INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (of UNESCO)

Fourteenth Session of the Intergovernmental Coordination Group
for the Indian Ocean Tsunami Warning and Mitigation System
(ICG/IOTWMS-XIV)

Jakarta, Indonesia, 17-19 November 2024

National Report of India

Page 1: Overview

Q1

Consent: I have read the above information and wish to proceed.

Confirm by clicking the checkbox

Q2

Please select your country from the list below:

India

Page 2: PART I: Basic Information

Q3

TNC Name:

Dr Srinivasa Kumar Tummala

Q4

Position:

Director

Q5

Organisation:

Indian National Centre for Ocean Information Services (INCOIS)

Q6

Telephone Number:

Q7

E-mail Address:

director@incois.gov.in

Q8

Fax Number:

Q9

Postal Address:

Indian National Centre for Ocean Information Services (INCOIS),
Ocean Valley,
Pragathi Nagar (BO), Nizampet (SO)
Hyderabad - 500 090
Telangana, INDIA

Page 3: PART I: Basic Information

Q10

NTWC Agency Name:

Indian Tsunami Early Warning Centre (ITEWC), Indian National Centre for Ocean Information Services (INCOIS)

Q11

NTWC URL (web link) for tsunami warnings:

https://tsunami.incois.gov.in/TEWS/

Q12

NTWC Agency Contact or Officer in Charge (person):

Nagaraja Kumar Masuluri

Q13

Position:

Scientist F, Division Head, Operational Ocean Services (OOS)

Q14

Telephone Number:

Q15

E-mail Address:

raja@incois.gov.in

Q16

Postal Address:

Indian National Centre for Ocean Information Services (INCOIS)
Ocean Valley,
Pragathi Nagar (BO), Nizampet (SO)
Hyderabad - 500 090
Telangana, INDIA

Q17

3a) Is your Tsunami Warning Focal Point (TWFP) the same as your National Tsunami Warning Centre (NTWC) agency?The TWFP is the 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established national Standard Operating Procedures. The TWFP may or not be the NTWC.

Yes

Page 4: PART I: Basic Information

Q18

TWFP Agency Name (if different from the NTWC Agency):

Respondent skipped this question

Q19

Name:

Respondent skipped this question

Q20

Position:

Respondent skipped this question

Q21

Telephone Number:

Respondent skipped this question

Q22

E-mail Address:

Respondent skipped this question

Q23 Respondent skipped this question

Postal Address:

Page 5: PART I: Basic Information

Q24

TWFP 24x7 point of contact (office, operational unit or position, not a person):

Indian Tsunami Early Warning Centre (ITEWC)

Q25

E-mail Address:

Q26

Telephone Number:

Q27 Respondent skipped this question

Cellular Telephone Number:

Q28

Fax:

Page 6: PART I: Basic Information

Q29

3d) Has your country appointed a Tsunami Ready Focal Point (TRFP)?The TRFP is a person from the Disaster Management (DMO) or similar institution that:- Acts as a national advocate for national implementation of the Tsunami Ready Recognition Programme (TRRP) or a recognised similar initiative to help make at-risk communities prepared and resilient to any tsunami threat within their Member State.- Actively contributes to the national implementation of TRRP or a recognised similar initiative.- Routinely update UNESCO-IOC ICG/IOTWMS on the status of the national implementation of the TRRP or a recognised similar initiative. - Informs relevant national authorities and orgaisations involved in the implementation of TRRP or a recongised similar initiative on any information and/or updates provided by UNESCO-IOC on activities related to making at risk communities Tsunami Ready.

No

Q30

If yes, please provide their details below:Name of the TRFP:

Respondent skipped this question

Q31

Position:

Respondent skipped this question

Q32

Agency:

Respondent skipped this question

Q33

Telephone Number:

Respondent skipped this question

Q34

E-mail Address:

Respondent skipped this question

Q35

Postal Address:

Respondent skipped this question

Page 7: PART II: Hazard Assessment

Q36

4a) Has your country undertaken a hazard assessment?

Yes

Page 8: PART II: Hazard Assessment

Q37

4b) What type of hazard assessment has been carried out?

Multi-hazard assessment including tsunami

Page 9: PART II: Hazard Assessment

Q38

4c) What type of multi-hazard assessment has been carried out? (select all that apply)

Tsunami,

Flooding,

Cyclone,

Other (please specify):

The Multi-hazard vulnerability has been carried out by holistic approach using data of historical extreme water levels, events, sea level changes, and costal topography

Page 10: PART II: Hazard Assessment

Q39

4d) Who did the tsunami hazard assessment in your country? (select all that apply)

National Agency,

Please specify the name(s) of the agencies:

Ministry of Environment and Forest (MoEF), Government of India, is the nodal agency to implement coastal zone management plan and policy in India. As part of the national policy, MoEF has generated the coastal hazard zones and INCOIS and National Centre for Coastal Research (NCCR) were involved in generation of coastal hazard maps (Multi-hazard including tsunami) pertaining to the Indian coast under Tsunami Early Warning System)

Q40

4e) At what level was the tsunami hazard assessment carried out? (select all that apply)

National Level,

Regional Level

Q41

4f) Which coastal areas have been mapped for tsunami hazard? Please include the names of the Region / City and an approximation of the percentage mapped.

All provinces of east and west coast of India

Q42

4g) For each of the data types listed below (in rows), answer the two questions (in columns). Select Yes / No / Don't know from the drop-down menu.

	Was this data used for tsunami hazard assessment?	Is this data publicly available?
Bathymetry	**Yes**	**No**
Seismo-tectonic model	**Yes**	**No**
Topography	**Yes**	**No**
Land Cover	**Yes**	**Yes**
Infrastructure details	**Yes**	**No**

Other data used (please specify):
Land cover data publicly available as map service on Bhuvan Portal of National Remote Sensing Centre (NRSC), Indian Space Research Organisation (ISRO)

Q43

4h) What products do you have from the tsunami hazard assessment? (select all that apply)

Deterministic Tsunami Hazard Analysis,

Field Studies on Tsunami Impacts,

Hazard map,

Inundation map,

Evacuation map

Page 11: PART II: Hazard Assessment

Q44

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

Capacity to undertake tsunami hazard assessment	**Very good**

Q45

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?

Probabilistic Tsunami Hazard Assessment (PTHA)	**Essential**
Deterministic Tsunami Hazard Analysis	**High priority**
Field Studies on Tsunami Impacts	**High priority**
Hazard map	**Essential**
Inundation map	**Essential**
Evacuation map	**Essential**

Q46

4k) On a scale of 1 (No capacity) to 5 (Very good), what capacity does your country have to give training and/or consultancy on tsunami hazard assessment to other countries?

Probabilistic Tsunami Hazard Assessment (PTHA)	**Good**
Deterministic Tsunami Hazard Analysis	**Very good**
Field Studies on Tsunami Impacts	**Good**
Hazard map	**Very good**
Inundation map	**Very good**
Evacuation map	**Very good**

Page 12: PART II: Risk Assessment

Q47

5a) Has your country undertaken a tsunami risk assessment?

Yes

Page 13: PART II: Risk Assessment

Q48

5b) What type of risk assessment?

Multi-hazard risk assessment including tsunami

Page 14: PART II: Risk Assessment

Q49

5c) What hazards have been considered in your multi-hazard risk assessment? (select all that apply)

Tsunami,

Flooding,

Cyclone,

Other (please specify):

sea level rise

Page 15: PART II: Risk Assessment

Q50

5d) Who did the tsunami risk assessment in your country? (select all that apply)

National Agency,

Please specify the name(s) of the agency(ies):

Indian National Centre for Ocean Information Services (INCOIS) and National Centre for Coastal Research (NCCR)

Q51

5e) At what level was the tsunami risk assessment carried out? (select all that apply)

National Level,

Regional Level,

City Level,

Village Level

Q52

5f) Which coastal areas have been tsunami risk mapped? Please include the names of the Region / City and an approximation of the overall national percentage of risk prone areas mapped.

Entire Indian coast except Lakshadweep Islands

Q53

5g) How many Cities / Municipalities / Regencies are at risk from tsunami?

All coastal areas are under risk from tsunami due to both Makran and Andaman-Sumatra subduction zones.

Q54

5h) What products do you have from the tsunami risk assessment? (select all that apply)

Risk map,

Evacuation map,

Guidelines (please specify below),

Action Plan (please specify below),

Other (please specify):

Hazard Map, Vulnerability Map and Inundation Map

Page 16: PART II: Risk Assessment

Q55

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

Capability to undertake tsunami risk assessment	**Very good**

Q56

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

Tsunami risk assessment at national level	**Essential**
Tsunami risk assessment at regional level	**Essential**
Tsunami risk assessment at city level	**Essential**
Tsunami risk assessment at village level	**Essential**
Tsunami risk assessment at community / neighbourhood level	**Essential**

Q57

5k) On a scale of 1 (No capacity) to 5 (Very good) what capacity does your country have to give training and/or consultancy on tsunami risk assessment to other countries?

Tsunami risk assessment at national level	**Very good**
Tsunami risk assessment at regional level	**Very good**
Tsunami risk assessment at city level	**Very good**
Tsunami risk assessment at village level	**Very good**
Tsunami risk assessment at community / neighbourhood level	**Very good**

Page 17: PART II: Policies

Q58

6a) Does your country have a national tsunami policy? For each of the four disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name of the policy (if available).

	In what form is the policy?
Prevention and mitigation	**Standalone tsunami only**
Preparedness	**Standalone tsunami only**
Emergency response	**Standalone tsunami only**
Rehabilitation and reconstruction	**Standalone tsunami only**

What is the name of policy? (if available):
National Disaster Management Guidelines: Management of Tsunamis by National Disaster Management Authority (NDMA)

Q59

6b) Does your country have local tsunami policies? For each of the disaster management phases listed below, select standalone policy / multi hazard policy / policy not available. Use the comments box to detail the specific name(s) of the policy (if available).

	In what form is the policy?
Prevention and mitigation	**Multi hazard including tsunami**
Preparedness	**Multi hazard including tsunami**
Emergency response	**Multi hazard including tsunami**
Rehabilitation and reconstruction	**Multi hazard including tsunami**

What is the name of policy? (if available):
Each province has developed their own multi-hazard disaster management policy based on the national guidelines

Page 18: PART II: Plans

Q60

7a) Does your country have national, local and community level tsunami disaster risk reduction plans? For each of the four disaster management phases listed below, select standalone plan / multi hazard plan / plan not available. Use the comments box to detail the specific name(s) of the plan(s) (if available). Please use the scroll bar to view the entire table.

	National level	Local level	Community level
Prevention and mitigation	**Standalone tsunami only**	**Multi hazard including tsunami**	**Multi hazard including tsunami**
Preparedness	**Standalone tsunami only**	**Multi hazard including tsunami**	**Multi hazard including tsunami**
Emergency response	**Standalone tsunami only**	**Multi hazard including tsunami**	**Multi hazard including tsunami**
Rehabilitation and reconstruction	**Standalone tsunami only**	**Multi hazard including tsunami**	**Multi hazard including tsunami**

What is the name of the plan(s) (if available):
At National level, National Disaster Management Guidelines: Management of Tsunamis. At province level, Multi-hazard management policies are available based on local disasters prioritization.

Q61

7b) Are your country's tsunami disaster risk reduction plans based on hazards and risk assessments?

Yes

Page 19: PART II: Guidelines

Q62

8a) Does your country have national tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available).

	In what form are the guidelines?
Prevention and mitigation	**Standalone tsunami guidelines**
Preparedness	**Standalone tsunami guidelines**
Emergency response	**Standalone tsunami guidelines**
Rehabilitation and reconstruction	**Standalone tsunami guidelines**

What is the name of guidelines? (if available):
National Disaster Management Guidelines: Management of Tsunamis by National Disaster Management Authority (NDMA)

Q63

8b) Does your country have local tsunami DRR guidelines? For each of the four lifecycle phases, select standalone guidelines / multi-hazard guidelines / guidelines not available. Use the comments box to detail the specific name of the guidelines (if available).

	In what form are the guidelines?
Prevention and mitigation	**Multi hazard guidelines including tsunami**
Preparedness	**Multi hazard guidelines including tsunami**
Emergency response	**Multi hazard guidelines including tsunami**
Rehabilitation and reconstruction	**Multi hazard guidelines including tsunami**

What is the name of guidelines? (if available):

At province level, each province has prepared their own guidelines, based on national guidelines provided by National Disaster Management Authority

Page 20: PART III: Detection and Warning

Q64

9a) Does your country have a national capability to assess and/or receive potential tsunami threat information and advise/warn its coastal communities?

Yes

Page 21: PART III: Detection and Warning

Q65

9b) Does your country utilise the data provided by the IOTWMS Tsunami Service Providers (TSPs) for the Coastal Forecast Zones (CFZ) of your country's coastline to determine national threats or does it undertake its own threat assessments? (select all that apply)

Use TSP data,

Use own threat assessments

Q66

9c) Which organisation in your country has the responsibility for assessing and/or receiving potential tsunami threat information?Please provide the name and contact details.

Indian Tsunami Early Warning Centre (ITEWC) of INCOIS

Q67

9d) Does the organisation responsible for assessing and/or receiving potential tsunami threat information operate 24x7?

Yes

Q68 9e) What / which infrastructure is available to enable 24x7 operations? (select all that apply)	**Computers,** **Internet,** **Landline Phone,** **Mobile Phone or Cell Phone,** **Satellite Phone,** **Fax,** **GTS (WMO Global Telecommunication System),** **UPS (Uninterruptable Power Supply),** **VSAT,** Please specify any other infrastructure: VoIP phones
Q69 9f) Which level of tsunami threat forecast information is produced by the responsible organisation? (select all that apply)	**Ocean-wide,** **National,** **Local**
Q70 9g) Does the organisation have access to national and/or international seismic networks? (please select one from the following options)	**Yes, national and international**

Page 22

Q71 9h) Is national seismic data shared in real time?	**Some national seismic data is shared in real time,** Please specify which seismic data is shared in real time: The seismic data from stations Hyderabad, Port Blair, Shillong and Minicoy is being shared with International community

Page 23: PART III: Detection and Warning

Q72 9i) Does your organisation have access to GNSS data?	**Yes**
Q73 9j) Is the list of broadband seismometers operated by your country listed accurately in the IOTWMS seismic database http://www.ioc-tsunami.org/index.php?option=com_oe&task=viewDocumentRecord&docID=20796)?	**Yes**

Q74

9k) When compared to the IOTWMS seismic database (http://www.ioc-tsunami.org/index.php?option=com_oe&task=viewDocumentRecord&docID=20796), have you decommissioned or added broadband seismometers operated by your country (Check all that apply and include details in the comments section below)

There are no changes

Page 24: PART III: Detection and Warning

Q75

9l) Does the organisation have access to national and/or international sea level networks? (please select one answer from the following options)

Yes, national and international,
If yes, please list/describe sources of information (e.g. national data through national communication infrastructure, WMO Global Telecommunications System (GTS), IOC Sea Level Facility):
INCOIS received national sea level data through INSAT, GPRS and Iridium connectivity and International data from NOAA-NDBC and IOC Sea Level Facility

Page 25: PART III: Detection and Warning

Q76

9m) Is national sea level data shared in real time?

Some national sea level data is shared in real time,
Please specify which sea level data is shared in real time:
All tsunami buoys data and 8 Tide gauge stations data is shared with international community. The 7 tsunami buoys ids are 23217, 23218, 23220, 23223, 23226, 23227, 23228. The 8 Tide gauge stations are Chennai, Cochin, Nancowry, Port Blair, Visakhapatnam, Minicoy, Marmagao and Veraval.

Page 26: PART III: Detection and Warning

Q77

9n) Is the list of sea level stations operated by your country listed accurately in the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php?option=com_oe&task=viewDocumentRecord&docID=20833)?

Yes

Q78

9o) When compared to the IOTWMS sea level database (http://www.ioc-tsunami.org/index.php?option=com_oe&task=viewDocumentRecord&docID=20833), have you decommissioned or added sea level stations operated by your country (Check all that apply and include details in the comments section below)

There are no changes

Page 27: PART III: Detection and Warning

Q79

9p) What other observing networks are operated by your country and used for tsunami early warning?

GNSS/GPS (please specify below),

Coastal radars (please specify below),

Please provide the type of observing network, the station name/location, email contact of any other observing network operator (IOTWMS Secretariat will contact for more information).:

35 No. of GNSS stations and 10 No. of HF radars are operated by INCOIS. Contact details for more information: Dr T Srinivasa Kumar, Director, INCOIS, email: director@incois.gov.in

Q80

9q) Does the organisation have the capability of analysing real-time seismic and sea-level data for potential tsunami threat?

YesPlease specify the software tools used:
seiscomp is used for real-time analysis of seismic data and in-house developed application is being used for sea-level data analysis

Q81

9r) Does the organisation have capability for tsunami modelling to support generation of threat forecasts?

YesPlease specify the modelling tools and data used:
In-house developed application is being used for generation of tsunami threat bulletins, based on the Tsunami Models: TUNAMI-N2 and ADCIRC

Q82

9s) Does the organisation responsible for identifying a potential tsunami threat also issue national tsunami no threat, watches, advisories, alerts and/or warnings?

Yes

Q83

9t) What are the threshold or criteria (for example sea levels, magnitude) for declaring a potential national tsunami emergency, watch, alert, advisory or warning?

The criteria for generation of different threat types (WARNING / ALERT / WATCH) for a particular region of the Indian coast are based on the available warning time (i.e. time taken by the tsunami wave to reach the particular coast).
WARNING is issued to the Indian coastal areas that fall within 60 minutes travel time from a tsunamigenic earthquake source and those coastal areas falling outside the 60 minutes travel time will be put under ALERT/WATCH status. Only upon confirmation from water- level data the status will upgraded to WARNING/ALERT.
Estimated Wave Amplitude (EWA) > 2.0 m - WARNING
EWA 0.5 to 2.0 m - ALERT
EWA 0.2 to 0.5 m - WATCH

Q84

9u) What actions were taken by your country's National Tsunami Warning Centre (NTWC) and/or Tsunami Warning Focal Point (TWFP) in response to earthquake events and messages issued by the IOTWMS TSPs during the inter-sessional period?

NTWC-India followed national SOP for the events that occurred in inter-sessional period and issued relevant advisories to national/local authorities.

Q85 9v) Did your country's NTWC and/or TWFP participate in the 6-monthly communications tests conducted by the IOTWMS TSPs?	**Yes (please name the organisation(s) that participated in the additional comments)** , Additional comments: INCOIS
Q86 9w) Did your country's NTWC and/or TWFP participate in national and/or international Tsunami Exercises (eg. IOWave) conducted in the inter-sessional period between ICG meetings?	**Yes (please name the exercise(s) and organisation(s) that participated in the additional comments)** , Additional comments: Many provinces of India participated in IOWave20 and IOWave23, in coordination with National Disaster Management Authority, Indian Navy, Coast guards, Nuclear Power Plans, Port & Harbors etc.
Q87 9x) After the December 26 2004 tsunami and until now, was your country impacted by any damaging tsunami? If Yes, what was your national response to each event (please comment if warnings were issued by your NTWC in a timely manner to enable communities to respond, if public were evacuated, etc.)	Yes (please indicate your national response to each event): There was no event which generated a major tsunami that impacted India after December 2004. However, on 11 April 2012 twin events (M 8.5 & M 8.2) generated a minor tsunami, NTWC-India issued appropriate bulletins for those events.
Q88 9y) Since 2018, have there been any enhancements in your national warning SOPs and alerting?	Yes (please specify the enhancements): CAP has been introduced for dissemination of the threat to stakeholders. Warning chain has been reviewed and SOPs are each level are refined.

Page 28: PART III: Dissemination

Q89

10a) How is the tsunami information (warning, public safety action, etc) disseminated within country? (select all that apply)

Email,

SMS,

Telephone,

Fax,

Webpage,

Radio,

WhatsApp / Facebook / Other social media,

Door-to-door,

Sirens,

Television,

Warning towers,

Megaphone,

Police/military,

Public alert system,

VHF radio,

VPN,

Other:

Local communities in a few provinces use traditional methods of dissemination too.

Q90

10b) For each emergency response organisation listed below, which communication methods for emergency response are available? (select all that apply)

National DMOs	**Telephone, Fax, Email, SMS**
Local DMOs	**Telephone, Fax, Email, SMS, Siren**
General Public	**Email, SMS, Siren**
Coastal Communities	**Email, SMS, Siren**
Media	**Telephone, Fax, Email, SMS**

Q91

10c) How is the warning situation terminated?

After receiving the final bulletin from INCOIS (NTWC),the local DMOs are take the decision based on assessment of local conditions and cancel the warning

Q92

10d) What website is used for display of national threat status during events? Please provide the URL.

https://tsunami.incois.gov.in/TEWS/

Q93

10e) Does your country's national tsunami warning system utilise the Common Alert Protocol (CAP) for the dissemination of warnings? If yes, please describe how the CAP is integrated into your warning dissemination processes, including any platforms or communication channels that are specifically utilised to broadcast CAP-formatted alerts to the public and relevant stakeholders.

Yes (please describe how CAP is integrated):
INCOIS uses the CAP for warning dissemination. Indian Tsunami Early Warning Centre generates the CAP messages and disseminates them through National Disaster Management Authority developed platform called SACHET, which broadcasts geo-centred messages and warnings to the public and relevant stakeholders via multiple communication channels.

Q94

10f) Who is primarily responsible for the direct dissemination of tsunami alerts to the public in your country, and what is the timeframe for these alerts to achieve effective last-mile responses? Please provide details.

The province and local DMOs are responsible for dissemination of tsunami threats directly to public.
About 5 to 15 minutes time is being taken to reach the last-mile stakeholders.

Page 29: PART IV: Standard Operating Procedures

Q95

11a) For each of the (upstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop-down menus.

	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
24/7 Emergency Operation Centre (EOC)	**Yes**	**No**	**Yes**	**No**
Receiving information from the NTWC	**Yes**	**No**	**No**	**No**
Response Criteria / decision making	**Yes**	**No**	**No**	**No**

Q96

11b) For each of the (downstream) emergency response issues listed below (in rows), consider the four questions (in columns). Select a yes/no response using the drop-down menus.

	Does your SOP address this aspect of tsunami emergency response?	Is support required to develop/improve this aspect of tsunami emergency response in your SOP?	Is support required to develop Human Resources in this aspect of tsunami emergency response?	Is support required to develop infrastructure for this aspect of tsunami emergency response?
Warning dissemination	**Yes**	**No**	**No**	**No**
Evacuation call procedures	**Yes**	**No**	**Yes**	**No**
Community evacuation procedures	**Yes**	**No**	**Yes**	**No**
Communication with NTWC	**Yes**	**No**	**No**	**No**
Communication with Local Government	**Yes**	**No**	**No**	**No**
Media arrangements	**Yes**	**No**	**No**	**No**
Communication with other stakeholder i.e. Red Cross, Fire Brigade, Search and Rescue, Police, Army, Navy etc.	**Yes**	**No**	**No**	**No**

Q97

11c) Would your country be willing to share your SOPs with the IOTIC and other countries?

Yes

Page 30: PART IV: Evacuation Infrastructure

Q98

12a) Does your country have the following evacuation infrastructure? (select all that apply and detail specific areas). Please use the scroll bar below to view the entire table.

Evacuation shelter	**Yes**
Comment:	All provinces have identified Evacuation zones and nearby infrastructure details for vertical evacuation too. About 75% risk-prone areas are covered.
Vertical evacuation structure	**Yes**
Comment:	Most of the provinces have identified vertical evacuation structures in tsunami-prone areas. 60% risk prone areas are covered.
Natural or artificial hill for vertical evacuation	**Yes**
Comment:	Depending on the topography of the area, a few provinces have identified nearby natural hills for vertical evacuation.
Evacuation signage	**Yes**
Comment:	A few provinces have already installed tsunami signages, covering 20% of risk prone areas.

Q99

12b) Is your evacuation infrastructure integrated in the evacuation plan?

Yes

Page 31: PART IV: Tsunami Exercises

Q100

12c) Are tsunami exercises incorporated within national policies and guidelines? (select all that apply)

National policy,

National guidelines

Q101

12d) At what levels were the exercises conducted during the inter-sessional (between ICG meetings) period? (select all that apply)

National level,

Regional level,

City level,

Village level,

Community/Neighbourhood level,

School level

Q102

12e) What kind of tsunami exercise activities have been undertaken in your country and how many times during the inter-sessional (between ICG Meetings) period?

Organisation table top exercise	**Yes**
Comment:	6
Inter-organisation table top exercise	**Yes**
Comment:	6
National tsunami drill/exercise	**Yes**
Comment:	4
Indian Ocean Wave exercise	**Yes**
Comment:	2 (IOWave20 and IOWave23)
Local tsunami drill/exercise	**Yes**
Comment:	4

Page 32: PART IV: Public Awareness

Q103

13a) Who is responsible for tsunami public awareness programmes in your country?

Provincial Disaster Management Office

Q104

13b) What tsunami related education and awareness materials do you have? (select all that apply)

Leaflets or flyers,

Posters,

Booklets,

Information boards,

Tsunami Signage,

Video, or other visual or oral media,

Indigenous knowledge, folklore, or oral history accounts or compilations

,

School curricula,

Public Evacuation Map

Q105

13c) Would your country be willing to share these education and awareness materials with the Indian Ocean Tsunami Information Centre (IOTIC) and other countries?

Yes

Q106

13d) Do you undertake the following tsunami awareness activities?

World Tsunami Awareness Day Comment:	**Yes** Since its inception, INCOIS is organizing "open day" and some other educational activities every year on World Tsunami Awareness Day
Global Disaster Risk Reduction day Comment:	**Yes** Open day and other activities are conducted on every GDRR day
Public tsunami preparedness outreach Comment:	**Yes** INCOIS organizes Open Day several times of the year to invite all local communities and other stakeholders to create awareness on oceanic hazards including tsunami. It is a regular activity.
School and/or children awareness Comment:	**Yes** Often students from schools and colleges are invited to INCOIS to create awareness on tsunami and other oceanic hazards. It is a regular activity at INCOIS.
Exhibitions Comment:	**Yes** INCOIS regularly participates in exhibitions and conducts them as part of conference or workshops, especially to create awareness on oceanic hazards including tsunami.
Competitions or other ways of highlighting tsunami safety Comment:	**Yes** Mostly during World Tsunami Awareness Day, several competitions are conducted for students
Tsunami Exercise Comment:	**Yes** In addition to regularly participating in IOWave exercises, INCOIS also conducts regular mockdrill at province level and in coordination the National Disaster Management Authority and SDMOs

Q107

13e) Use the boxes below to indicate any areas in which you require support from the IOTIC to develop or enhance public awareness in your country. If you do not require support, please leave blank.

Development of tsunami awareness programmes, activities or campaigns

,

Provision of general tsunami awareness materials

Q108

13f) Can your country offer support to other Member States to develop or enhance public awareness in their country?

Yes (please specify what type of support):
Training in real-time analysis of seismic data, sea level data, preparation of SOP, Warning chains, Tsunami Hazards maps, Vulnerability assessments and GIS related support.

Page 33: PART V: UNESCO-IOC Tsunami Ready Recognition Programme (TRRP)

Q109

14a) Does your country have an interest to participate in the UNESCO-IOC TRRP?

Yes, we are already participating

Q110

14b) Aside from UNESCO-IOC TRRP, is your country currently implementing any other tsunami resilience and preparedness related initiatives or programmes?

No

Q111

14c) What number of villages, cities/districts and provinces/state levels in your country are at risk to tsunami?

Village	**15508**
City / District	**89**
Province / State	**13**

Q112

14d) Does your country have a National Tsunami Ready Board (NTRB)The National Tsunami Ready Board (NTRB) is responsible for guiding the community on the steps for Tsunami Ready recognition and for the review and approval of the community's Tsunami Ready application. It consists of designated representatives of the National Emergency Management Agency or Disaster Mangement Office, NTWC, TNC, the scientific community, and other invited guests.

Yes

Q113

14e) Which institution(s) should be involved in the implementation of TRRP or similar national initiative? (please use a comma between the name of the institutions)

National Disaster Management Organization, National Tsunami Warning Centre, Meteorological/Hydrological services agency responsible for any other coastal hazard, International representative from respective TWS, DMOs from two highly vulnerable provinces, Representatives from 2 LDMOs, NGOs, Media, Academia, Community based organizations.

Q114

14f) Are any communities (for example, villages, cities, districts, provinces or states) in your country currently working towards implementing or interested in implementing the UNESCO-IOC TRRP or similar national initiative?

Yes (please list the names of the communities below),
Names of the communities working towards or interested in working towards TRRP:
24 communities from east coast province are already working towards the TRRP and 9 communities from west coast of India are also actively implementing TRRP.

Q115

14g) Have any communities in your country achieved recognition through UNESCO-IOC TRRP or similar national initiative?

Yes (please list the names of the communities below),
Names of the communities that have achieved TRRP:
Two communities are already recognized as Tsunami Ready under TRRP 1. Venkatraipur and 2. Noliasahi

Page 34: PART V: UNESCO-IOC Tsunami Ready Recognition Programme (TRRP)

Q116 15a) Is there national capacity to develop tsunami hazard maps?	**Yes, it can be easily done through mobilising national experts and funding**
Q117 15b) Is there national capacity to train the community on identifying and estimating the number of people that live in the tsunami hazard zone?	**Yes, it can be easily done through mobilising national experts and funding**
Q118 15c) Is there national capacity to train the community on the inventory of available economic, instrastructural, political, and social resources to reduce tsunami risk at the community level?	**Yes, it can be partially done through mobilising national experts and funding, but also needs some international technical expertise**
Q119 15d) Is there national capacity to work with the community to develop tsunami evacuation maps, plans and procedures at the community level?	**Yes, it can be easily done through mobilising national experts and funding**
Q120 15e) Is there national capacity to work with the community to develop a public display of tsunami information?	**Yes, it can be easily done through mobilising national experts and funding**
Q121 15f) Is there national capacity to work with the community to develop local context outreach and public education materials?	**Yes, it can be partially done through mobilising national experts and funding, but also needs some international technical expertise**
Q122 15g) Is there national capacity to train and build capacity of community to be able to organise and implement outreach and education activity?	**Yes, it can be partially done through mobilising national experts and funding, but also needs some international technical expertise**
Q123 15h) Is there national capacity to train and build capacity of community to be able to organise and implement tsunami exercises?	**Yes, it can be easily done through mobilising national experts and funding**
Q124 15i) Is there national capacity to train and build capacity of communities to be able to develop their community Emergency Operation Plan?	**Yes, it can be partially done through mobilising national experts and funding, but also needs some international technical expertise**

Q125

15j) Is there national capacity to train and build capacity of communities to manage 24/7 tsunami emergency response operation?

Yes, it can be partially done through mobilising national experts and funding, but also needs some international technical expertise

Q126

15k) Is there national capacity to train and work with the communities to develop mechanisms (means and procedures) to receive 24/7 warning?

Yes, it can be easily done through mobilising national experts and funding

Q127

15l) Is there national capacity to train and work with the communities to develop mechanisms (means and procedures) to disseminate 24/7 warning to the community?

Yes, it can be easily done through mobilising national experts and funding

Page 35: PART V: UNESCO-IOC Tsunami Ready Recognition Programme (TRRP)

Q128

15m) Which of the following challenges inhibit the implementation of TRRP or similar national initiatives in your country? (select all that apply)

Tsunami is not a high priority hazard in country,

Limited resources (for example, champions, leadership, scientific support, social support)

,

Limited awareness,

Limited activity

Page 36: PART VI: Narrative

Q129

16) Please briefly describe any innovations or modifications to national tsunami warning and mitigation procedures or operations since the last reassessment. For example, this might include tsunami related research projects, implementation of new seismic and/or sea level monitoring technologies, tsunami mitigation activities and best practices (especially in preparedness and emergency management), as well as public education programmes or other measures taken to heighten awareness of the tsunami hazard and risk.

Since the last assessment, significant innovations and modifications have been made to national tsunami warning centre at INCOIS. It includes, SOP for satellite based volcanic monitoring and sea-level data monitoring for abrupt changes is being implemented for non-seismic tsunamis. Actively involved in PTHA development in North West Indian Ocean region as part of ESCAP project. Also collaborated with University College of London for improving tsunami services including non-seismic and complex sources such as landslides. The improvements also include, Enhanced Multi-hazard vulnerability mapping, Real-time tsunami inundation modelling using ADCIRC, Implementation of CAP for dissemination of tsunami threats etc. A mobile app "samudra" was launched for dissemination of INCOIS services, which include tsunami threats too.
In capacity building several national SOP workshops, mock exercises, exhibitions, open days, and several activities on World Tsunami Awareness Day were conducted. Also, extensive public education campaigns, including school programs, community outreach activities, and multilingual educational materials have been launched to increase awareness of tsunami hazard.
Several provinces has come forward for implementation of Tsunami Ready Recognition programme and around 33 communities are actively involved in the programme. Installation of warning signages and evacuation route maps is in progress in several communities.

Q130

17) Please provide a brief summary of plans for future tsunami warning and mitigation system improvements

INCOIS is working towards improving tsunami services through advanced technologies and innovative research projects.
Advanced technology: INCOIS is working toward establishment of under water observatory network through SMART cables. Also use of GNSS and SMA data for real-time estimation of tsunamigenic potential of an earthquake and reduce the timelines for issuing the tsunami bulletins. To improve the services, INCOIS is leveraging the AI/ML tools for optimizing the speed and accuracy of tsunami model results. The High Performance Computing system installation is under progress on premises. This is will help in developing high-resolution inundation models to provide precise and impact based tsunami forecasts, in turn initiation towards service level-3 products.
The TRRP implementation is given priority in high tsunami risk prone areas and bring all coastal districts on board for implementation of the programme.
In addition, regular training programmes, mock drills, and other educational activities will be continued.

Q131

18) Please list areas where your country would like support for targeted capacity development.

INCOIS would support in installation and analysis of observation network, preparation of SOPs, Generation of tsunami hazard maps, inundation maps, evacuation maps, tsunami emergency plans, GIS support etc.

Q132 **Respondent skipped this question**

Upload Documents