/ Probabilistic	Deterministic/ Probabilistic	Deterministic	Deterministic

Output 3: Gap Analysis

Phase 2b: Completed

Identify where national expertise exists and where capacity development is required

Evacuation Mapping:

- **National Working Groups for Tsunami Evacuation Planning (NWG-TEP) were established** in each country to help coordinate existing experts in general evacuation mapping planning, who can be utilised to develop tsunami evocation maps
- **Tsunami Evacuation Planning Information Package** (and translated into Farsi), detailing best-practices
- Representatives from each country were supported to attend the **UNESCO-IOC INDIAN OCEAN TSUNAMI READY HYBRID WORKSHOP, 22 – 26 November 2022, in Bali Indonesia**, to further benefit from first-hand experiences and training in best-practices**.**
- UNESCO-IOC Tsunami Ready Recognition Programme (TRRP) helps countries to make at-risk communities prepared for the tsunami threat

Hazard and inundation mapping capabilities

Phase 2c: Completed

Training in development of tsunami inundation maps by enhancing capacities in tsunami modelling

Muscat, Oman 19 – 23 April 2024

- Discussed the roadmap for the further implementation and development of the PTHA.
- Prepared local inundation maps: strategy, approach and uncertainties.
- Discussed the role of scientists (modelers) in the implementation of national and local DRR strategies.
- Discussed expectations and needs of evacuation planning from the modelers.
- Presented and discussed the progress inundation modelling in 5 pilot regions around NWIO to be addressed in the TEP meeting.

Evacuation mapping capabilities

Phase 2c: Completed

Training in development of evacuation plans to facilitate effective community responses to the threat from near-field and far-field tsunamis.

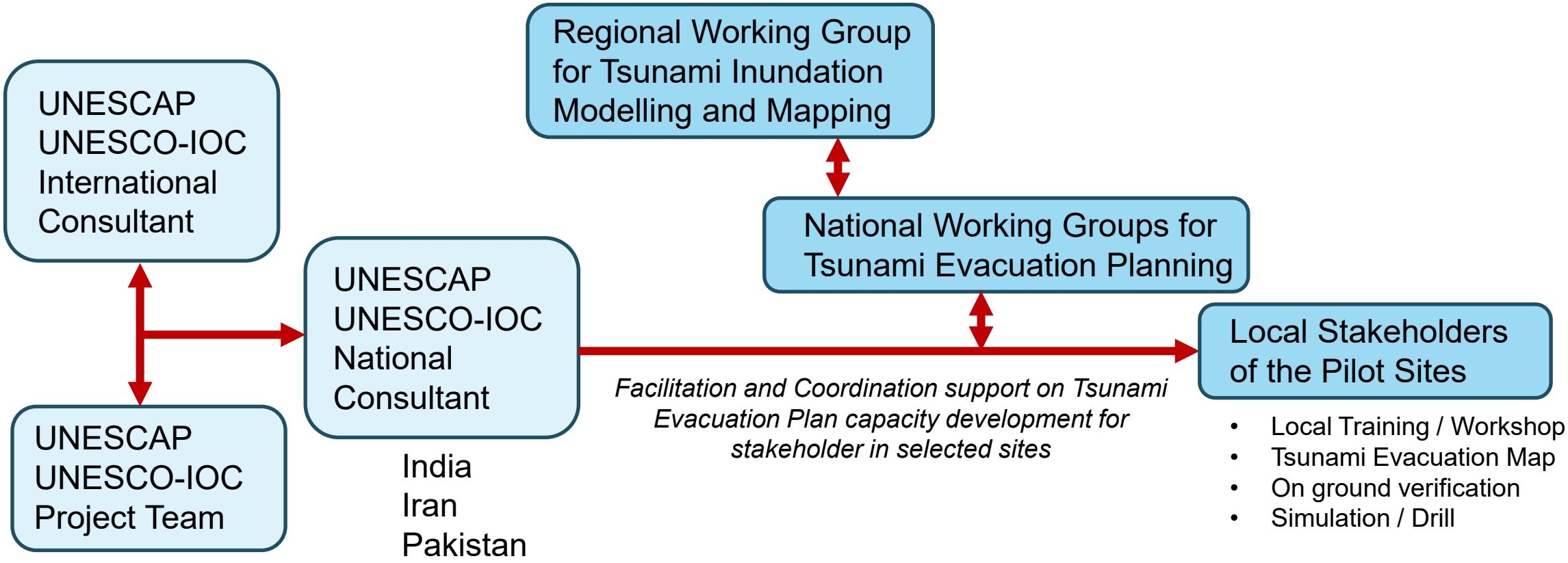
Muscat, Oman 21-15 April 2024

- Reviewed designated hazard and inundation maps
  - Outlining evacuation zone(s)
  - Identifying vulnerable groups and elements
- Worked on the overall evacuation strategy
- Identify evacuation routes and signage requirements
- Defined evacuation procedures
- Discussed features of a public evacuation map
- Discussed methods for consultation and process for approval of a draft TEP
- Discussed strategies and methods to make the approved TEP known and understood by the public
- Discussed policies for exercising and revision processes

Piloting in In country Selected Sites

Phase 2c: On-going (until November 2024)

Engaged with National Consultant to support the facilitation coordination at the local level to Pilot Tsunami Evacuation Plan in selected sites in the country.



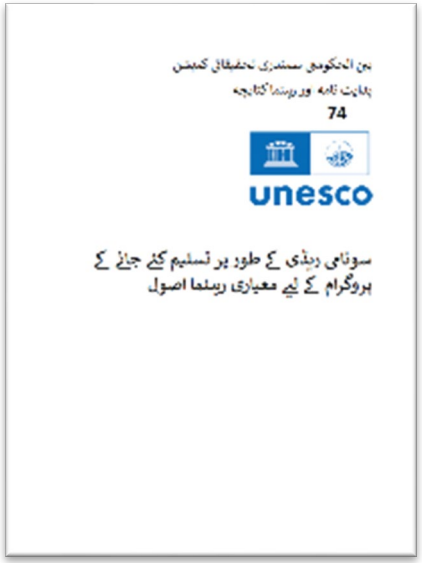
Translate Manual and Guides

Phase 2c: On-going (Until November 2024)

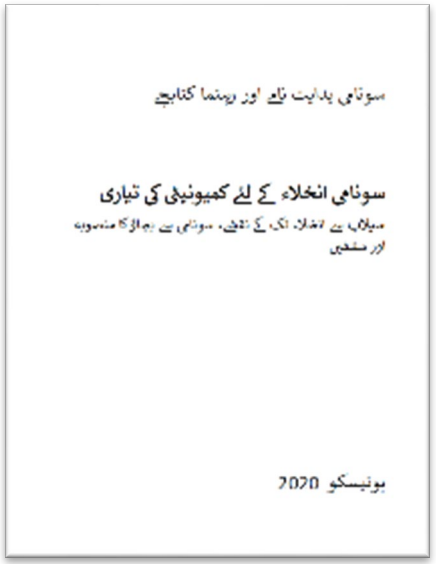
Engaged with National Consultant to support the translation of UNESCO-IOC Manual and Guide .

Translation of MG 74 (Tsunami Ready) to Farsi

Translation of MG 82 (Preparing For Community Tsunami Evacuation) to Farsi



Translation of MG 74 (Tsunami Ready) to Urdu



Translation of MG 82 (Preparing For Community Tsunami Evacuation) to Urdu

The Karachi Folio
Impact of 1945 Tsunami

Tsunami Evacuation Maps Plans and Procedures

Phase 2c: Planned (Under No Cost Extension, planned for February 2025)

Organize TEMPP training capitalizing on lessons learnt of the Makran and Eastern Indian Ocean regions' experience toward the implementation of Tsunami Ready for better Indian Ocean Tsunami Resiliency

- Tsunami Inundation Modeling and Mapping (TIMM): 4 days
- Tsunami Evacuation Maps, Plans and Procedures (TEMPP): 4 days
- Tsunami Ready Implementation Planning (TRIP): 3 days

IOTIC UNESCO-IOC, UNESCAP, INCOIS, and BMKG
Indian Ocean Regional Training/Workshop 2025
Tsunami Inundation Map and Evacuation Maps, Plans, and Procedures and Tsunami Ready Implementation Planning
TIMEMPP – TRIP

Day 0 Sunday	Day 1 Monday	Day 3 Tuesday	Day 4 Wednesday	Day 6 Thursday	Day 6 Friday	Day 7 Saturday	Day 8 Sunday	Day 9 Monday	Day10 Tuesday	Day 11 Wednesday	Day 12 Thursday
1	2	3	4	5							
Arrival of Tsunami Modelling and Inundation Mapping (TMIM) Participants	TMIM (Day 1)	TMIM (Day 2)	TMIM (Day 3)	TMIM (Day 4)							
		1	2	3	4	5	6	7	8	9	Departure of Tsunami Evacuation Map, Plans and Procedures (TEMPP) and Tsunami Ready (TRIP) Participant
		Arrival of Tsunami Evacuation Map, Plans and Procedures (TEMPP) and Tsunami Ready (TRIP) Participant	TEMPP (Day1)	TEMPP (Day2)	TEMPP (Day3)	TEMPP (Day4)	Free Day	TRIP (Day1)	TRIP (Day2)	TRIP (Day3)	
					Departure of Tsunami Modelling and Inundation Mapping (TMIM) Participants						

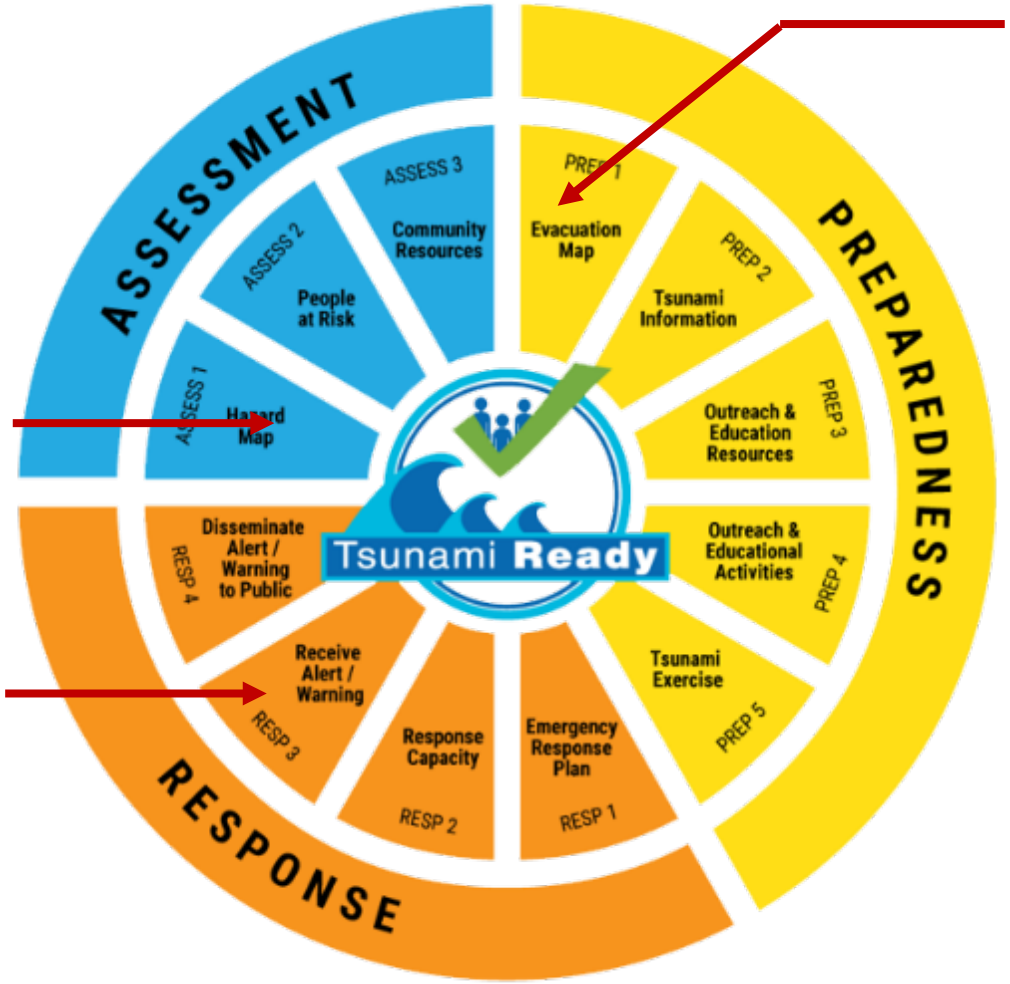
Member States Participants: 25 Countries.
Australia, Comoros, Bangladesh, France La Reunion, India, Indonesia, Iran, Kenya, Malaysia, Madagascar, Maldives, Mauritius, Myanmar, Mozambique, Oman, Pakistan, Singapore, Seychelles, South Africa, Sri Lanka, Tanzania, Thailand, Timor Leste, United Arab Emirates, Yemen.

Tsunami Ready Implementation in Pilot Sites

Phase 3: Proposed for (2025-2027)

Tsunami Ready consist of 12 key indicators designed to strengthen local tsunami risk reduction capacity. The indicators are group into three categories:

Assessment
Preparedness and Response



Note:

- Proposal to be submitted mid 2025 After the External Evaluation (March 2025)
- Proposal to Include Maldive (IO SIDS)

Tsunami Ready Implementation in Pilot Sites

Phase 3: Proposed for (2025-2027)

Gwadar - Pakistan

Chabahar - Iran

Kerala - India

Male - Maldives

Karachi - Pakistan

Jask - Iran

Gujarat - India

Dhifusi - Maldives

THANK YOU