2024 Capacity Assessment of Tsunami Preparedness in the Indian Ocean – Results from survey data analysis

Sessional Committee Discussion
18th November 2024

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Intergovernmental Oceanographic Commission

Discussion Team of Sessional Committee

1. Dr.Harkunti P. Rahayu (Chair Session)
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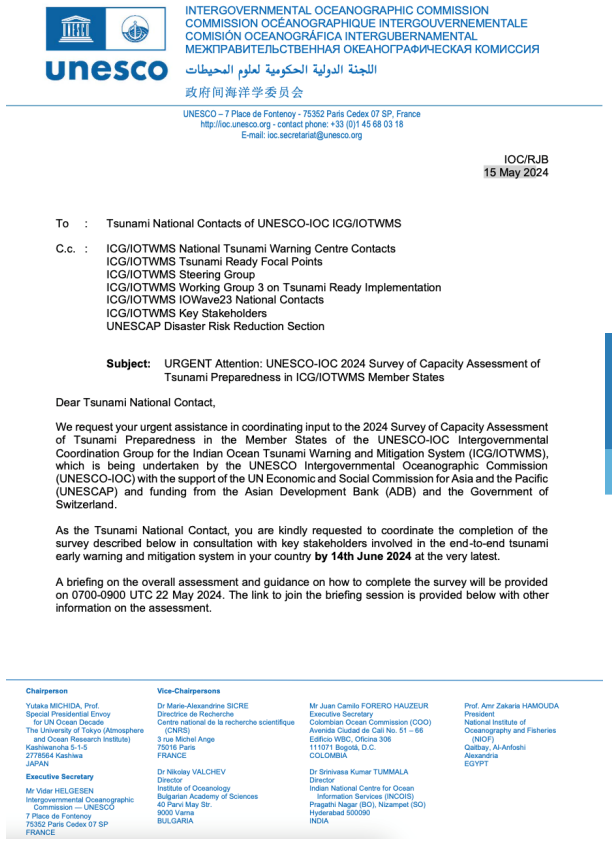
3. Prof Dilanti Amaratunga (Expert for Data Compilation)
4. Dr. Deni Septiadi (Indonesia)
5. Dr. Nasser Al Ismaili (Oman)
6. Dr. Ranganali S. Mahendra (India)
7. Ms. Hidayanti (Indonesia)
8. Mr. Gita Priyo Aditya (Indonesia)

Who completed the survey?

- Responses to the survey were coordinated, compiled, and submitted by **Tsunami National Contact (TNC)** of each Member State.
- The survey had six distinct parts (I-VI). Each part may have needed inputs from different stakeholders based on their national responsibility in the end-to-end tsunami warning and mitigation system.



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COMISIÓN OCEANOGRÁFICA INTERGUBERNAMENTAL
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اللجنة الدولية الحكومية لعلوم المحيطات
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IOC/RJB
15 May 2024

To : Tsunami National Contacts of UNESCO-IOC ICG/IOTWMS

C.c. : ICG/IOTWMS National Tsunami Warning Centre Contacts
ICG/IOTWMS Tsunami Ready Focal Points
ICG/IOTWMS Steering Group
ICG/IOTWMS Working Group 3 on Tsunami Ready Implementation
ICG/IOTWMS IOWave23 National Contacts
ICG/IOTWMS Key Stakeholders
UNESCAP Disaster Risk Reduction Section

Subject: URGENT Attention: UNESCO-IOC 2024 Survey of Capacity Assessment of Tsunami Preparedness in ICG/IOTWMS Member States

Dear Tsunami National Contact,

We request your urgent assistance in coordinating input to the 2024 Survey of Capacity Assessment of Tsunami Preparedness in the Member States of the UNESCO-IOC Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWMS), which is being undertaken by the UNESCO Intergovernmental Oceanographic Commission (UNESCO-IOC) with the support of the UN Economic and Social Commission for Asia and the Pacific (UNESCAP) and funding from the Asian Development Bank (ADB) and the Government of Switzerland.

As the Tsunami National Contact, you are kindly requested to coordinate the completion of the survey described below in consultation with key stakeholders involved in the end-to-end tsunami early warning and mitigation system in your country **by 14th June 2024** at the very latest.

A briefing on the overall assessment and guidance on how to complete the survey will be provided on 0700-0900 UTC 22 May 2024. The link to join the briefing session is provided below with other information on the assessment.

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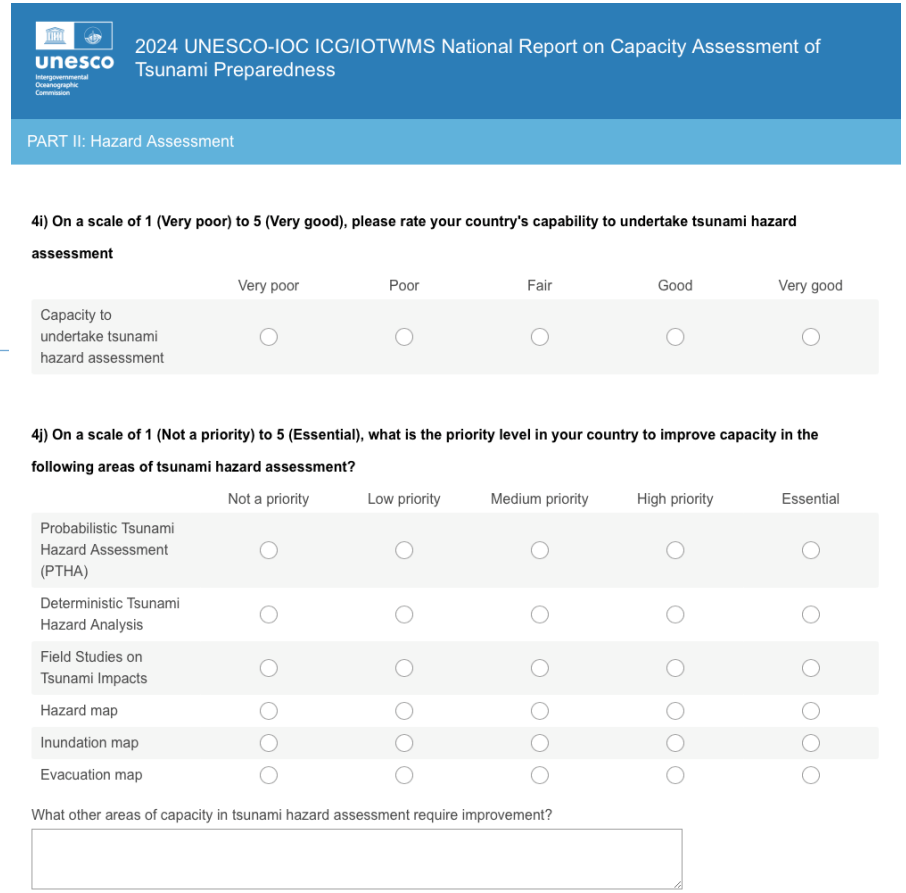

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2024 UNESCO-IOC ICG/IOTWMS National Report on Capacity Assessment of Tsunami Preparedness

PART II: Hazard Assessment

4i) On a scale of 1 (Very poor) to 5 (Very good), please rate your country's capability to undertake tsunami hazard assessment

	Very poor	Poor	Fair	Good	Very good
Capacity to undertake tsunami hazard assessment	○	○	○	○	○

4j) On a scale of 1 (Not a priority) to 5 (Essential), what is the priority level in your country to improve capacity in the following areas of tsunami hazard assessment?

	Not a priority	Low priority	Medium priority	High priority	Essential
Probabilistic Tsunami Hazard Assessment (PTHA)	○	○	○	○	○
Deterministic Tsunami Hazard Analysis	○	○	○	○	○
Field Studies on Tsunami Impacts	○	○	○	○	○
Hazard map	○	○	○	○	○
Inundation map	○	○	○	○	○
Evacuation map	○	○	○	○	○

What other areas of capacity in tsunami hazard assessment require improvement?

Structure of the survey (from the 4 Pillar of EWALL)

I Basic Information about TNC/NTWC/TWFP
II Risk Assessment (**Pillar I**) and Reduction (**Pillar IV**)
III Detection, Warning (**Pillar II**) and Dissemination (**Pillar III**)
IV Public Awareness, Preparedness and Response (**Pillar IV**)
V Tsunami Ready Recognition Programme (TRRP) (**Pillar I, III, IV**)
VI Narrative

Sample

Tanzania, Timor-Leste (2)

18 + 2 = 20 in 2018

Australia, Bangladesh, Comoros, France (Indian Ocean Territories), India, Indonesia, Iran, Kenya, Madagascar, Malaysia, Mauritius, Mozambique, Myanmar, Oman, Pakistan, Singapore, Sri Lanka, Thailand (18)

18 + 4 = 22 in 2024

Maldives, Seyshelles, South Africa, United Arab Emirates (4)

Limitations

- Where possible, summary data from the 2018 survey is displayed alongside the 2024 results to aid comparisons.
- Caution should be used when drawing direct comparisons between the results.
  - Differences in the composition of countries responding to the 2018 and 2024 surveys
  - Changes to the personnel who completed the survey on behalf of each country
- It is a self assessment and responses have not been validated

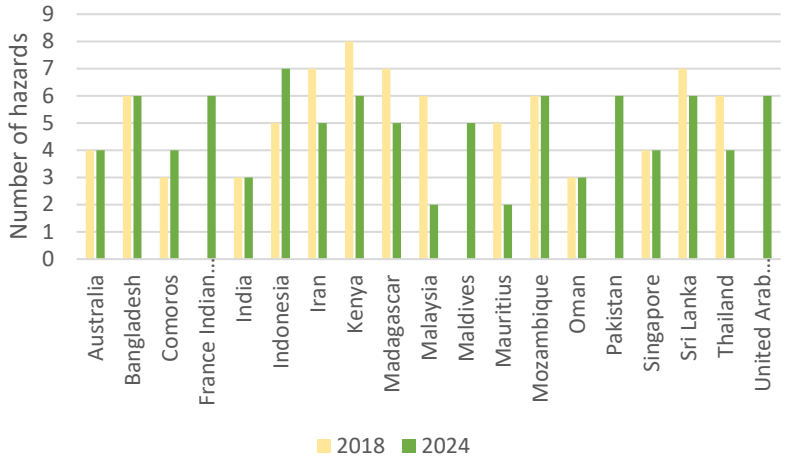


Figure 2: Number of hazards included in a multi-hazard assessment

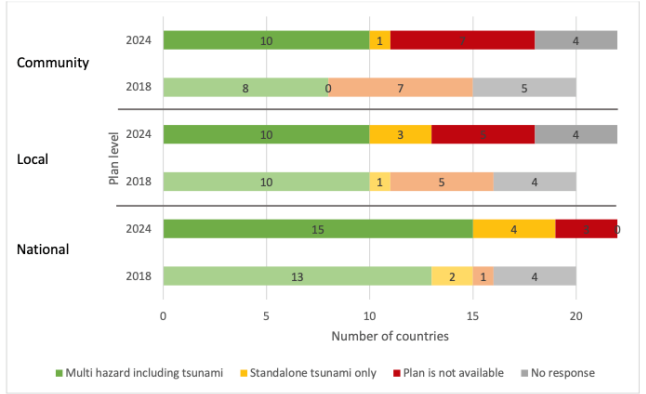


Figure 22: Availability of national, local and community level tsunami disaster risk reduction plans during emergency response phase

Table 1: Ranking of priority areas for capacity improvement in tsunami hazard assessment

Areas of tsunami hazard assessment	RII	2024 Rank (2018 Rank)
Evacuation map	0.85	1 (1)
Hazard map	0.81	2 (2)
Inundation map	0.81	2 (3)
Deterministic tsunami hazard analysis	0.76	4 (4)
Probabilistic tsunami hazard assessment (PTHA)	0.75	5 (6)
Field studies on tsunami impacts	0.67	6 (5)

Pillar 1

2. RISK ASSESSMENT AND REDUCTION – HAZARD ASSESSMENT

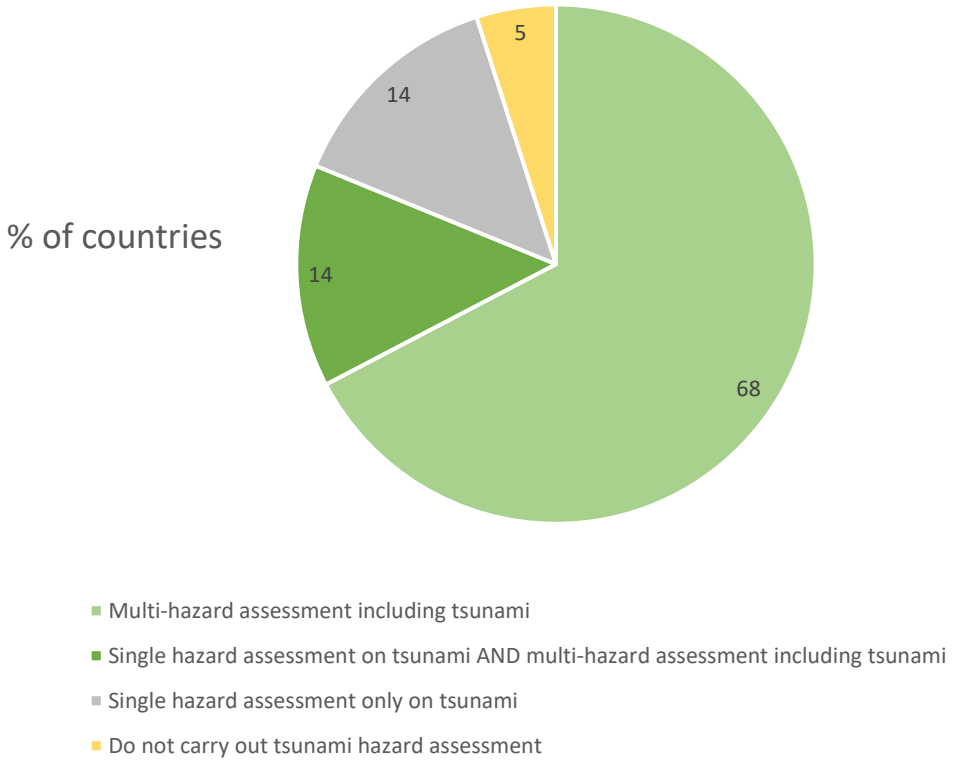


Figure 1: Type of hazard assessment

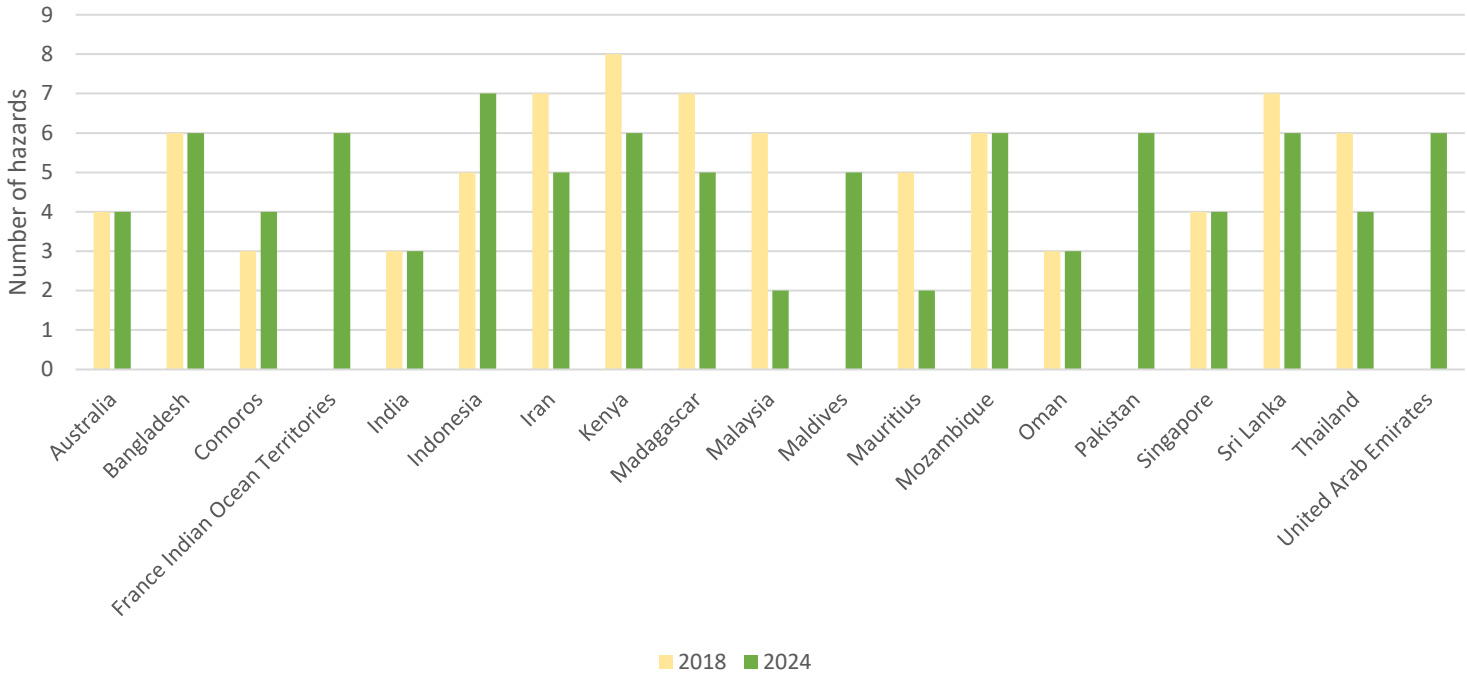


Figure 2: Number of hazards included in a multi-hazard assessment

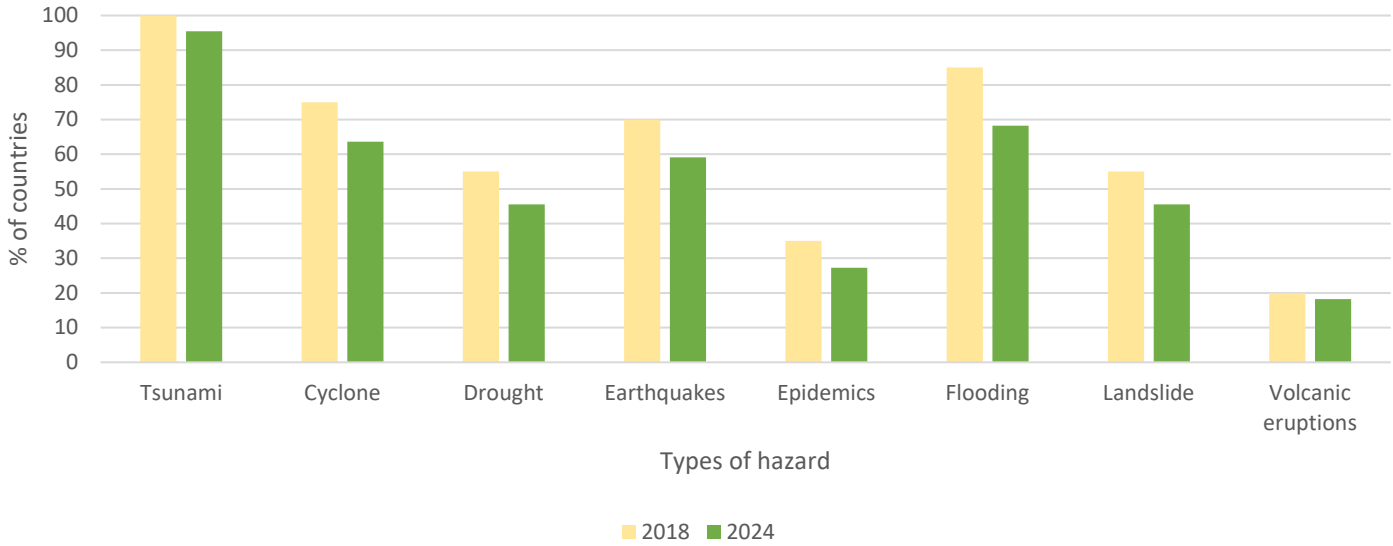


Figure 3: Type of hazard(s) included in multi-hazard assessment

2. RISK ASSESSMENT AND REDUCTION –
HAZARD ASSESSMENT

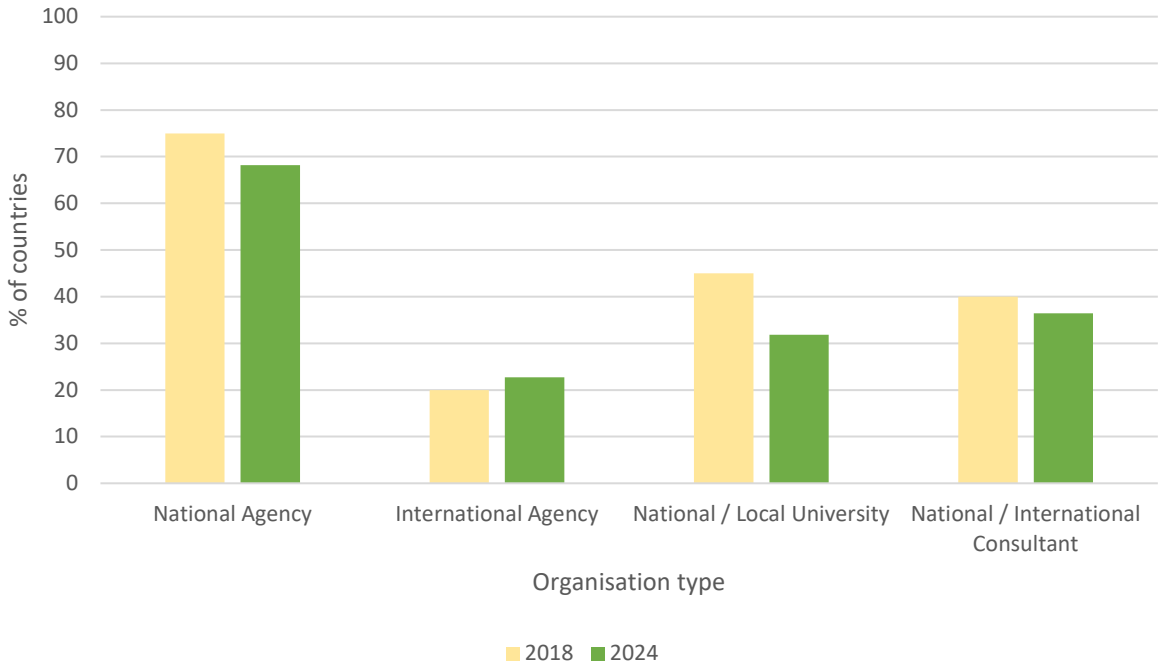


Figure 4: Organisation(s) responsible for the tsunami hazard assessment

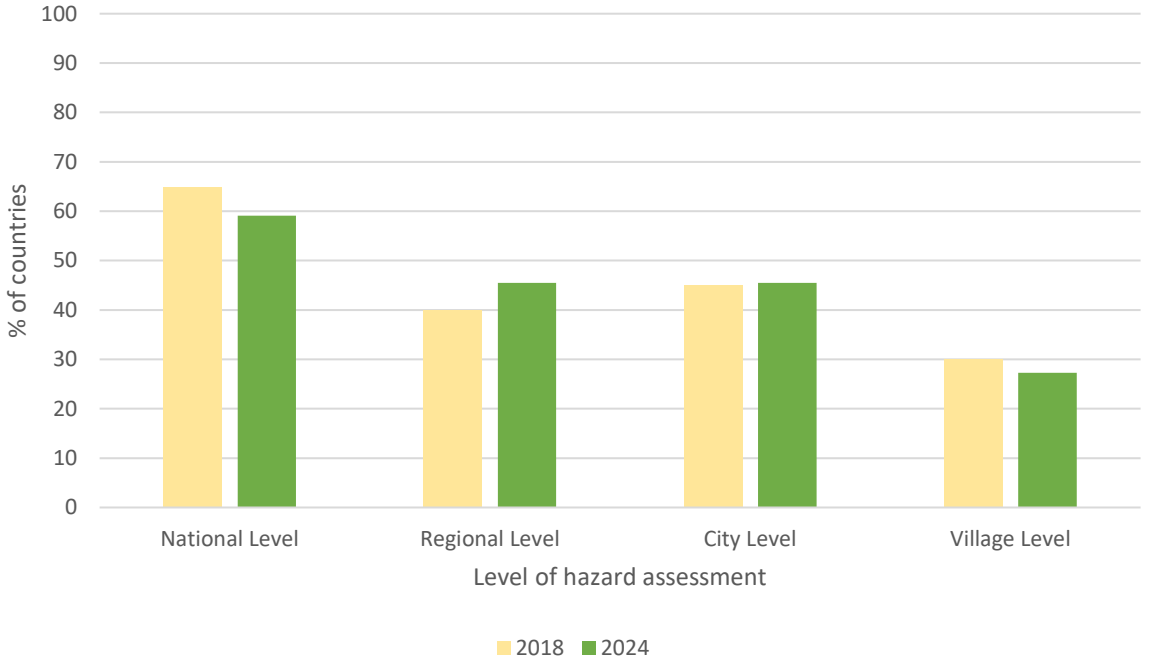


Figure 5: Level at which tsunami hazard assessment is carried out

2. RISK ASSESSMENT AND REDUCTION –
HAZARD ASSESSMENT

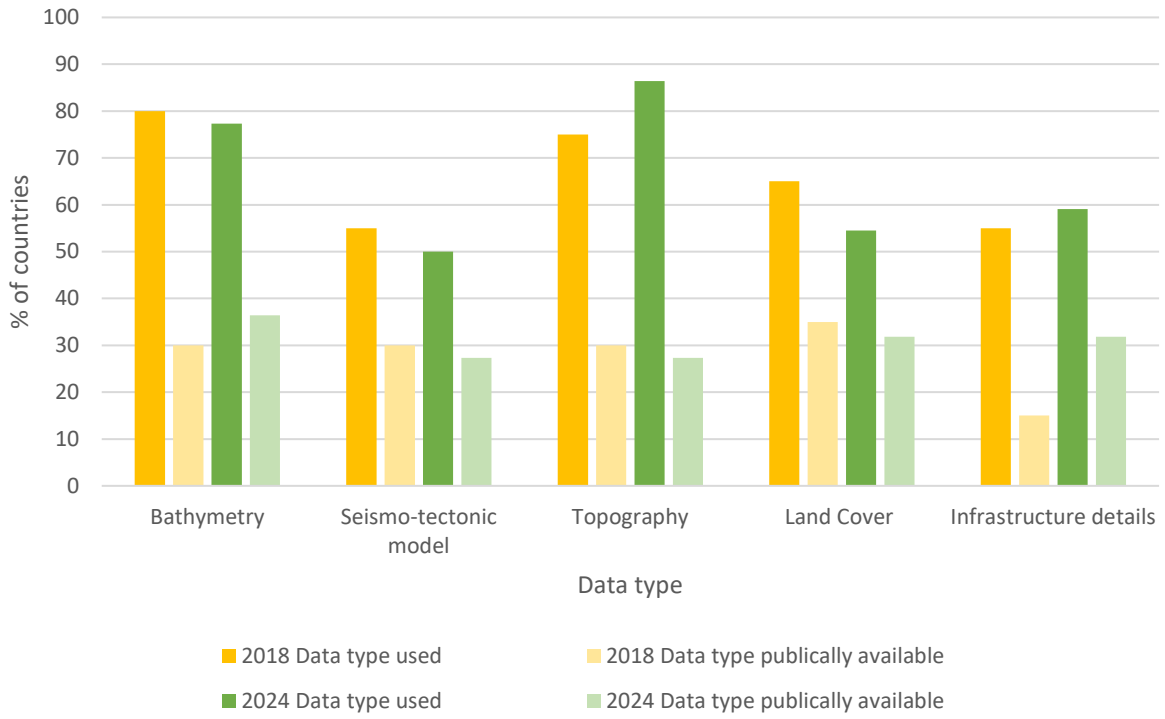


Figure 6: Data types used for tsunami hazard assessment

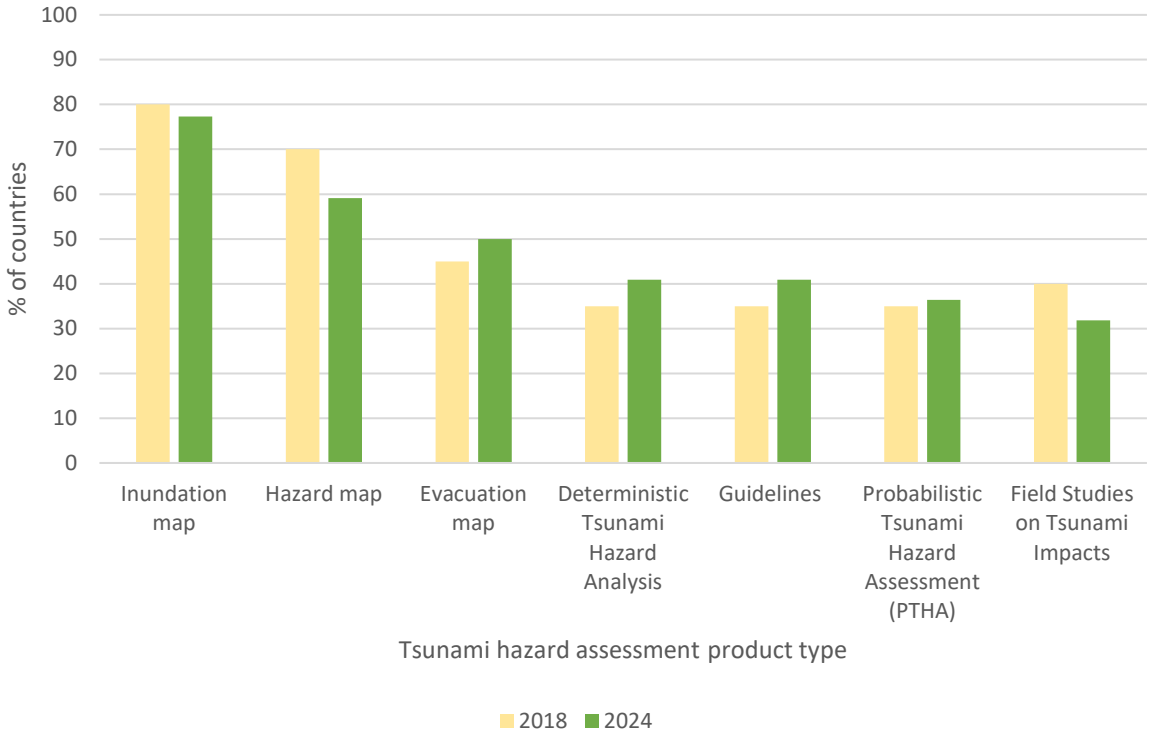
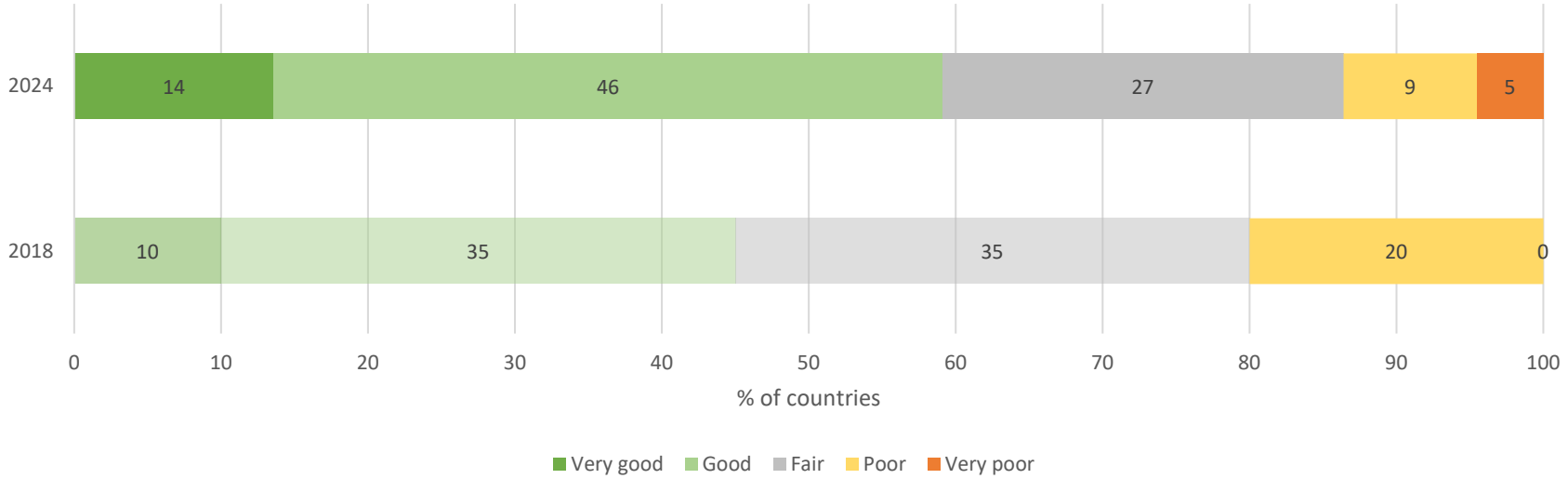


Figure 7: Products from tsunami hazard assessment

2. RISK ASSESSMENT AND REDUCTION –
HAZARD ASSESSMENT



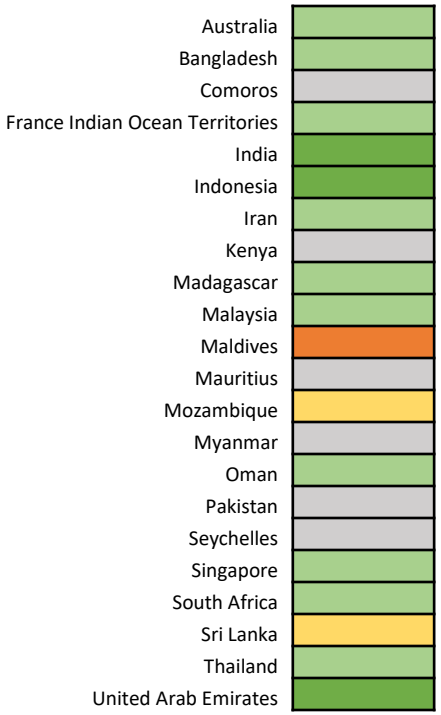


Figure 9: Capacity to undertake tsunami hazard assessments

Areas of tsunami hazard assessment	RII	2024 Rank (2018 Rank)
Evacuation map	0.85	1 (1)
Hazard map	0.81	2 (2)
Inundation map	0.81	2 (3)
Deterministic tsunami hazard analysis	0.76	4 (4)
Probabilistic tsunami hazard assessment (PTHA)	0.75	5 (6)
Field studies on tsunami impacts	0.67	6 (5)

Table 1: Ranking of priority areas for capacity improvement in tsunami hazard assessment

2. RISK ASSESSMENT AND REDUCTION –
HAZARD ASSESSMENT

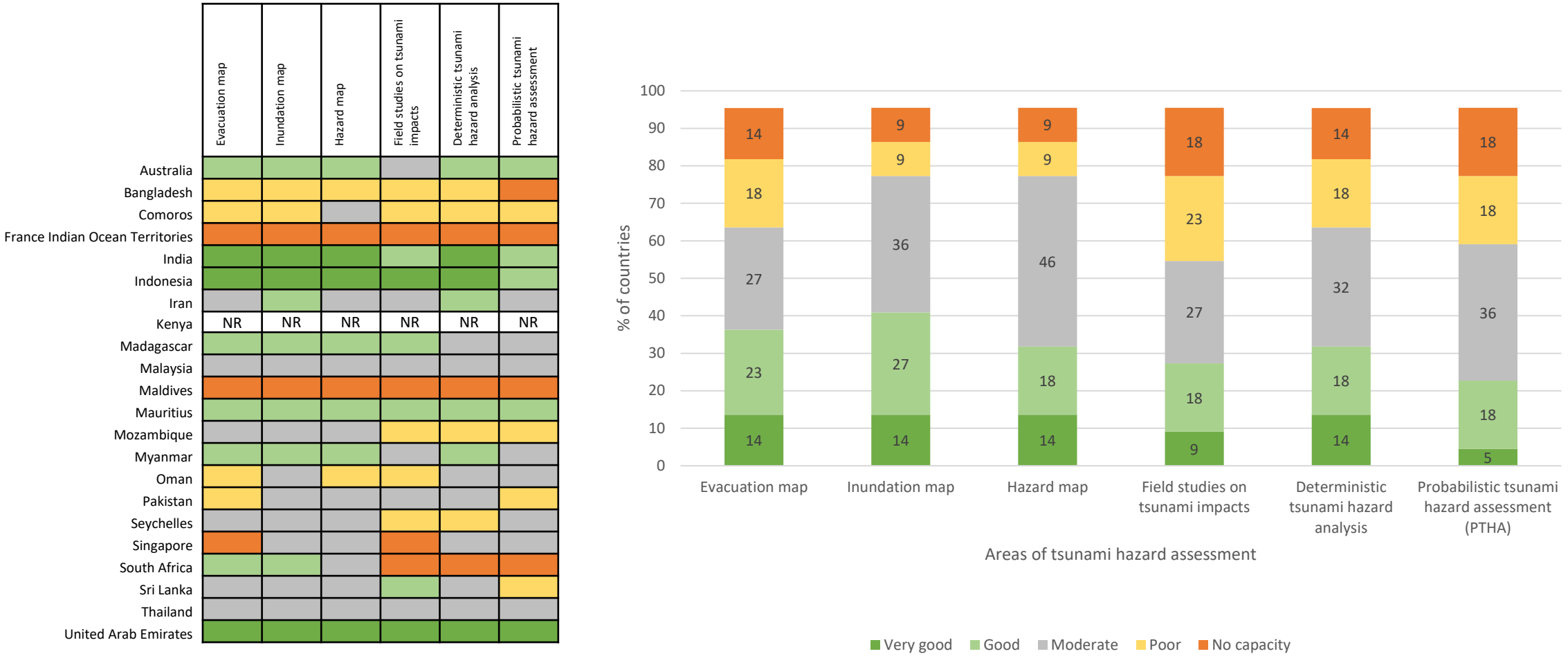


Figure 10: Capacity to give training and/or consultancy on tsunami hazard assessment to other countries

2. RISK ASSESSMENT AND REDUCTION –
RISK ASSESSMENT

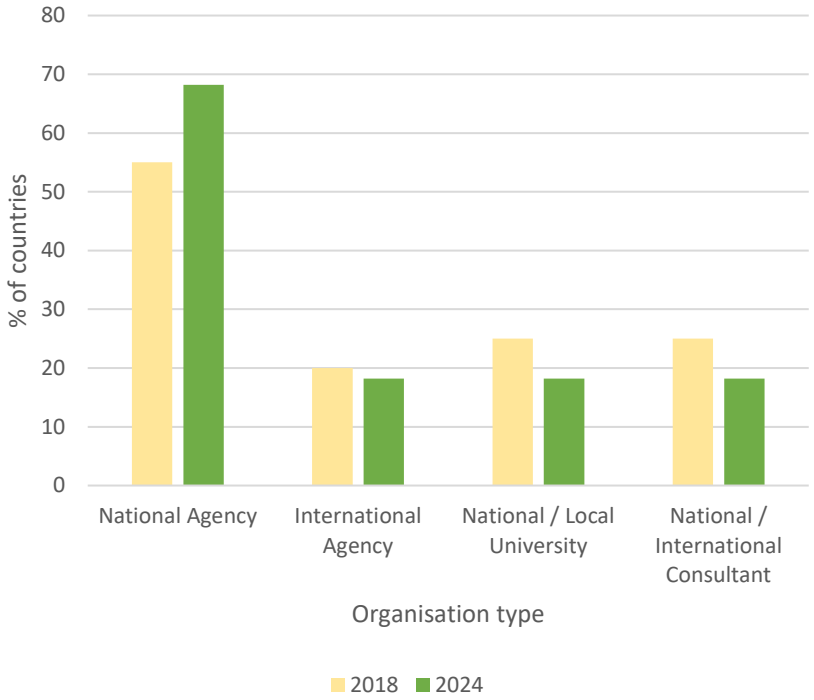


Figure 13: Organisation(s) responsible for the tsunami risk assessment

Figure 14: Level at which tsunami risk assessment is carried out

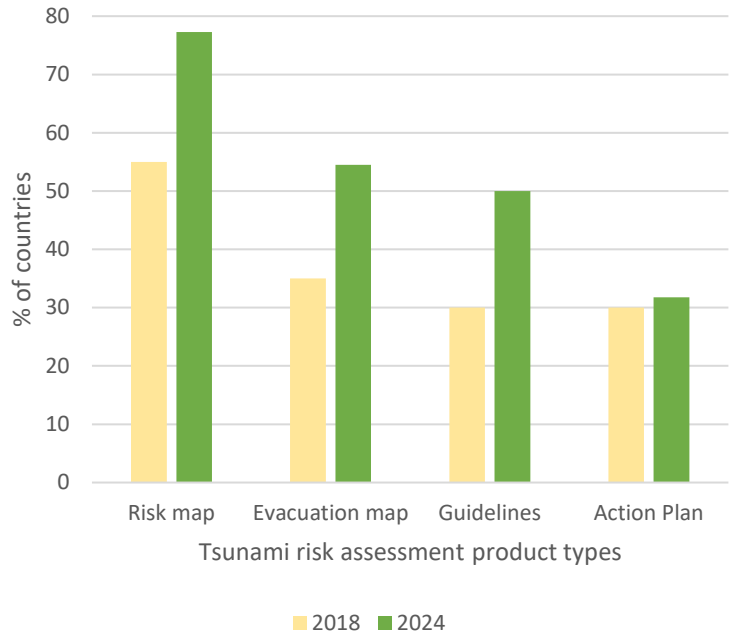
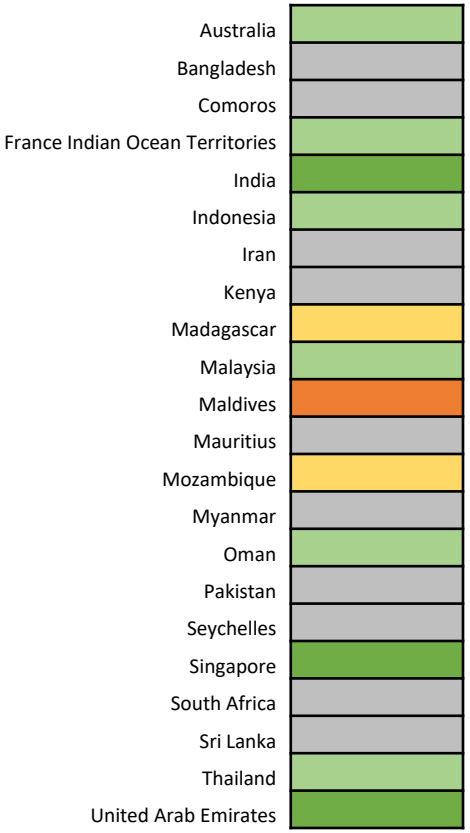
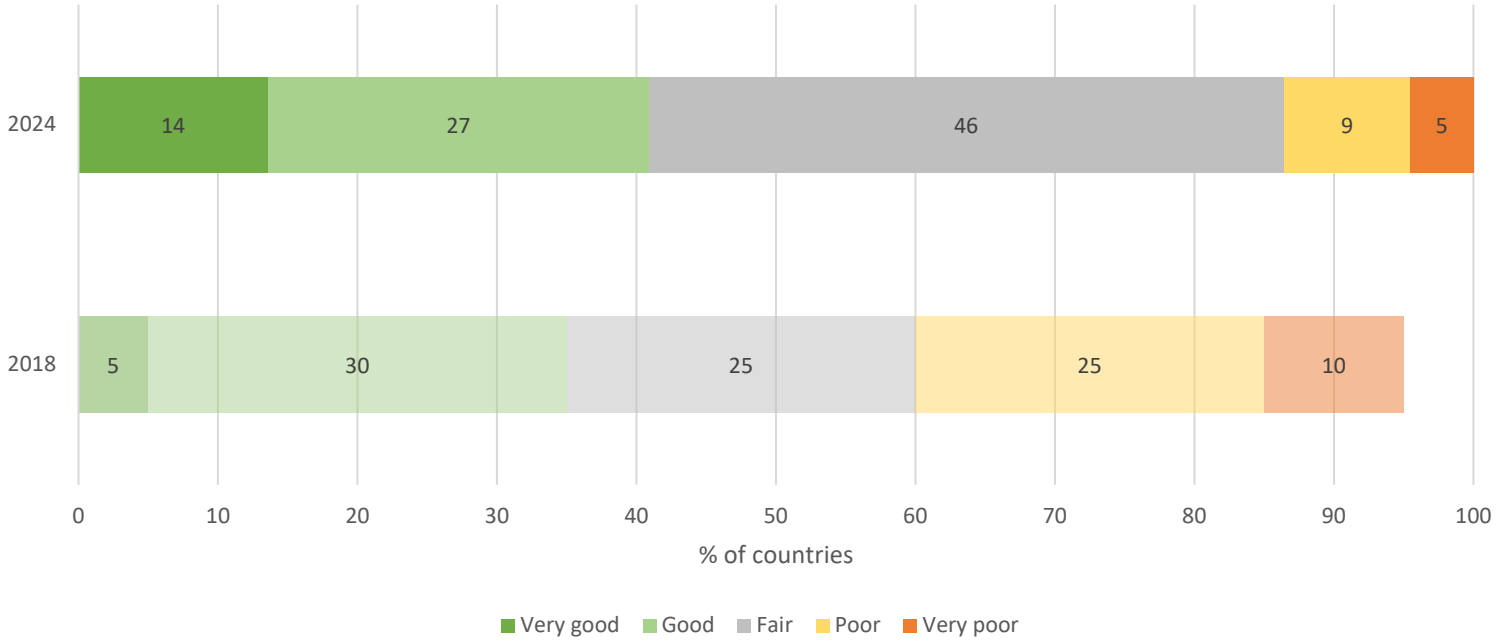


Figure 15: Types of product to emerge from the tsunami risk assessment

2. RISK ASSESSMENT AND REDUCTION – RISK ASSESSMENT

Figure 16: Capacity to undertake tsunami risk assessment

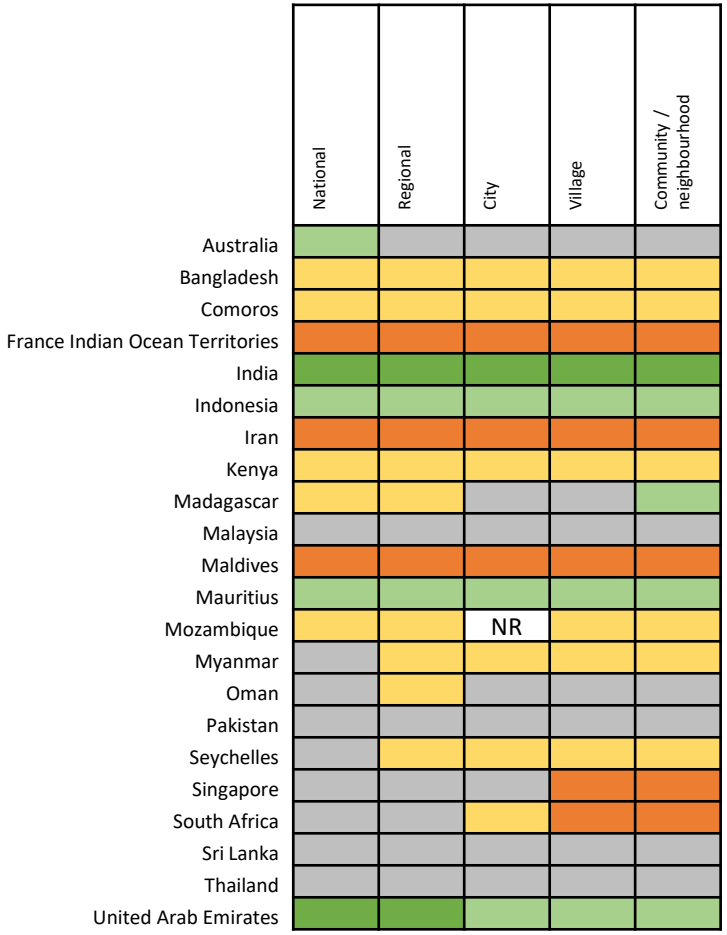




Priority level	RII	2024 Rank (2018 Rank)
Tsunami risk assessment at city level	0.82	1 (1)
Tsunami risk assessment at national level	0.79	2 (4)
Tsunami risk assessment at regional level	0.78	3 (5)
Tsunami risk assessment at village level	0.75	4 (2)
Tsunami risk assessment at community / neighbourhood level	0.74	5 (3)

Table 2: Ranking of priority areas for capacity improvement in tsunami risk assessment

2. RISK ASSESSMENT AND REDUCTION –
RISK ASSESSMENT



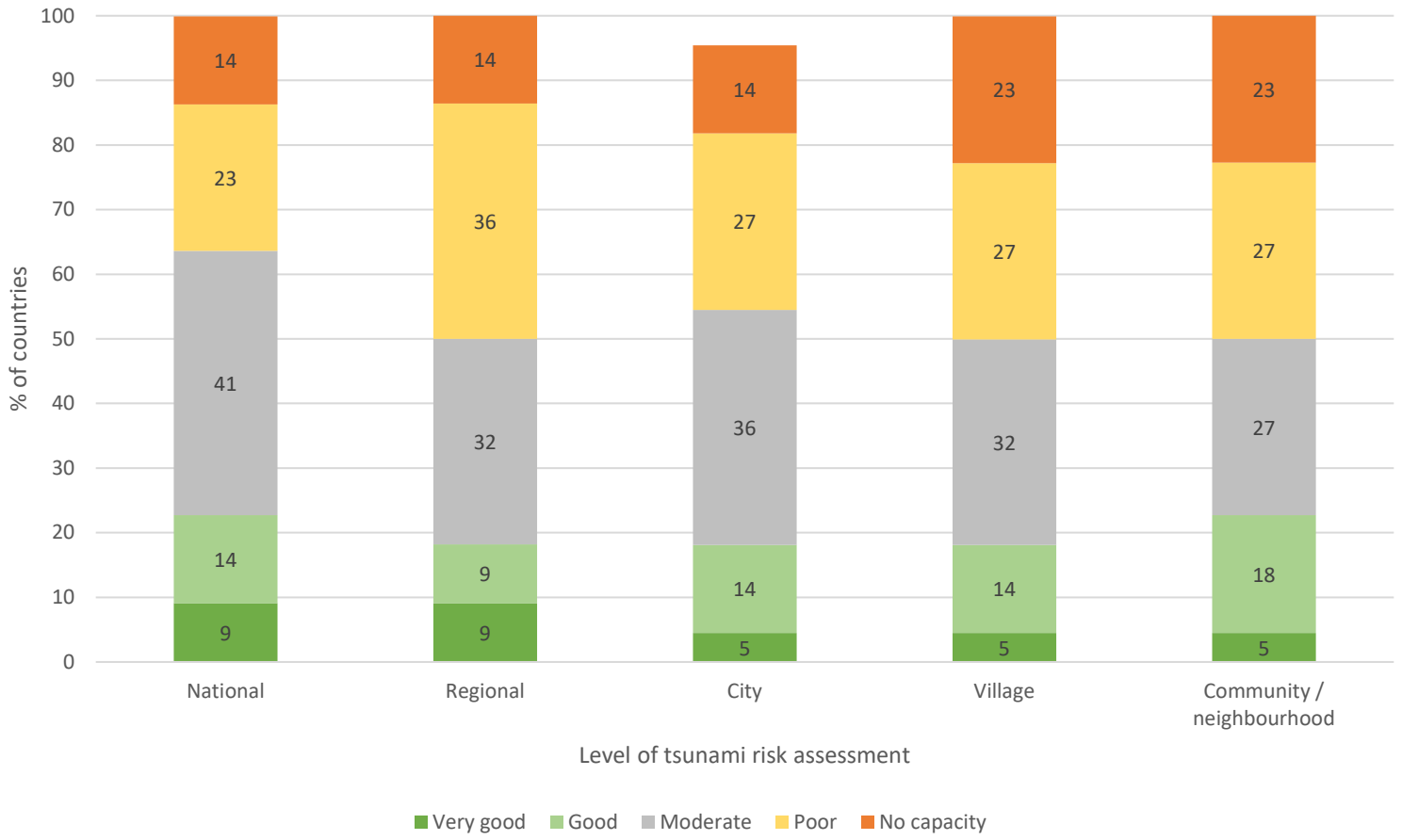


Figure 17: Capacity to give training on tsunami risk assessment

Pillar II

3. DETECTION, WARNING AND DISSEMINATION – DETECTION AND WARNING

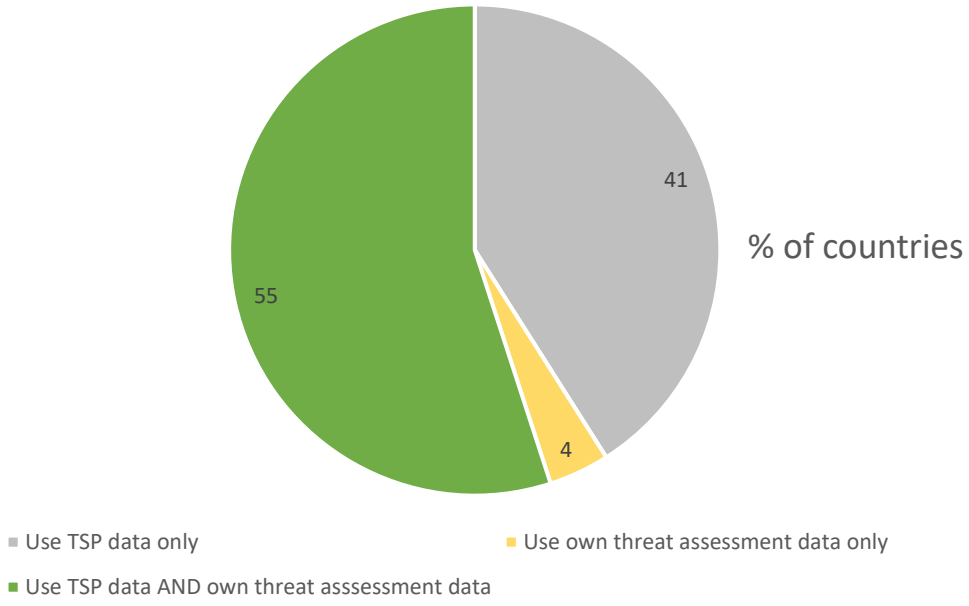


Figure 26: Data use for the Coastal Forecast Zones (CFZ) of a country's coastline to determine national threats

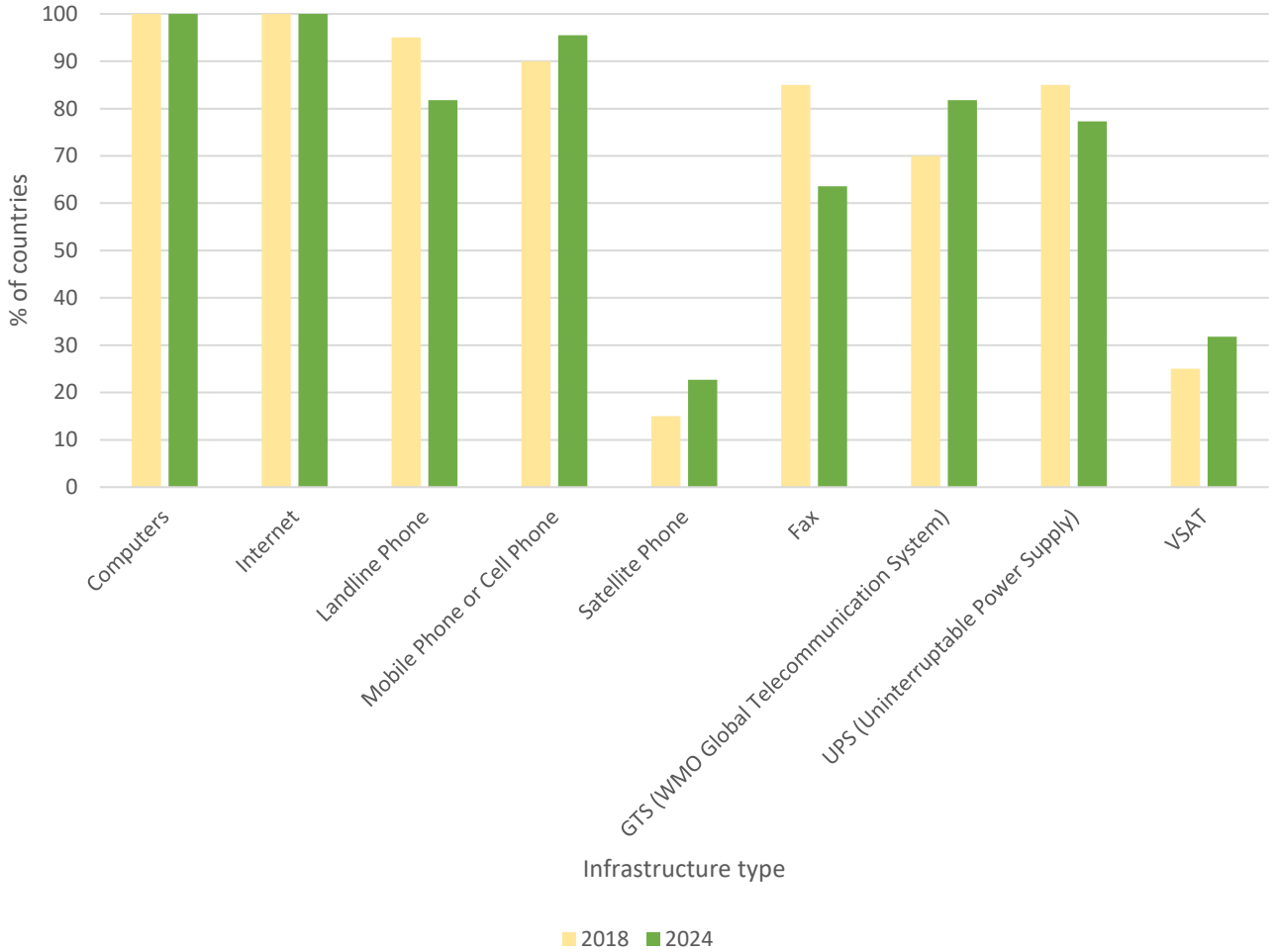


Figure 27: Infrastructure availability to support 24x7 operations

3. DETECTION, WARNING AND DISSEMINATION – DETECTION AND WARNING

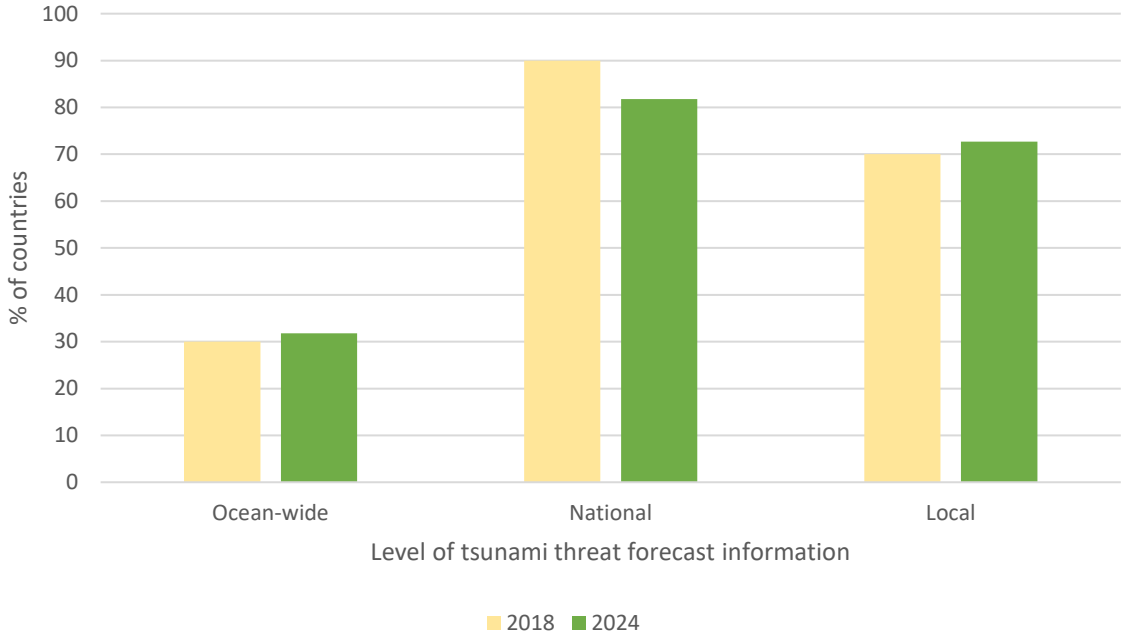


Figure 28: Level of tsunami threat forecast information is produced by the responsible organisation

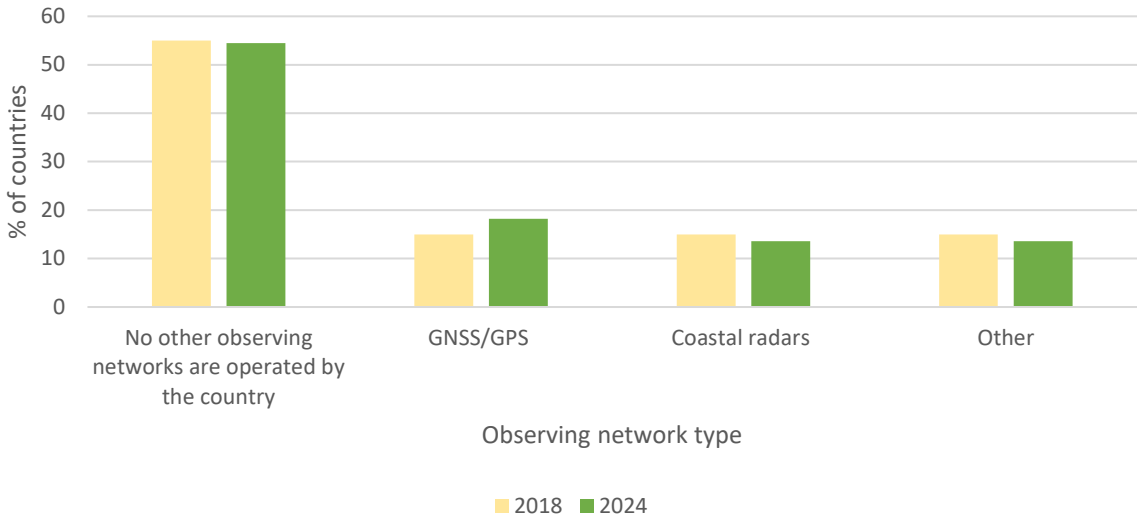


Figure 29: Other observing networks operated and used for tsunami early warning

Pillar III

3. DETECTION, WARNING AND DISSEMINATION – DISSEMINATION

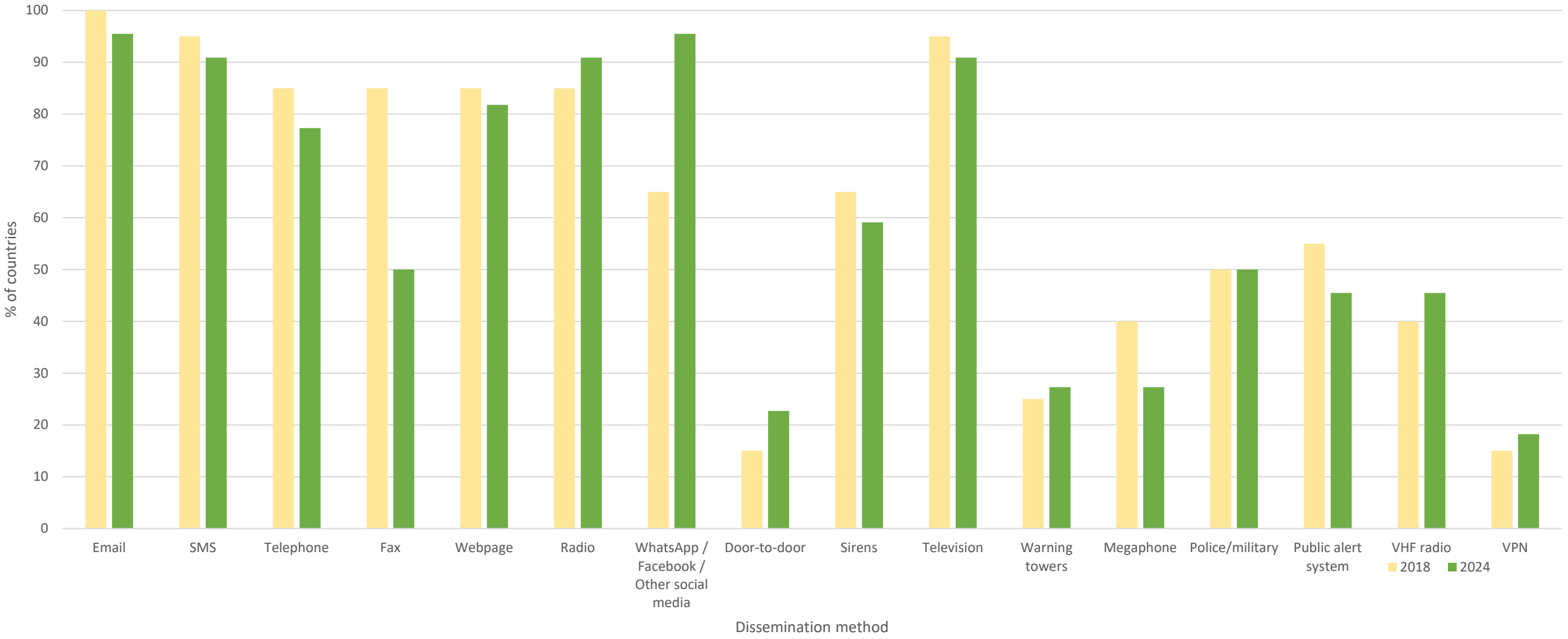
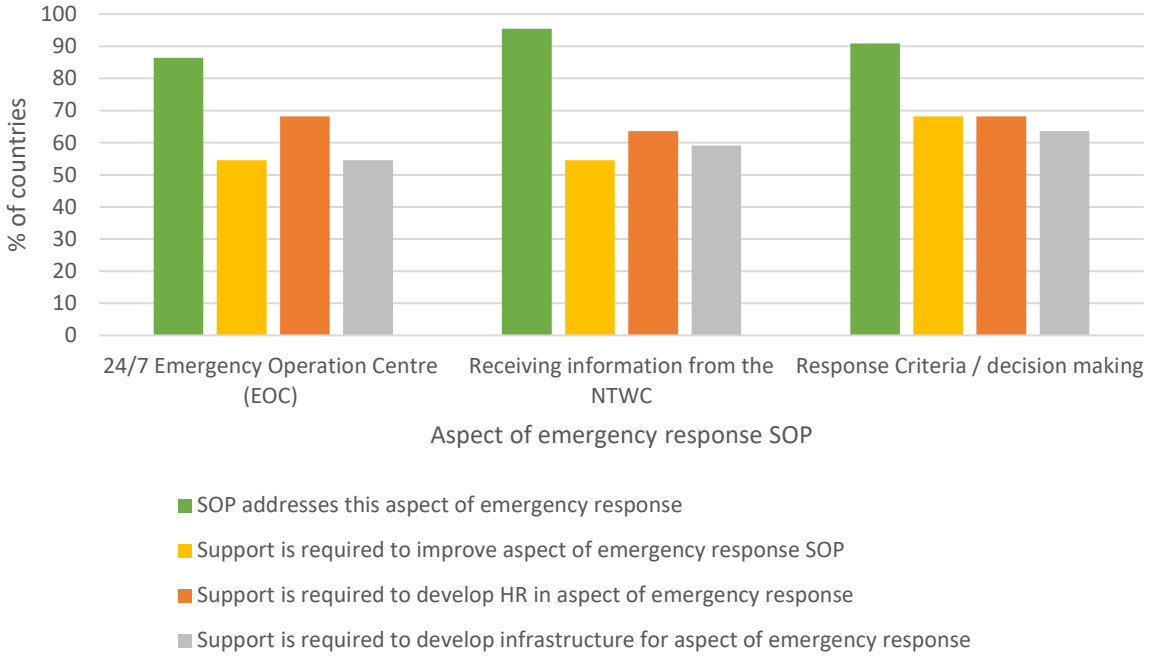


Figure 30: How tsunami information is disseminated

4. PUBLIC AWARENESS, PREPAREDNESS AND RESPONSE

– STANDARD OPERATING PROCEDURES



	ASPECT OF UPSTREAM EMERGENCY RESPONSE SOP											
	24/7 Emergency Operation Centre (EOC)				Receiving information from the NTWC				Response criteria / decision making			
	SOP addresses this aspect	Support required to develop/improve SOP	Support required to develop human resources	Support required to develop infrastructure	SOP addresses this aspect	Support required to develop/improve SOP	Support required to develop human resources	Support required to develop infrastructure	SOP addresses this aspect	Support required to develop/improve SOP	Support required to develop human resources	Support required to develop infrastructure
Australia	●	○	○	○	●	○	○	○	●	○	○	○
Bangladesh	●	●	●	●	●	●	●	●	●	●	●	●
Comoros												
France Indian Ocean Territories	●	○	○	○	●	○	○	○	●	●	●	●
India	●	○	●	○	●	○	○	○	●	○	○	○
Indonesia	●	●	●	●	●	●	●	●	●	●	●	●
Iran	○	●	●	●	●	●	○	○	●	●	●	●
Kenya	●	●	●	●	●	●	●	●	●	●	●	●
Madagascar	●	●	●	●	●	●	●	●	●	●	●	●
Malaysia	●	○	●	○	●	○	●	○	●	●	●	○
Maldives	●	●	●	●	●	●	●	●	●	●	●	●
Mauritius	●	○	○	○	●	○	○	○	●	○	○	○
Mozambique	●	●	●	●	●	●	●	●	●	●	●	●
Myanmar					●	●	●	●				
Oman	●	●	●	●	●	●	●	●	●	●	●	●
Pakistan	●	○	●	●	●	○	●	●	●	●	●	●
Seychelles	●	●	●	●	●	●	●	●	●	●	●	●
Singapore	●	○	○	●	●	○	○	○	●	○	○	○
South Africa	●	●	●	●	●	○	●	●	●	●	●	●
Sri Lanka	●	●	●	●	●	●	●	●	●	●	●	●
Thailand	●	●	●	●	●	●	●	●	●	●	●	●
United Arab Emirates	●	○	○	○	●	○	○	○	●	○	○	○

● = Yes ○ = No Blank = No Response

Figure 31: Availability of, and support required to develop upstream emergency response SOP

4. PUBLIC AWARENESS, PREPAREDNESS AND RESPONSE

– STANDARD OPERATING PROCEDURES

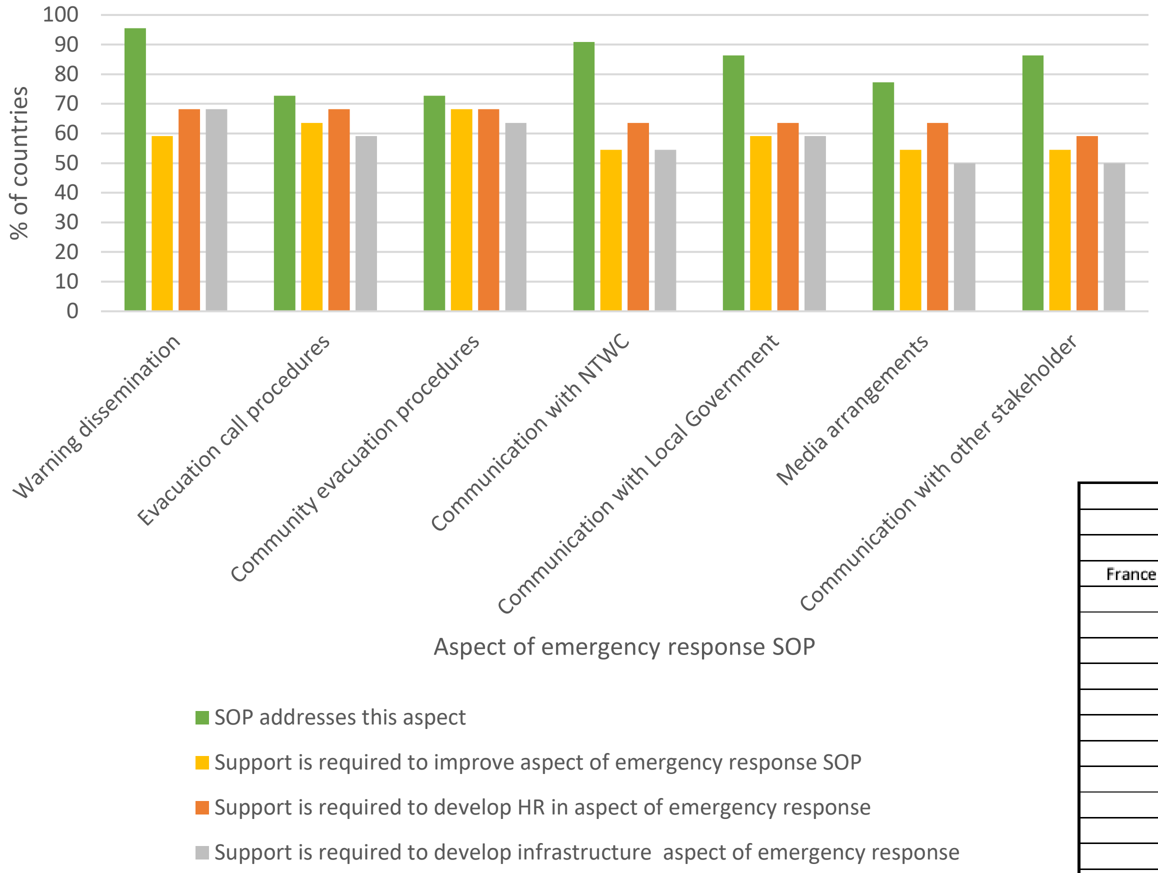


Figure 32: Availability of, and support required to develop downstream emergency response SOP

	ASPECT OF DOWNSTREAM EMERGENCY RESPONSE SOP																											
	Warning dissemination				Evacuation call procedures				Community evacuation				Communication with NTWC				Communicaton with local government				Media arrangements				Communication with other stakeholders			
	SOP addresses this aspect	Support required to develop/improve SOP	Support required to develop human resources	Support required to develop infrastructure	SOP addresses this aspect	Support required to develop/improve SOP	Support required to develop human resources	Support required to develop infrastructure	SOP addresses this aspect	Support required to develop/improve SOP	Support required to develop human resources	Support required to develop infrastructure	SOP addresses this aspect	Support required to develop/improve SOP	Support required to develop human resources	Support required to develop infrastructure	SOP addresses this aspect	Support required to develop/improve SOP	Support required to develop human resources	Support required to develop infrastructure	SOP addresses this aspect	Support required to develop/improve SOP	Support required to develop human resources	Support required to develop infrastructure	SOP addresses this aspect	Support required to develop/improve SOP	Support required to develop human resources	Support required to develop infrastructure
Australia	●	●	●	○	●	●	●	○	●	●	●	●	●	●	●	○	●	●	●	○	●	●	●	○	●	●	●	○
Bangladesh	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Comoros																												
France Indian Ocean Territories	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○
India	●	○	○	○	●	○	●	○	●	○	●	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○
Indonesia	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Iran	●	○	●	●	●	○	○	○	●	●	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○
Kenya	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Madagascar	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Malaysia	●	○	●	●	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○
Maldives	●	●	●	●	○	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●
Mauritius	●	○	○	○	●	●	○	●	●	●	○	●	●	○	○	○	●	○	○	●	●	○	○	○	●	○	○	○
Mozambique	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Myanmar	●	●	●	●																								
Oman	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Pakistan	●	●	●	●	○	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○	○
Seychelles	●	●	●	●	○	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●
Singapore	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○
South Africa	●	○	○	●	○	●	●	●	○	●	●	●	●	○	●	●	●	●	●	●	○	●	●		○	●	●	●
Sri Lanka	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●
Thailand	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
United Arab Emirates	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○

● = Yes ○ = No Blank = No Response

PILLAR IV A

4. PUBLIC AWARENESS, PREPAREDNESS AND RESPONSE

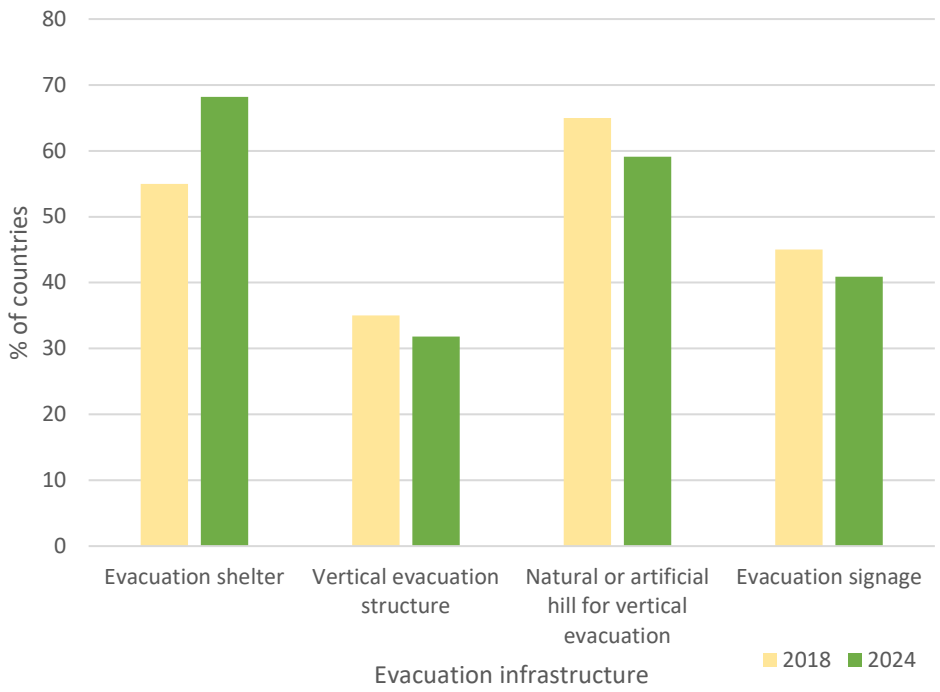


Figure 34: Availability of evacuation infrastructure

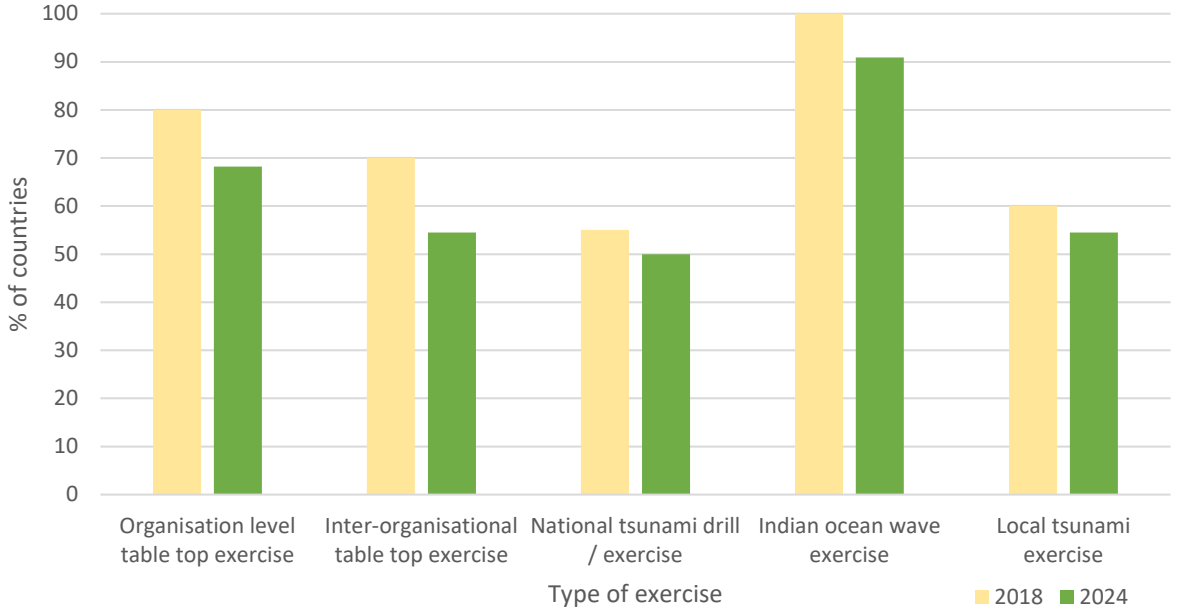


Figure 36: Types of tsunami exercise conducted

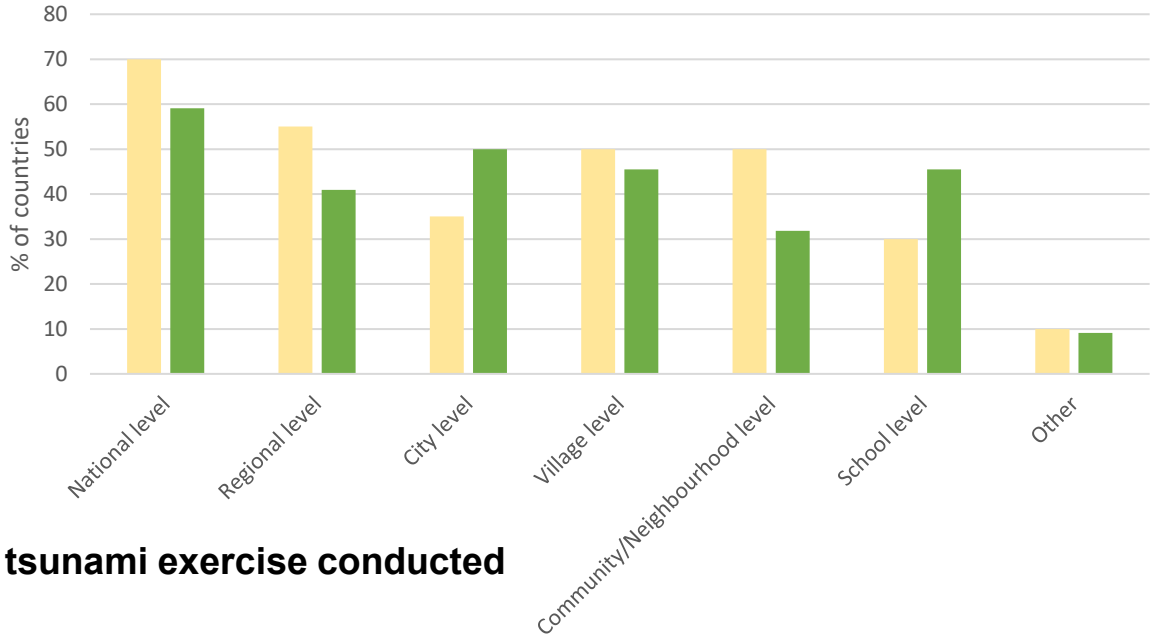


Figure 35: Levels of tsunami exercise conducted

4. PUBLIC AWARENESS, PREPAREDNESS AND RESPONSE

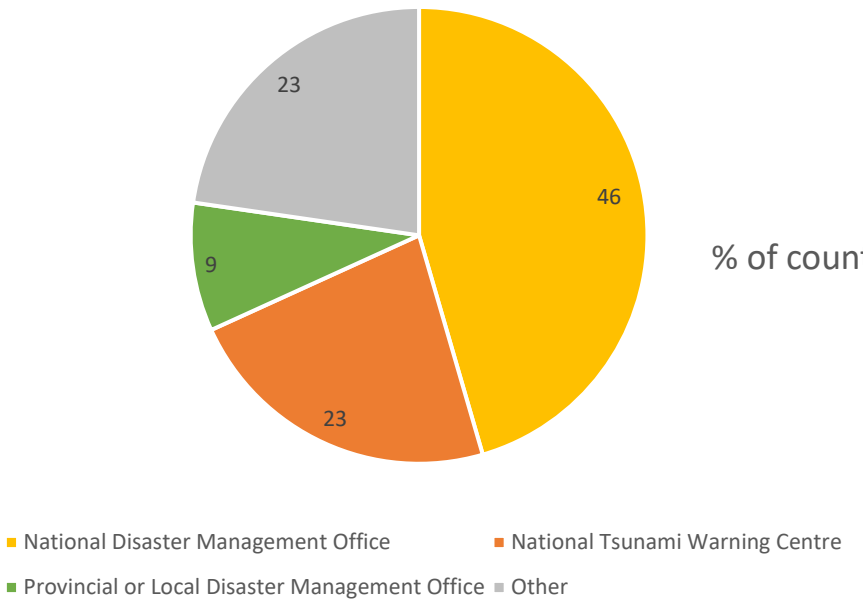
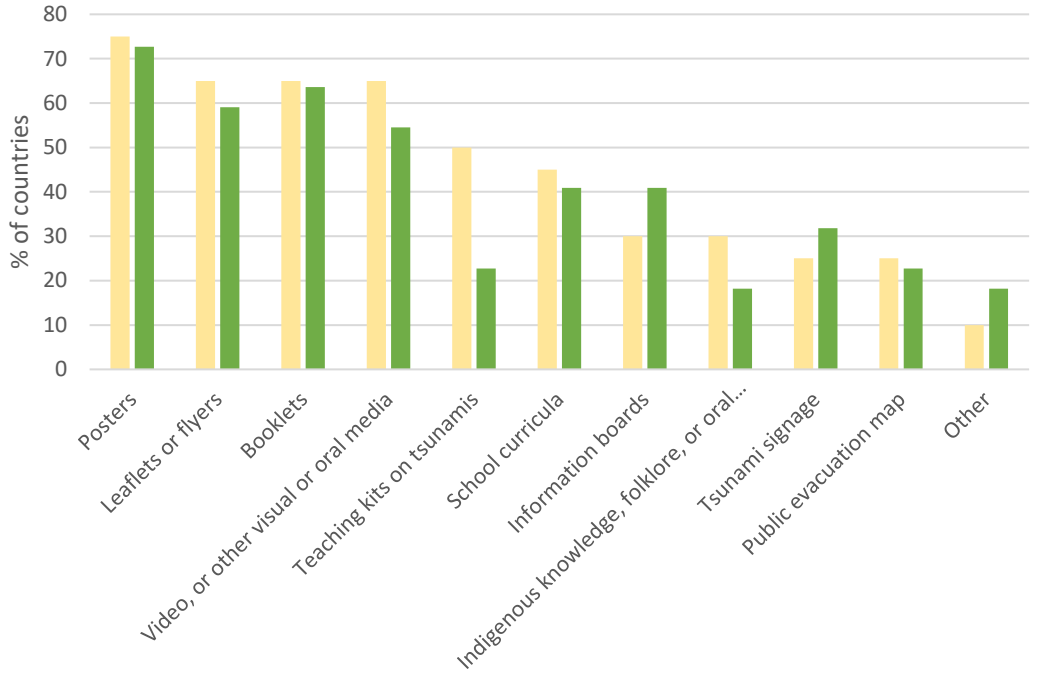


Figure 37: Organisation responsible for tsunami public awareness programmes

Figure 39: Types of public awareness activity



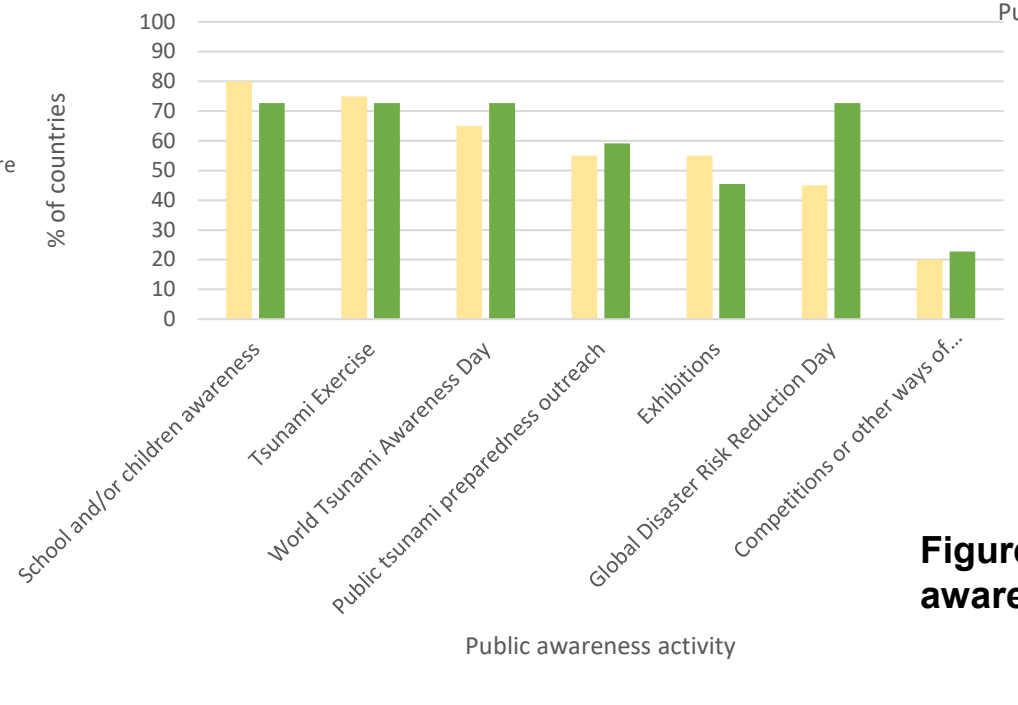


Figure 38: Types of public awareness materials

4. PUBLIC AWARENESS, PREPAREDNESS AND RESPONSE

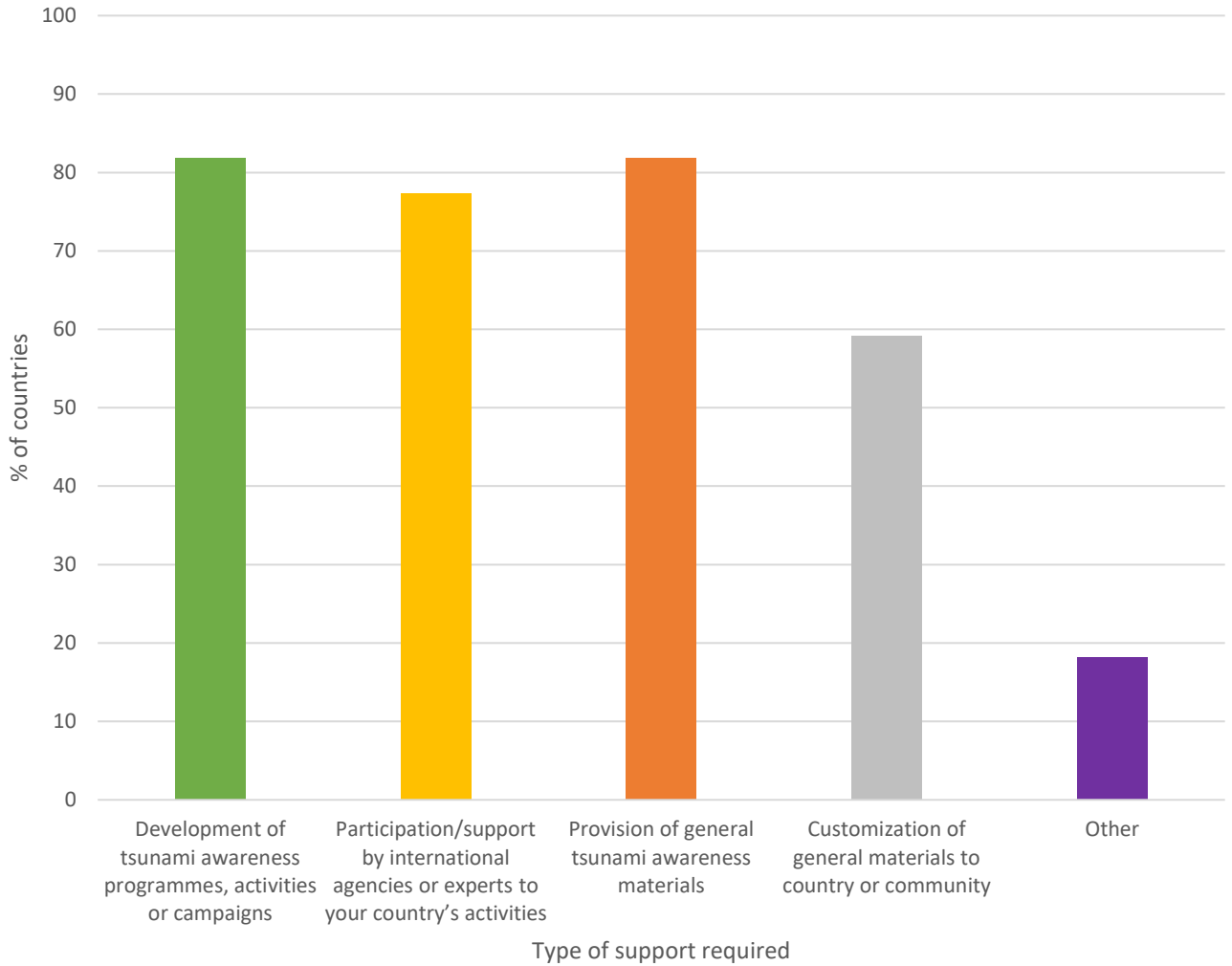


Figure 40: Support required for public awareness activity

	Support required for public awareness activity				
	Provision of general tsunami awareness materials	Customisation of general materials to country or community	Development of tsunami awareness programmes, activities or campaigns	Participation/support by international agencies or experts to your country's activities	Other
Australia	●	●	●	●	●
Bangladesh	●	●	●	●	○
Comoros	●	●	●	●	○
France Indian Ocean Territories	○	○	○	○	○
India	●	○	●	○	○
Indonesia	●	●	●	●	●
Iran	●	○	●	●	○
Kenya	●	●	●	●	○
Madagascar	●	●	●	●	○
Malaysia	●	●	●	●	○
Maldives	●	●	●	○	○
Mauritius	●	●	●	●	●
Mozambique	●	○	●	●	○
Myanmar	●	●	●	●	○
Oman	●	●	●	●	○
Pakistan	○	○	○	●	○
Seychelles	●	●	●	●	○
Singapore	○	○	○	○	○
South Africa	●	○	●	●	○
Sri Lanka	●	●	●	●	●
Thailand	●	○	●	●	○
United Arab Emirates	○	○	○	○	○

● = Yes ○ = No

PILLAR IV B

2. RISK ASSESSMENT AND REDUCTION – POLICIES

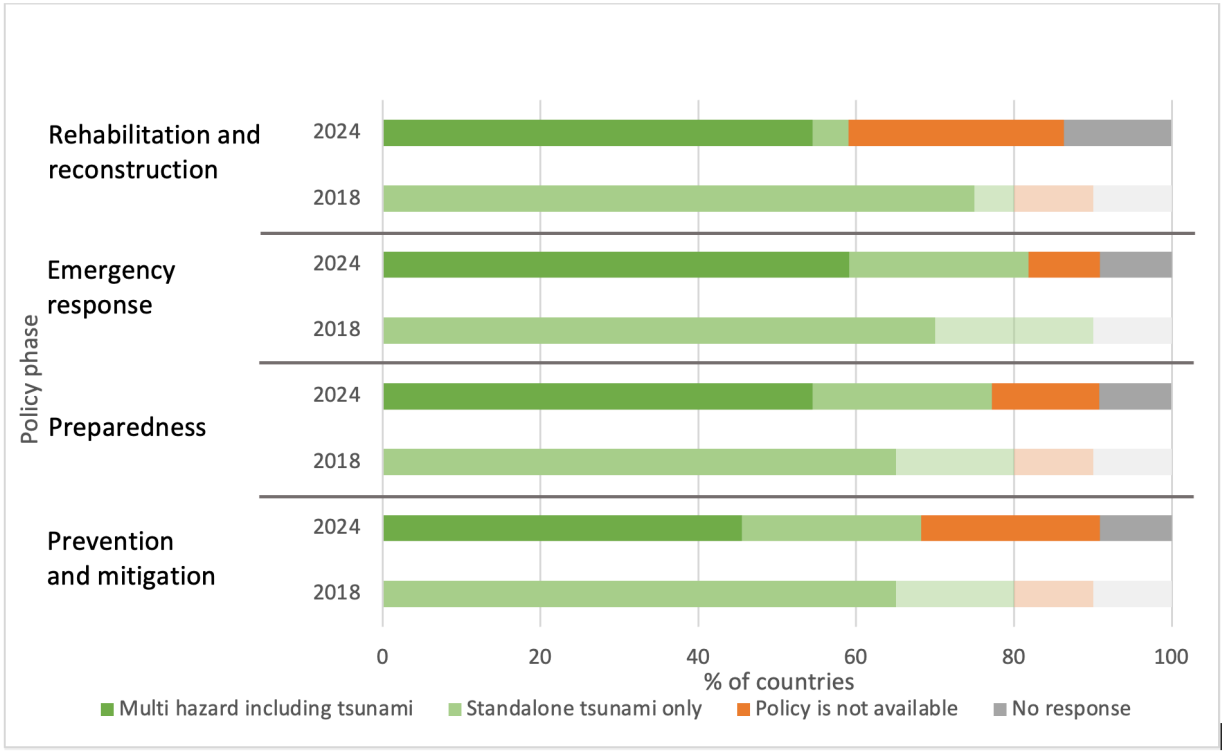


Figure 18: Types and phases of national tsunami policy

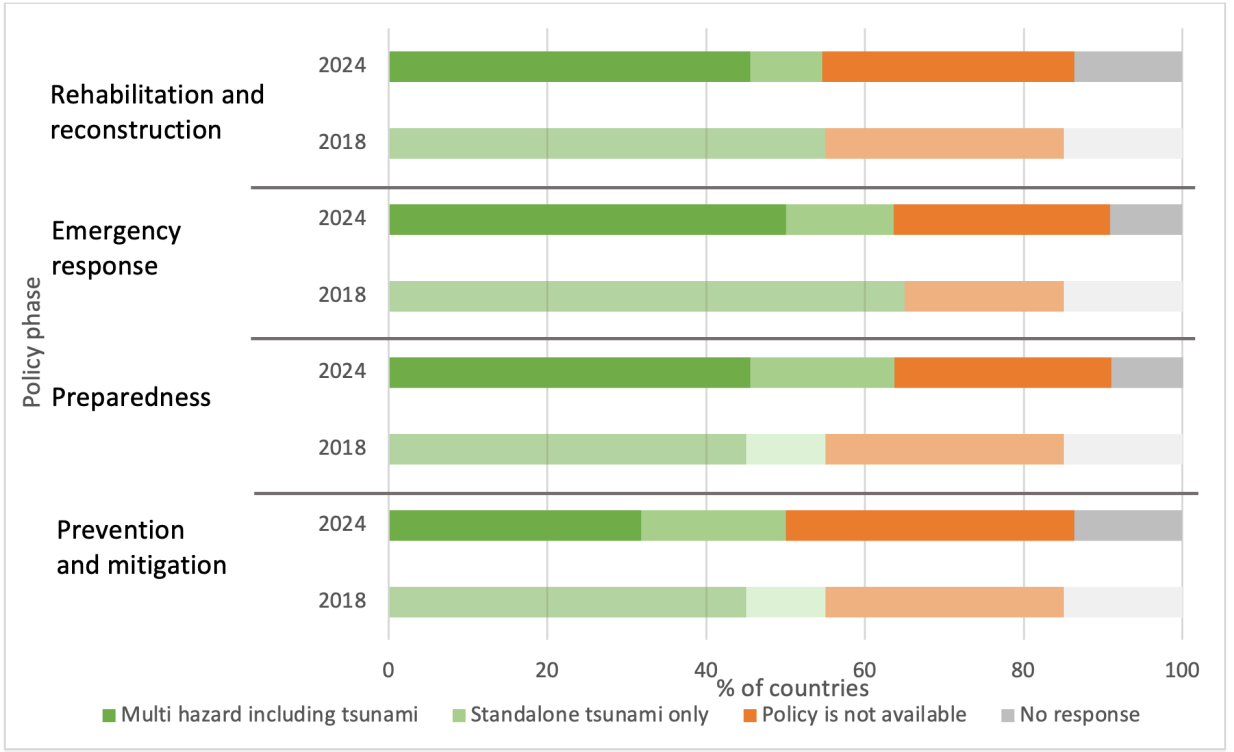


Figure 19: Types and phases of local tsunami policy

2. RISK ASSESSMENT AND REDUCTION – PLANS

Figure 20: Prevention and mitigation phase

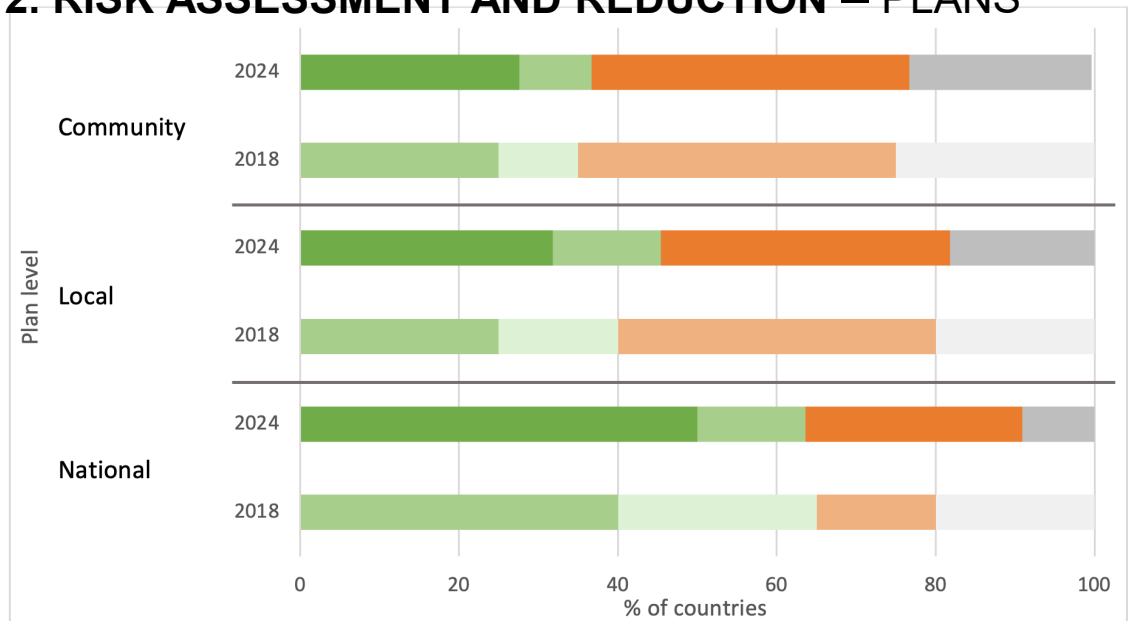


Figure 21: Preparedness phase

Availability of national, local and community level tsunami disaster risk reduction plans during different phases

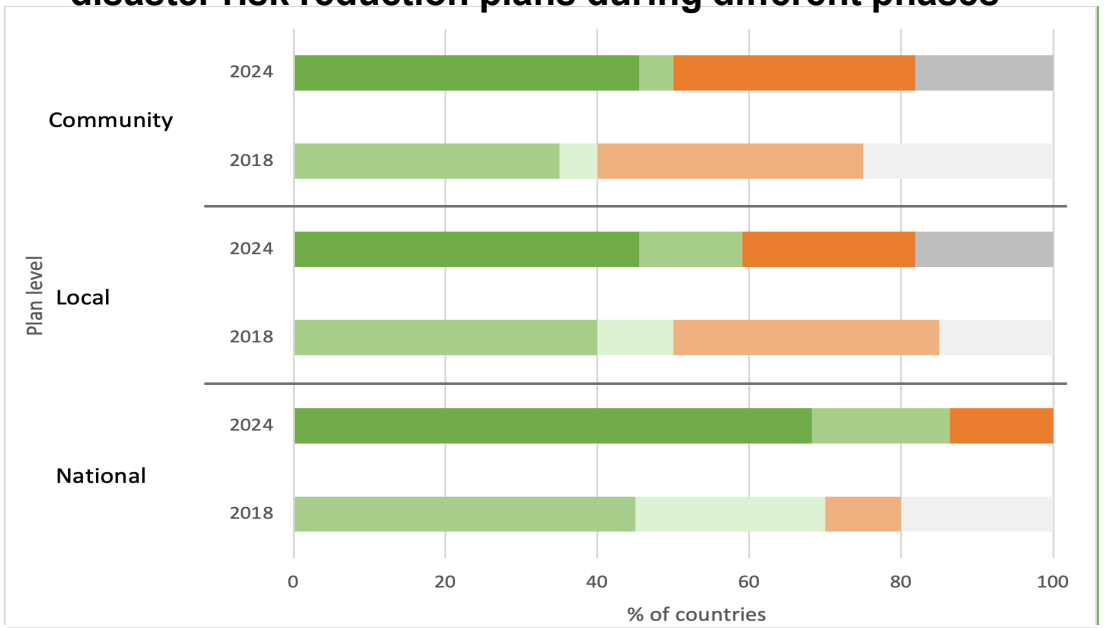


Figure 22: Emergency response phase

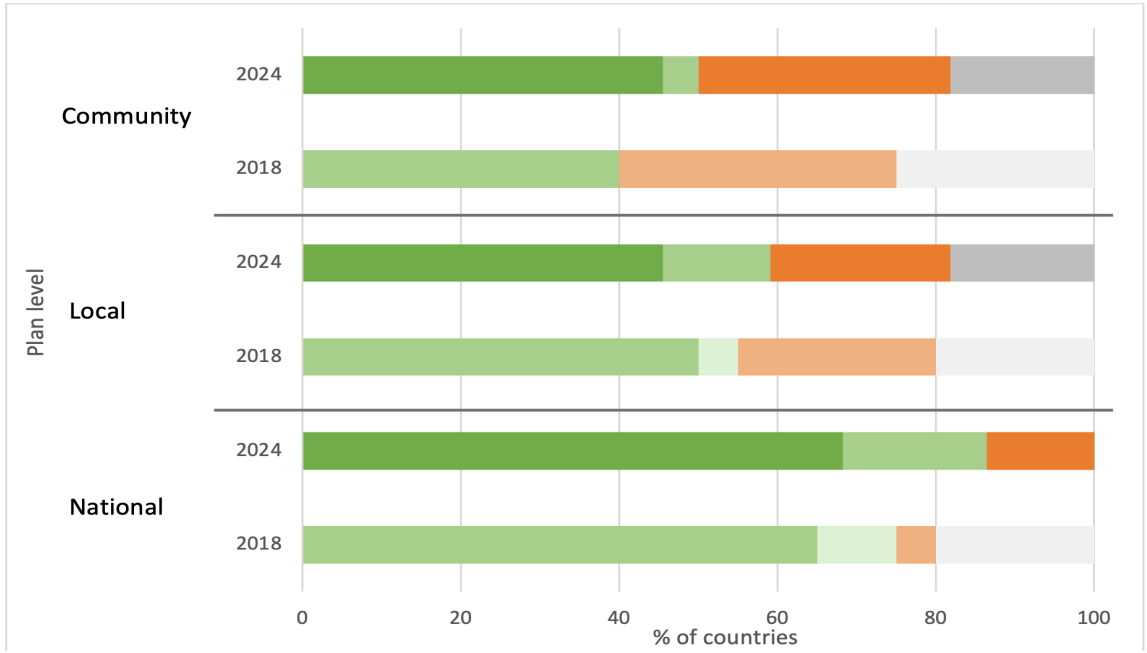
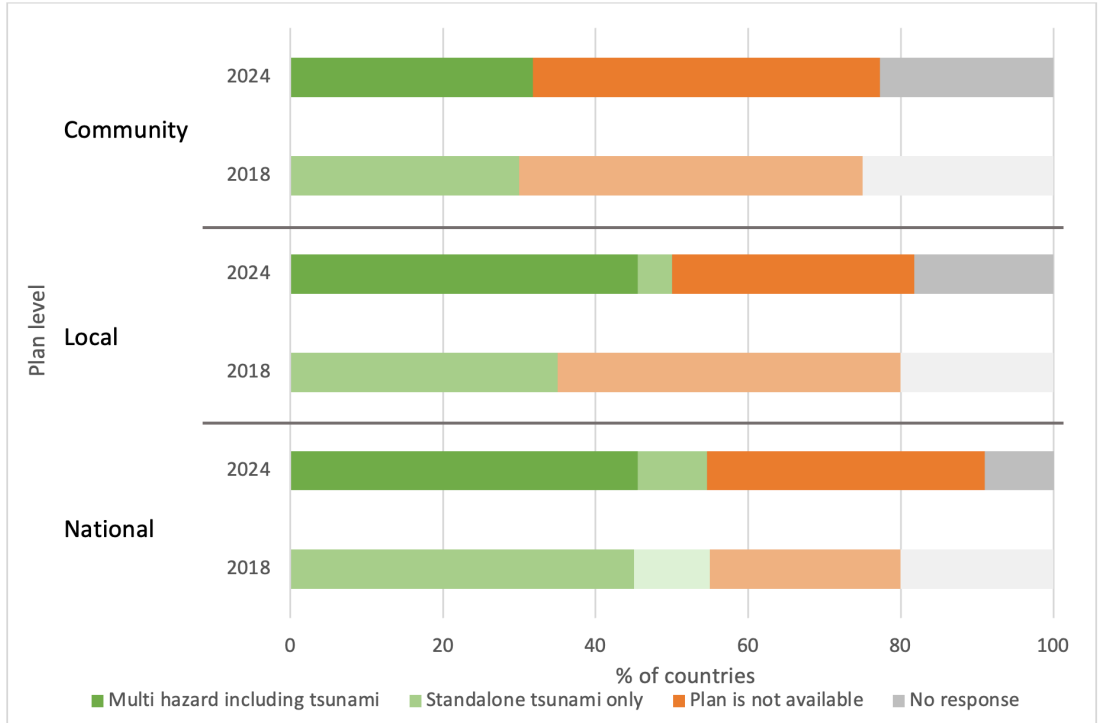


Figure 23: rehabilitation and reconstruction phase



2. RISK ASSESSMENT AND REDUCTION – GUIDELINES

Figure 24: Types and phases of national tsunami guidelines

Figure 25: Types and phases of local tsunami guidelines

TRRP

5. UNESCO-IOC Tsunami Ready Recognition Programme (TRRP)

13 countries are already participating in TRRP

8 are not currently doing so

Of those, 6 have plans to do so in the near future, while 2 do not

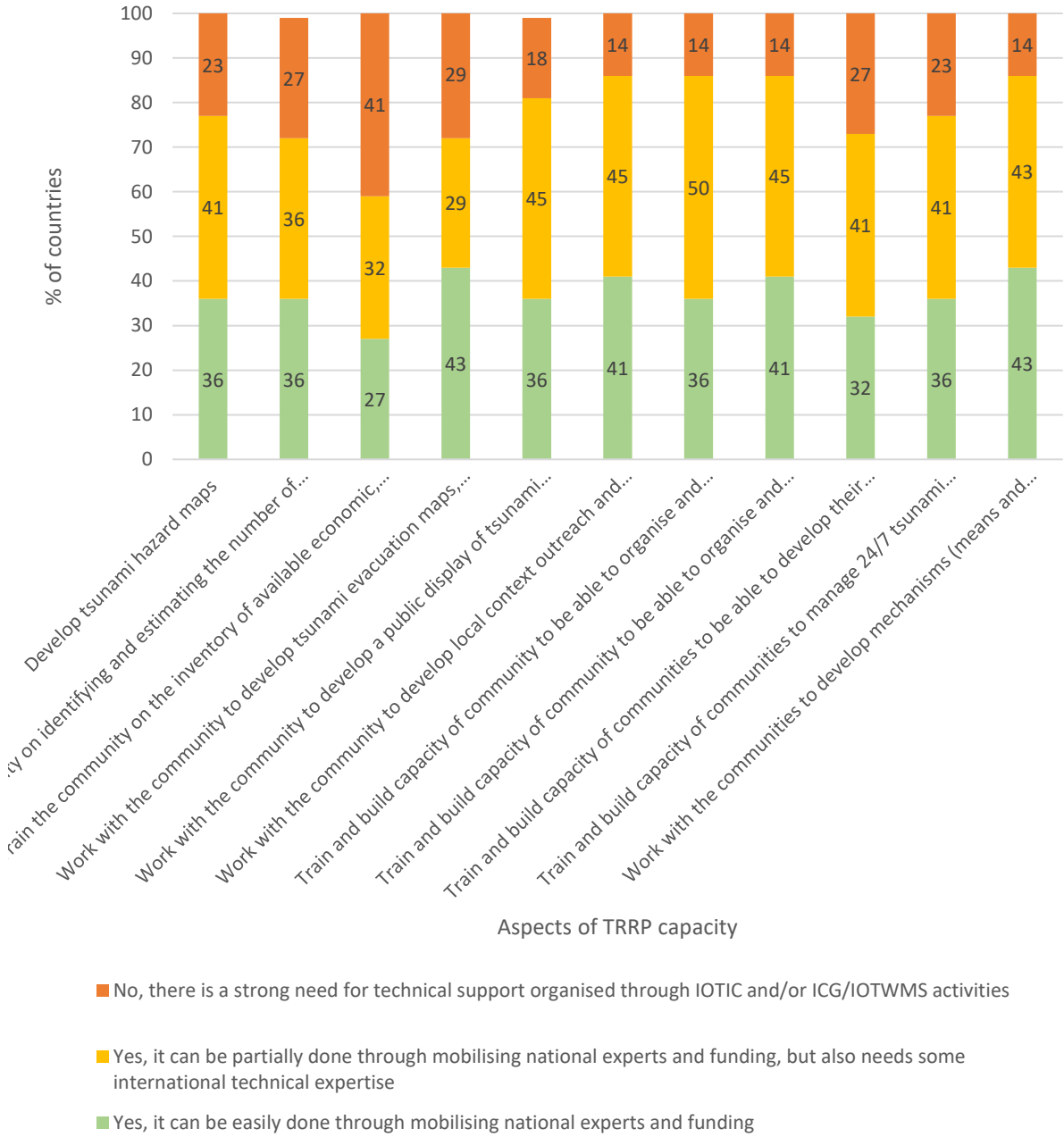
Table 3: Number of villages, cities/districts and provinces/state levels at risk to tsunami

Country	Village	City / District	Province / State
Australia			
Bangladesh		14	
Comoros	50	20	3
France Indian Ocean Territories	36		
India	3174	73	13
Indonesia	5744	255	26
Iran	50	6	2
Kenya			4
Madagascar			
Malaysia			3
Maldives	172	5	198
Mauritius		6	
Mozambique			
Myanmar	1000	70	5
Oman	60	23	7
Pakistan	0	2	2
Seychelles		27	
Singapore	0	0	0
South Africa			3
Sri Lanka		14	5
Thailand	509	27	6
United Arab Emirates			2

5. UNESCO-IOC Tsunami Ready Recognition Programme (TRRP)

Figure 41: Country responses on national capacity according to different aspects of the TRRP

Figure 42: Summary of national capacity according to different aspects of the TRRP



5. UNESCO-IOC Tsunami Ready Recognition Programme (TRRP)

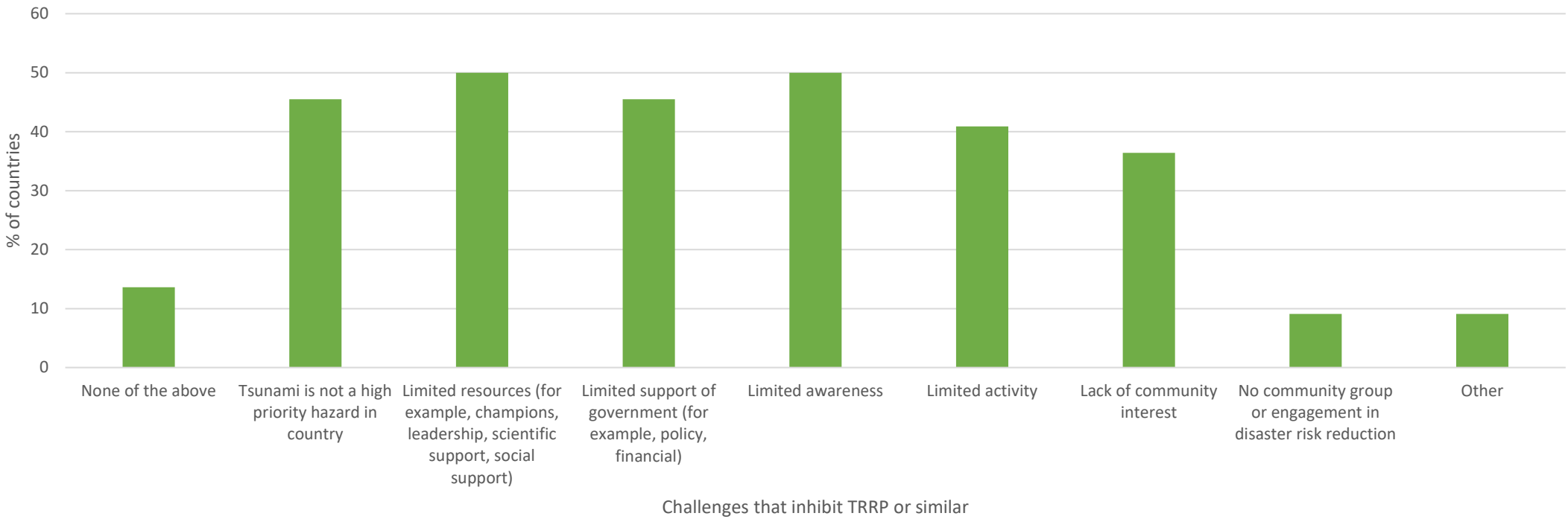


Figure 43: Challenges that inhibit the implementation of TRRP or similar national initiatives

Thank You….