

Regional Guide for Schools to Prepare for Tsunamis



From
the People of Japan



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Resilient nations.



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ACRONYMS

BRH	Bangkok Regional Hub
CO	Country Office
DRR	Disaster Risk Reduction
GCDS	Global Centre for Disaster Statistics
GoJ	Government of Japan
ICG/IOTWS	Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System
ICG/PTWS	Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System
IOC	Intergovernmental Oceanographic Commission
IOTIC	Indian Ocean Tsunami Information Centre
IRIDeS	International Research Institute of Disaster Science
ITIC	International Tsunami Information Centre
JICA	Japan International Cooperation Agency
LIPI	Indonesia Institute of Sciences
MOU	Memorandum of Understanding
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNV	United Nations Volunteer

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In June 2017, UNDP and the Government of Japan launched a regional project in 18 tsunami-prone countries in Asia and the Pacific. During its first phase, 2017-2018, the project conducted evacuation drills in 115 schools with participation of 61,175 students and teachers. Photo: UNDP Thailand

1. INTRODUCTION

Background

Over history (1610 BC to AD 2014), there have been 1,212 confirmed tsunamis, of which 245 have been deadly. In the last 50 years alone there have been 37 deadly tsunamis or approximately one deadly tsunami every 1.5 years¹. Although catastrophic tsunamis may not be as frequent as extreme climate events, the loss of lives and economic consequences of such events are substantial.

Seventy-six per cent of tsunamis that have occurred took place in the Pacific Ocean and its marginal seas. The 2004 Indian Ocean tsunami and the 2011 Great East Japan Earthquake (GEJE) tsunami were two of the worst tsunamis in recent years. Despite progress made in seismological and tsunami science in the last 50 years, these tsunamis caused devastating damage in the countries they hit.

A tsunami can occur any time; there is no tsunami season, and tsunamis can strike during the day or night, and during good or bad weather². Whilst both structural and non-structural measures are important and required, structural measures such as building sea walls can be costly and may not be long term solutions to withstand tsunami waves. Tsunami awareness and preparedness are key to mitigate the impact of tsunamis and prevent loss of lives and property. A lesson learned from the 2011 GEJE was that people should not be too dependent on early warning systems but be able to react based on their own judgement, and they can do this only if they are aware.

With these objectives, in 2017-18, UNDP implemented a regional project titled *Partnerships for Strengthening School Tsunami Preparedness*, hereafter referred to as the project, funded by the Government of Japan. The project aimed at strengthening school tsunami preparedness and awareness in 90 schools in 18 tsunami prone countries in the Asia-Pacific region³. The focus of the project was on tsunami awareness education and the conduct of safe evacuation drills in schools so that they are better prepared to respond to a tsunami warning.

¹ Source: International Tsunami Information Center/ Pacific Tsunami Warning System ITIC/PTWS

² State of Hawai'i, Tsunami Safety Booklet See Annex 1 for detailed information on tsunamis.

³ See Annex 2 for project details.

About the Regional Guide

The Regional Guide is intended to provide practical guidance to school administration on how to prepare for and respond to a tsunami risk. This guide is particularly relevant to schools in tsunami-prone areas, although much of the procedures are applicable to flood prone or even multi-hazard areas. Whilst many guides or instructional manuals exist, this guide is based on reports from expert technical agencies, as well as lessons learned and good practices that have emerged from the practical experience under the project.

The Regional Guide has two main sections: Seven Steps of School Tsunami Evacuation Drills (Chapter 2), and School Tsunami Preparedness (Chapter 3).

The Seven Steps are based on the technical expertise of internationally reputed agencies that UNDP partnered with for this project – the International Tsunami Information Center (ITIC), Hawaii; the IOC-UNESCO Indian Ocean Tsunami Information Center (IOTIC), Indonesia; Tohoku University, Japan and the Indonesian Institute of Sciences (LIPI). They illustrate the minimum steps for an effective tsunami evacuation drill.

The chapter on School Tsunami Preparedness highlights measures that schools need to have in place before to be able to carry out an effective evacuation during a tsunami. These range from assessing their existing preparedness to assigning roles and responsibilities and engaging with external agencies outside the school system for effective evacuation. An important consideration is also how to address the special needs of students who are very young and those that may be physically disabled or injured so that they are not left behind.

No one school drill or preparedness plan can be the same – each is distinct and needs to be tailored to its unique context⁴. The plans vary based on their location (urban/ rural), topography, distance from the sea, and cultural context. In addition to providing general guidance that are applicable to all tsunami risk schools, this guide also highlights the importance of context and that preparedness is an iterative process. By adapting this guide to schools' needs, schools can improve their preparedness and enhance the safety of their students and teachers during a tsunami event.

It is also important to note that in many countries, schools have been used as temporary evacuation shelters or relief camps in the event of a disaster. However, the focus of this guide is to strengthen the preparedness and awareness of the school students and staff in the event that the school may be affected by a potential tsunami, hence, this guide will not cover the possible use of the school as a temporary shelter.

CASE STUDY FROM JAPAN:

The Miracle of Kamaishi

Kamaishi East Junior High School was able to save more than 3,000 lives in 2011 during a devastating tsunami. When a magnitude 9.0 earthquake occurred, the school's students and staff immediately evacuated from the school buildings and moved to the assembly area. Students and staff followed the procedures which they had learnt through the school's tsunami disaster prevention education. The evacuation of the school also prompted neighbouring schools and local residents living in the city to evacuate as well. During the evacuation, students from the high school helped younger students make their way to the assembly area safely. While 1,000 people in the city still lost their lives, only five of them were school-age children, and they were not at school when the earthquake occurred.

Source: Public Relations Office, Government of Japan; How 3,000 students survived 3/11. (<https://mnj.gov-online.go.jp/kamaishi.html>)

⁴ Pacific Tsunami Museum, Tsunami Evacuation Guidelines for Schools in Hawaii, 2012.



Tsunamis can occur anytime. Tsunami-prone schools need to be ready to evacuate all of their students to safety when tsunamis strike during school hours. Photo: UNDP Cambodia

2. SEVEN STEPS OF TSUNAMI EVACUATION DRILLS

If a school receives a tsunami warning, the school is required to take immediate action by evacuating all students and staff to safety. This chapter defines seven steps that schools should take to evacuate. It is important that school drills are conducted to practice these steps and test the school preparedness plans regularly so that students and staff know what to do in the event of an actual tsunami. By following the Seven Steps of Tsunami Evacuation Drills, it is estimated that all students and teachers can be evacuated from the school buildings to the assembly area ideally within 15-20 minutes.

Under the project, this was the minimum time that schools required in the event of a local tsunami⁵. In this chapter, reference has been made to Committees and Task Teams that schools should establish to strengthen preparedness. The composition of the teams and functions are described in chapter 3. These are indicative and based on the expert technical reports reviewed, as well as actual teams that were set up to manage the evacuation drills under the project. It is up to the schools to decide how to constitute teams that are required to fulfil the tasks defined in chapters 2 and 3⁶.



Figure 1: Seven Steps of a Tsunami Drill

⁵ A tsunami from a nearby source for which its destructive effects are confined to coasts within 100 km or less than 1 hour tsunami travel time from its source.

⁶ See section 3 on Teams and Responsibilities in chapter 3 for further information.

STEP 1: HEAR A LOUD SOUND SIMULATING AN EARTHQUAKE

The Simulation Coordinator⁷ activates an initial pre-determined signal, such as a siren, bell, or whistle, to simulate an earthquake.

Note:

- An alternate warning system to alert the entire school should be in place in case of power failure.
- In the event of a real earthquake or tsunami threat, teachers should not wait for tsunami warnings and evacuation orders. Instead they should take students to the assembly area, especially for a short lead-time tsunami.

STEP 2: DROP. COVER. HOLD

Immediately upon hearing the signal, all students in classrooms “Drop, Cover, Hold” under sturdy tables and desks, or under door frames and concrete posts, or cover their heads with chairs.

Note:

- **DROP** down on hands and knees; this protects students from falling but allows them to move if they need to;
- **COVER** heads and necks (or their entire bodies if possible) under a sturdy table or desk (if it is within a few steps of them). If there is no shelter nearby, then they should cover their heads and necks with their arms and hands;
- **HOLD** on to their shelter (or their position to protect their heads and necks) until the shaking stops. If the shaking shifts their shelter around, they should move with it⁸.



*Students taking cover under the table.
Photo: UNDP Timor Leste*

Teachers make sure that children move away from windows, glass, doorways, and unfastened furniture. Teachers ensure the classroom door remains open in order to prevent their students from being locked inside the classroom due to falling debris during an earthquake. Teachers then also “Drop, Cover, Hold” themselves while continuing to remain alert and monitor their students during the earthquake. Students and teachers Hold until the siren stops during a drill.

⁷ A Terms of Reference for a Simulation Coordinator is included in chapter 3.

⁸ Civildefence.govt.nz “When an earthquake happens, DROP, COVER, HOLD”.

When the signal simulating an earthquake is activated while students and staff are⁹:

Outdoors: Students and teachers quickly move away from buildings, power lines, trees, and any other potential dangers. Students and teachers gather together. All students and teachers Drop down to their knees, Cover their heads and necks with their arms and hands, and Hold until the shaking stops.

In science labs and kitchens: Teachers extinguish burners and close containers with hazardous materials and/or place them out of harm's way before taking cover. People in kitchen areas stay away from hot stoves, overhead cabinets, and from hazardous materials that may spill.

In a wheelchair: The occupant locks it and takes the "brace position" covering their head and neck. If in stadium seating, they will take the brace position in their seat.

In a recliner or bed: They do not try to move elsewhere during the shaking, and Cover their head and neck with their arms or a pillow until the shaking stops¹⁰.

LESSONS FROM THE PROJECT:

Exception to "Drop, Cover, Hold"

During a real earthquake, teachers should omit "Drop, Cover, Hold" and evacuate immediately from school buildings if:

- Cracks are forming in school structures or walls;
- Any structural parts are falling; School buildings are non-engineered construction (informally constructed without any or little intervention by qualified architects and engineers in their design);
- School buildings are on the ground floor of a non-reinforced mud-brick (adobe) building with a heavy ceiling.

Source: Earthquake Country Alliance, How to Protect Yourself During an Earthquake <https://www.earthquakecountry.org/dropcoverhold/>

Note:

- "Drop, Cover, Hold" is a crucial measure to prevent students to protect their heads and necks from getting hit by objects that could fall during a real earthquake or high wind conditions. Students and teachers should "Drop, Cover, Hold" immediately and every time they feel the ground shaking, and Hold until the earthquake stops and the ground stops shaking.
- Students and teachers are advised to start counting out loud when they feel the shaking begin during an earthquake. If the earthquake lasts more than 40 seconds, teachers should evacuate students immediately and take them to the predetermined assembly area instead of waiting for an official warning to arrive.
- Teachers ensure the classroom door remains open during an earthquake in order to prevent their students from being locked inside the classroom due to falling debris on the other side obstructing the door from being opened.
- In the event of a real earthquake, teachers and students should expect aftershocks. Though these secondary shockwaves are usually less violent than the main quake, they can be strong enough to do additional damage and to weaken structures¹¹.

⁹ International Finance Corporation, Disaster and Emergency Preparedness: Guidance for Schools, 2010

¹⁰ Shake out, Earthquake Preparedness Guide For People with Disabilities and Others with Access and Functional Needs.

¹¹ Earthquake Planning and Protection Organization, Get Ready for the Earthquake: Follow 5 steps before the earthquake, during the earthquake, after the earthquake, 2013.

STEP 3: EVACUATE HAZARD ZONES

Once the signal simulating an earthquake is off, teachers check the safety of students.

The Early Warning Team¹² informs the Simulation Coordinator of any natural or official warning signs of a tsunami. The Simulation Coordinator then activates a second pre-determined signal.

The Simulation Coordinator makes an announcement that a tsunami has occurred and instructs staff to carry out an evacuation, following their designated roles for this situation.

Teachers immediately take their students from their classrooms to the predetermined assembly area, while carrying their evacuation backpacks (containing attendance lists, first aid kits, water, flashlights etc.)¹³ with them. Teachers keep their students grouped by their classes and with their buddies in order to ensure the headcount can be carried out quickly, to keep students calm, and to prevent students from being left behind. When evacuating classrooms, teachers lead students from the front. Teachers check that the evacuation route out of the school building is clear¹⁴ Class Monitors (or student captains) are at the rear of the group and check everyone stays together¹⁵.

Students preferably walk out - and not run - from their classrooms in queues. Students cover their heads with their hands or with books until they arrive at the assembly area. Students do not go back into their classroom under any circumstance.

Evacuation Assistant¹⁶ support teachers and students to move quickly and calmly out from the building and make their way to the assembly area using pre-determined evacuation routes. All school members evacuate on foot.

Local authorities, traffic police, hospitals, and local communities are involved to support students to move safely to the assembly area. Especially in urban areas,

LESSONS FROM THE PROJECT:

Ideal Response Time

The response time for evacuation after the issuance of a tsunami warning is dependent on several factors. These include whether the tsunami is local or distant, size and period of the waves, the near-shore bathymetry and shape of the coastline, the state of the tide etc.

Under the project, the response time available differed for each country and school based on the tsunami risk and location. For instance, in Samoa, the schools were located barely 150 metres from the coast and students had about 15-20 minutes to evacuate.

Given that the land is quite flat, the students and teachers had to run almost one kilometre inland to the safe evacuation zone.

In other countries such as the Maldives, students had almost two hours to get to safe areas so they could evacuate in an organised manner and walk to the safe evacuation zones.

¹² A Terms of Reference for an Early Warning Team is included in chapter 3.

¹³ See full list of equipment in chapter 3.

¹⁴ International Finance Corporation, Disaster and Emergency Preparedness: Guidance for Schools, 2019.

¹⁵ Ibid.

¹⁶ A Terms of Reference for Evacuation Assistants are included in chapter 3

traffic police are required to stop traffic in traffic police are required to stop traffic in order to enable students to evacuate safely.

Ambulances should be on standby in case accidents occur or students with special needs require additional assistance.

The Safety and Security Team¹⁷ carries out a final sweep to make sure there is no one left behind in the school building once the school has been evacuated.

Note:

- A Class Monitor can be selected within each class, and they can assist the teacher to evacuate students safely. If the teacher gets injured, the Class Monitor can seek help from Evacuation Assistants¹⁸.
- The lower the school grade, the more important it is for teachers to be directly involved in the drill. The higher the grade, the more students are able to participate, for example in conducting head counts or developing scenarios.
- The buddy system is a useful means of effectively evacuating students. By pairing students as buddies (groups of two people), all students can evacuate classrooms safely and students are likely to be calmer because they can help each other. The buddy system is also particularly useful for ensuring students who have physical disabilities or who are injured get the additional support and assistance they require.
- In the event of a tsunami, 2-3 members of the Safety and Security will go ahead to check if the evacuation route is clear and indicate to the Simulation Coordinator any alternate route already identified by the School Emergency and Disaster Preparedness Committee.
- Using motor vehicles during a tsunami event needs to be avoided as they can impede the quick evacuation from hazard zones to assembly areas, with traffic congestions making roads impassable¹⁹.
- Teachers ensure students are careful about any potentially dangerous materials (such as debris from damaged infrastructure, broken glass, petroleum, gas, sewage lines etc.) along or near evacuation routes.
- The Safety and Security Team checks whether school utilities are switched off in order to avoid damage to utilities and collateral damage to properties adjacent to the school.
- In the event of a distant tsunami that takes hours to reach the shore²⁰ the school cooperates with local authorities to control congestion caused by the huge influx of people and ensures that all students and staff arrive at the assembly area safely at least an hour before the tsunami arrives²¹.

¹⁷ A Terms of Reference for the Safety and Security Team is included in chapter 3.

¹⁸ A Terms of Reference for Evacuation Assistants is included in chapter 3.

¹⁹ Pacific Tsunami Museum, Tsunami Evacuation Guidelines for Schools in Hawai'i, 2012.

²⁰ See Annex 1 for further information on different types of tsunamis and examples of response times.

²¹ UNESCO/IOC, A tsunami Warning, 2005.

STEP 4: MEET AT THE ASSEMBLY AREA

Teachers keep their students grouped by their classes when they arrive at the assembly area. Teachers keep the situation calm and safe and watch out for strangers. As required, the First Aid and Relief Team²² performs first aid on injured students and staff.

Note:

- If possible, it is advisable to provide water and snacks at the assembly area so that students and teachers stay hydrated.
- For some schools, the assembly area is an elevated area within the school premises. This is because a school is far from coastal zones or because its buildings are more durable and higher than other buildings in the community²³. These schools should be prepared with equipment that can enable school members to survive for at least 72 hours. Ideally, these schools should have adequate facilities including toilets and clean water.



In the Maldives, the mosque was identified as the safe areas. Photo: UNDP Maldives

STEP 5: CONFIRM HEADCOUNT

The teacher of each class starts counting the students who are present by roll call in order to confirm the number of students present and identify if any students are missing. Roll call simply means the teacher calls out loud for each student by their name, using the same order as the attendance or registration sheet.

Teachers report to the Simulation Coordinator on the status of the students, including any students that may be injured or unwell. After confirming the headcount and reporting to the Simulation Coordinator, teachers organise recreation activities to keep students calm and prevent panic.

In the event that any students are missing, the Simulation Coordinator reports the names and identifying features of the missing students to the Rescue Team²⁴. The Rescue Team searches for missing students or staff in the assembly area for a designated time. If all missing students are found, the Simulation Coordinator can signal the end of the drill.

²² A Terms of Reference for the Safety and Security Team is included in chapter 3.

²³ Ministry of Education, Republic of Maldives, Guide for School Emergency Operations Plan, 2009.

²⁴ A Terms of Reference for the Rescue Team is included in chapter 3.

Note:

- If, during a real tsunami event, a teacher is injured, the Class Monitor conducts the headcount and reports to the Simulation Coordinator.
- In the event of a real tsunami if students or staff are missing, the Rescue Team contacts the governments' First Responders to help find and rescue them.
- In the event of a real tsunami, all teachers and students wait at the assembly area until the Simulation Coordinator receives the 'all clear' message from the National Disaster Management Office or Meteorological Services Office (or the equivalent government departments in each country)²⁵. This message indicates that the tsunami warning has been lifted and the risk of a tsunami is no more.
- In the event of a real tsunami, after the 'all clear' message is issued by the National Disaster Management Office, Meteorological Services or Ministry of Education, the Safety and Security Team returns to the school first to assess whether it is safe for students and teachers to return to their classrooms or if they should go on to the temporary evacuation shelters. The Team reports their assessment to the Simulation Coordinator who announces the appropriate decision.

STEP 6: SIMULATION COORDINATOR SIGNALS END OF DRILL

The Simulation Coordinator announces that the drill has ended. All students and teachers return to their classrooms.

Note:

- After a real tsunami event, the students and teachers may be relocated to a temporary evacuation shelter with the help of Evacuation Assistants. The same process of evacuating from the school to the assembly area is followed again – walking with buddies, headcount on arrival and reporting of any students or teachers that may be missing or injured.
- In the event of a real tsunami, parents need to be notified in advance where they will meet their children. Parents should not come to the school, but instead should meet their children at the temporary evacuation shelter. Family reunification booths will be set up for this purpose. Students under the age of 16 are not permitted to leave except in the company of an adult approved in advance by a parent or guardian. Teachers ensure students are patient and follow safe family reunification procedures, and do not leave with anyone except those approved in advance by their parent or guardian. Evacuation Assistants keep the records of students who are released.

²⁵ International Tsunami Information Centre IOC of UNESCO, Tsunami Warning, 2005.

STEP 7: ASSESS DRILL TO IMPROVE FOR THE REAL EVENT

Debriefing to evaluate or assess the drill is important to identify what went well, what did not work, and what were the gaps and areas that need improvement so that the school preparedness and evacuation plan can be improved.

There are two types of debriefing: a hot debrief, where the assessment is conducted immediately after the drill exercise to generate initial feedback, and a cold debrief, where the assessment is conducted within four weeks of the exercise.

They complement each other: the hot debrief provides immediate feedback while the drill is still fresh, and the cold debrief allows time for reflection and greater insights.

Teachers conduct hot debriefs with their students immediately after returning to their classrooms after the drill is finished.

Similarly, the Simulation Coordinator conducts an initial hot debrief with the School Emergency and Disaster Preparedness Committee²⁶, staff, teachers, student representatives, and external observers. The Simulation Coordinator will then conduct further cold debriefs over the following weeks.

The School Emergency and Disaster Preparedness Committee uses the result of these series of debriefs to propose recommendations to improve the effectiveness of the school's tsunami response, in particular given the school's unique challenges and cultural context.

Once the improvements are implemented, the school should hold further drills to assess the outcomes and to iteratively identify further areas of improvement, as well as to ensure all students and staff are familiar with their expected roles.

LESSONS FROM THE PROJECT:

Reflections by Drill Evaluators

For the schools under the project the drill evaluation revealed a range of gaps and issues that needed to be addressed, especially since many of the schools lacked preparedness plans. For instance, in Tonga and Solomon Islands, new evacuation routes were built as either they didn't exist or the older routes were no longer safe. Across all countries, many teachers felt that they themselves lacked the knowledge and training to respond to a tsunami warning, hence requested the need for user-friendly manuals.

The involvement of the neighbouring community – the local authorities, local NGOs, parents, traffic police and even the military was perhaps the most important lesson – that preparing a school requires preparing the community in which the school is located in. Based on these lessons, chapter 3 identifies key ways in which schools can strengthen their preparedness to tsunamis and conduct successful drills.

²⁶ A Terms of Reference for the School Emergency and Disaster Preparedness Committee is included in chapter 3.



A tsunami warning requires the entire community to evacuate. School preparedness is more effective if the emergency plans are harmonized with those of local governments and surrounding communities.
Photo: UNDP Malaysia

3. SCHOOL TSUNAMI PREPAREDNESS

Evacuation drills test preparedness plans and measures and help to address gaps and improve them. For a drill to be conducted successfully, it must be part of a preparedness and awareness plan. For all the schools under the project, awareness education programmes and workshops to review existing preparedness preceded the conduct of the drills.

Broadly, the preparedness measures include the following which are elaborated upon in detail below:

- 1) Assessing the existing school tsunami preparedness through the collection of baseline data;
- 2) Identifying gaps in preparedness and making recommendations;
- 3) Setting up teams and clarifying their roles and responsibilities;
- 4) Developing school preparedness plans;
- 5) Procuring equipment required by the school;
- 6) Raising awareness of tsunami risks through a range of activities; and
- 7) Supporting students after a real tsunami event.

All these measures must consider the context of the school, be gender-sensitive and inclusive in their approach and address special needs of those who may have disabilities or injuries.

1. COLLECTING BASELINE DATA

The first step is to assess the existing school preparedness to tsunami risk. This information indicates the extent to which school members are currently prepared for, ready to respond to, and able to recover from tsunamis.

The baseline data can be collected in two ways: (i) schools collect general information, and (ii) schools assess their existing safety information across five parameters.

a. General information

A school should have general information such as total number of staff and students, emergency contact numbers and available facilities. An example of what this information should include is provided in the table below:

General information to collect	Further information and means to aggregate data
The principal (and deputy)	(names / contact numbers)
Focal point in case of emergency	(name / contact number)
Total number of support staff	(male / female)
Total number of teachers	(male / female)
Total number of enrolled students	(male / female)
Total number of students with special needs	(names / medication, symptoms etc.)
School Emergency and Disaster Preparedness Committee	(names / contact numbers)
Number of available emergency kits	(contents of emergency kits)
List of contact details of students' parents/guardians	(names / contact numbers)
Emergency contact numbers near the school (telephone numbers of emergency and support agencies)	(e.g. nearest fire departments, hospitals, police station, radio and television stations, tsunami centre)
School facilities	(number of buildings / floors / classrooms / canteens / staff housing / water tanks etc.)
The distance from the school to the coast and the school's elevation above sea level	
The distance of potentially feasible assembly areas from the school	

Table 1: Proposed format for General School Information for Emergencies²⁷

b. Safety information

In 2006, the Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO) and LIPI Indonesia developed a School Preparedness Assessment manual to assess the preparedness level of a school based on five preparedness parameters: a) policy, b) knowledge, c) preparedness and response plan, d) early warning system, and e) resource mobilization capacity.

²⁷ As suggested in the project report from UNDP Pakistan - *Tsunami Evacuation Plans For six schools: Reducing Loss of Lives of School children from Tsunamis in Asia-Pacific through Better Awareness and Preparedness, 2018.*

Under this project, the tool was updated by UNDP in partnership with IOC-UNESCO and LIPI through a series of consultations with the Government of Indonesia, UN agencies, civil society, school representatives, and experts. The tool was developed into a mobile application called STEP-A Strengthening Tsunami and Earthquake Preparedness and tested in several schools in Indonesia, Maldives and Sri Lanka during the first phase of the project. STEP-A can be used to assess the existing status of school preparedness at regular intervals thereby assessing not only the baseline but also the actions and improvements made to address tsunami risks²⁸.

LESSONS FROM THE PROJECT:

STEP-A: Supporting the Collection of Baseline Data

STEP-A (Strengthening Tsunami and Earthquake Preparedness) is a mobile application which has been developed under the technical guidance of IOC-UNESCO and LIPI Indonesia, coordinated by UNDP Indonesia, and supported by UNDP Bangkok Regional Hub.

STEP-A can be used to collect non-structured and primary sources of data to assess the level of school preparedness on the five parameters (knowledge and skills, school policy, school early warning system, school emergency response plan, and resource mobilisation). Schools can collect baseline and end line data by using this app before and after drill practices. Schools can use this data to monitor behaviour changes of each school member group (authorities, teachers, and students) before and after drill practices. Schools can also receive recommendations for improvement at the end of the assessment.

The assessment can be performed through the following process:

1. **Download and install** STEP-A app on Android devices;
2. **Log-in** with your school ID and password (if your school has been registered);
3. Start filling in the questionnaires.
4. Send the results to the server. If the device you are using for the preparedness assessment is online, you can continue to send results to the server. If your device is being used offline, the results will be saved in the app and sent automatically to the server once the device is online;
5. Display the results. Schools can receive the assessment results which shows the five parameters of preparedness for each school member group and the level of preparedness for the school as low, medium, or high. The result will also contain recommendations for each parameter and each type of respondent.



Using STEP-A, teachers can evaluate changes in students' knowledge and attitudes towards tsunamis. Photo: UNDP Indonesia

²⁸ See Annex 3 for the STEP A checklists.

2. GAPS AND RECOMMENDATIONS

Based on the drills conducted, the project identified gaps across the five parameters and proposed recommendations to address them²⁹

a. Policy

- The scoping missions undertaken under the project showed that the level of schools' preparedness to tsunamis varied from school to school.
- Disaster preparedness education was not uniformly integrated into school curriculum. Moreover, where it was integrated, teachers did not find it user-friendly and it lacked practical application.
- Most schools did not have committees or teams for carrying out drills, training staff and coordinating with external partners including the local community.

Recommendations:

- Education policies should include integration of disaster preparedness education into school curriculum. Practical information on how to respond to a tsunami warning and do's and don'ts should also be shared.
- A school policy can help to formalize the disaster preparedness arrangements that a school may establish, and this policy should include collaboration with other partners such as the local administration, the traffic police, hospitals or even the military as may be applicable in the country context.
- Each school should establish teams with clear roles and responsibilities for preparedness and conduct of tsunami drills. Some of the teams have been mentioned in chapter 2 and the next section describes in greater detail their roles. For instance, an overall team, such as the *School Emergency and Disaster Preparedness Committee*, should be established including members of the school administration, staff, student representatives (including from vulnerable groups), parents, and the local community³⁰. Depending on the context, experts from the fire services, the police, the health department etc. could also join and support the Committee³¹

²⁹ UNESCO/IOC, School Based Disaster Preparedness

³⁰ International Finance Corporation, Disaster and Emergency Preparedness: Guidance for Schools, 2010.

³¹ UNDP India, School Disaster Management Plan.

b. Knowledge

The lack of awareness of tsunami risk amongst staff and students was also apparent in many schools even in the most tsunami prone areas, hence, a need to organise tsunami education and awareness before developing or testing the plans was strongly felt.

Recommendations:

- Staff and students should be aware of hazard risks in general and in particular how it affects them. Such awareness raising can be done in a variety of ways – through posters, signages and instructions; through theme days, competitions and events; and through other fun learning activities. For instance, in Thailand, interactive information booths were set up to provide practical information in a fun and non-threatening way.
- Schools can also collaborate with other schools and local NGOs to hold events to increase awareness of tsunamis and tsunami drills for people living in the community³². For instance, in Viet Nam, rock concerts and art competitions were organised raising awareness of tsunami risks to the schools and also the local community in the city of Hanoi.
- Several schools under the project used the opportunity to conduct comprehensive disaster awareness and education training for teachers and students on recognising tsunami trigger signs and even learning first aid practices. Teachers can use various teaching materials to increase the awareness of students (see Section 6). Teachers can encourage their students to share the knowledge about tsunamis and drills they learned at school with their families and neighbours³³.
- For most schools, this was the first time that a comprehensive awareness programme and drill was conducted. In some countries, Training of Trainer materials were developed that could be shared and help more schools replicate drills.

c. School Preparedness and Response Plan

- Most schools did not have tsunami/ disaster preparedness plans. Where they existed, the plans were not updated or tested through drills.
- Most schools did not have risk information, such as hazard maps or inundation data which are necessary to identify safe evacuation routes. Hence, much of the evacuation route mapping was based on local knowledge of past tsunamis or floods, and not performed scientifically.
- Some schools did not have the proper equipment needed for tsunami drills and did not have enough first aid kits in particular.
- Some students and teachers needed extra help because they were not fit enough to run to the assembly areas.

³² UNDP, Tsunami Vulnerability of Bangladesh: Science-based Assessment and Recommendations.

³³ Ibid.

Recommendations:

- Each tsunami prone school should have its own disaster preparedness plan that's unique to its location, topography and cultural context. The plan should include a comprehensive assessment of the hazard risks to the school, roles and responsibilities of staff and students, equipment and facilities available, special needs of students with disabilities or others, coordination with external partners, evacuation routes, and process of evacuation.
- The plan should be developed in a consultative and collaborative manner – involving staff, student representatives, and students with special needs as well as parents, the local administration, local hospital, the local community etc. as required.
- Schools should determine main and alternative evacuation routes and ensure that communication is still possible despite poor network services³⁴.

d. School Early Warning System

Most of the schools did not have the proper tools or an alarm system to receive and disseminate early warning messages from reliable sources.

Recommendations:

- Schools should have access to tsunami warning information from official reliable sources such as governments' meteorological department. An Early Warning Team can help to understand and interpret warning information from both natural signs and official warnings.
- Schools should be equipped with bells, whistles, alarms, signages, loudspeakers and any other kind of device required to conduct an evacuation. Wheelchairs for students with disabilities or injuries and first aid kits should be available and accessible. All equipment should be regularly checked, stored safely, and maintained.



Officials explain the evacuation signages in local language. Photo: UNDP PNG

e. Resource Mobilisation Capacity

A lesson learned was that a school drill especially where students and teachers need to leave the premises to evacuate to a safe location cannot be done in isolation and requires the support of a host of external partners.

³⁴ UNDP, Tsunami Vulnerability of Bangladesh: Science-based Assessment and Recommendations.

Recommendations:

- The School Emergency and Disaster Preparedness Committee should engage with parents and local authorities to develop tsunami risk and resource maps, to decide the location of assembly areas and evacuation routes, to conduct and assess drills, and to make plans for temporary shelters³⁵. Schools could build partnerships with local hotels or hospitals if there is no safe place to evacuate in the school grounds during a tsunami event.
- Local government, traffic police, and local hospitals were engaged in the drill preparations and process, as were armed forces and private organisations depending on the context. Moreover, NGOs such as the Red Cross and Red Crescent Societies have a large network of volunteers that can be deployed to support safe evacuation.
- Before the conduct of a drill, it is also important to inform students and their parents beforehand what is going to happen so that they are prepared and do not panic. For instance, during the first drill in Bali, several students fainted due to dehydration or because they were not used to running up several flights of stairs to reach the safe evacuation point. In the follow-up drills teachers instead told their students to have adequate breakfast, and water and snacks were provided at the assembly area.

LESSONS FROM THE PROJECT:

Including Students with Disabilities in Tsunami Preparedness

Schools may have students with disabilities that require special support during tsunami preparedness and awareness. Disabilities could be of different types – visually impaired, hearing disabilities or physical disabilities that require different kinds of support. To be able to address their special needs, schools should:

1. Include students with disabilities as members of the School Emergency and Disaster Preparedness Committee so that they can contribute to the planning process;
2. Consult experts on disability inclusion in tsunami preparedness and evacuation in order to understand what support is required;
3. Procure equipment such as wheelchairs or stretchers that can be used both by students with disabilities or injured students;
4. Train evacuation assistants to communicate with and support students with disabilities so that they can be safely evacuated.

Please note that these measures are recommended for tsunami-prone schools that may have a few students with disabilities and not for tsunami-prone schools that are dedicated to students with disabilities – the latter will require more specialized procedures that this regional guide does not cover.

More information: UNESCO, *A Teacher's Guide to Disaster Risk Reduction: SAFE AND BE PREPARED*, 2014. <https://unesdoc.unesco.org/ark:/48223/pf0000228963>

³⁵ UNISDR Asia and the Pacific, *Guidance Notes: School Emergency and Disaster Preparedness*, 2010.

3. TEAMS AND RESPONSIBILITIES

It is important that schools organise teams with different responsibilities and that all school members know what they need to do during a real tsunami event. All school members and response teams should practice their roles during drills in order to improve their effectiveness and familiarity with their duties to increase the safety of people during a real tsunami. Schools should not assign dangerous task to students³⁶.

i. Roles and responsibilities of all students and teachers³⁷

All Teachers	All Students
<ol style="list-style-type: none"> 1. Teach students about how to prepare and respond to tsunami warning signs and familiarise them beforehand with drill procedures. 2. Be aware of evacuation principles and procedures³⁸ including evacuation routes and instruct students to follow procedures from the classroom to the safe assembly area. 3. Carry evacuation backpacks with basic equipment as specified in section 5. 4. Be aware of how to use safety equipment and how to perform first aid. 5. Take headcount of students by roll call at the assembly area, report any injured students to the Simulation Coordinator, and organise recreation activities to keep students calm. 6. After the drill, conduct hot debriefs with their students in the classroom. 	<ol style="list-style-type: none"> 1. Understand the nature of tsunamis, early warning and evacuation signals, and evacuation procedures. 2. Follow instructions for safe evacuation. 3. Provide feedback during hot debriefs.
	School maintenance and technical staff
	<ol style="list-style-type: none"> 1. Check school buildings regularly and report any structural defects to the School Emergency and Disaster Preparedness Committee. 2. Maintain an inventory of tools and equipment. 3. Post charts showing the locations of equipment required by each Task Team. 4. Advise the School Emergency and Disaster Preparedness Committee about the potentially hazardous and safe areas in the school.

³⁶ Ibid.

³⁷ Ibid.

³⁸ Ministry of Education and Human Resource Development Solomon Islands, Guidelines for Preparing School Disaster Management Plan, 2011.

ii. Roles and responsibilities of the School Emergency and Disaster Preparedness Committee and Task Teams³⁹

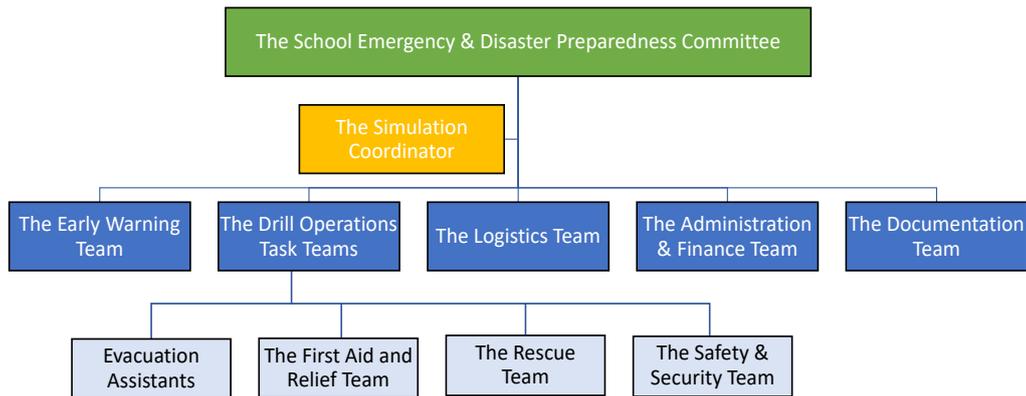


Figure 2: Proposed Structure of Preparedness Committee and Task Teams Adapted from: International Finance Corporation, *Disaster and Emergency Preparedness: Guidance for Schools*, 2010.

a) The School Emergency and Disaster Preparedness Committee

The School Emergency and Disaster Preparedness Committee is in charge of all tsunami preparedness procedures in the school, including preparedness, drills, and assessments. Chaired by the Headmaster or School Principal, the Committee includes at least seven people representing different stakeholder groups including:

- The school administration (such as the deputy headmaster, teachers, or staff)
- Student representatives (e.g. Scouts, Class Monitors, students with disabilities)
- Parents and community members (e.g. Red Cross)

The Committee⁴⁰:

1. Maintains a list of important telephone numbers and radio contacts (e.g. National Disaster Management Office, Meteorological Department, and Ministry of Education).
2. Leads the development of the school disaster preparedness and evacuation plan that identifies the tsunami risk and resource map for the school, safe assembly area, evacuation routes, and temporary evacuation shelter⁴¹.
3. Coordinates the testing of the preparedness plans through organising conduct of tsunami evacuation drills, their evaluation, and incorporating lessons learned to update the school plans at regular intervals (twice per year and after a disaster)⁴².
4. Plans for how teachers can support their students after they experience a tsunami⁴³.

³⁹ International Finance Corporation, *Disaster and Emergency Preparedness: Guidance for Schools*, 2010.

⁴⁰ Ministry of Education and Human Resource Development Solomon Islands, *Guidelines for Preparing School Disaster Management Plan*, 2011.

⁴¹ See section 4 for drafting school preparedness plans.

⁴² UNDP India, *School Disaster Management Plan*.

⁴³ See section 7 on Supporting Students After a Tsunami for further information.

b) The Early Warning Team

The Early Warning Team consists of at least three members from the school administration staff.

The Team:

1. Receives official alerts and tsunami warnings from the National Disaster Management Office, the Ministry of Education, or Meteorological Services Office, and observe for natural signs of tsunamis.
2. Informs the Simulation Coordinator to activate the second pre-determined signal to evacuate students and teachers.
3. In the event of a real tsunami, in case of not enough time, the team signals on behalf of the Simulation Coordinator for students and staff to evacuate.
4. In the event of a real tsunami, the Early Warning Team initiates procedures to inform parents by activating the telephone tree or by using community radio where available.

c) The Simulation Coordinator

The Simulation Coordinator is a senior representative of the school, most likely the Headmaster or School Principal or Deputy Headmaster. S/he leads the School Emergency and Disaster Preparedness Committee in conducting the evacuation. At least 2-3 individuals should be prepared to perform this role in the event of any individual being absent during an actual tsunami event⁴⁴.

The Simulation Coordinator:

1. Signals the start of an earthquake drill to Drop, Cover, Hold, and evacuate.
2. On receiving the signal from the Early Warning team of a tsunami alert, activates the second pre-determined signal for evacuation.
3. Leads the students and teachers to the safe assembly area and makes any relevant announcements.
4. Collects from teachers the status of students in the assembly area including any students that may be missing or injured and reports their names to the Rescue and the First Aid and Relief Team respectively.
5. In the event of a real tsunami, after hearing from the Safety and Security Team, announces the next steps – whether students should return to the school or go ahead to the temporary evacuation shelters.
6. Announces the end of the drill and informs teachers and students to return to their classrooms.

⁴⁴ International Finance Corporation, Disaster and Emergency Preparedness: Guidance for Schools, 2010.

d) The Drill Operations Task Teams

The process of an evacuation requires certain critical functions that need to be carried out by additional trained staff. These can be categorised into four Task Teams with each comprising 5-8 persons depending on the size of the school⁴⁵:

The Team:

1. **Evacuation Assistants:** They could be senior students from the school or volunteers from the community that are responsible for:
 - Helping students and teachers evacuate by using pre-determined evacuation routes and accompanying them on their way to the assembly area.
 - Providing additional support to students with mobility issues.
 - In the event of a real tsunami where the school members have been relocated to the temporary evacuation shelter, they set up family reunification booths and keep records of the students who are released.

2. **The First Aid and Relief Team:** They could be trained school medical staff or trained volunteers from the community that are responsible for:
 - Performing first aid on injured students and teachers at the assembly area.
 - Holding first aid trainings for students and teachers.

3. **The Rescue Team:** They could be trained school administration staff that are responsible for:
 - Searching for missing students or teachers in the assembly area after receiving the list from the Simulation Coordinator.
 - In the event of a real tsunami, they inform the government's First Responders to support search and rescue efforts.

4. **The Safety and Security Team:** They could be trained school administration staff that are responsible for:
 - Carrying out a final sweep to make sure there is no one left behind in the school once the school has been evacuated.
 - Checking whether school utilities (such as the gas and electricity) are switched off.
 - In the event of a real tsunami, 2-3 team members go ahead to check if the evacuation route is clear and indicate to the Simulation Coordinator any alternate route already identified by the School Emergency and Disaster Preparedness Committee.
 - In the event of a real tsunami, after the 'all clear' message is issued, the Team goes back to the school first to assess whether it is safe for students and teachers to return to their classrooms or if they should go on to the temporary evacuation shelters, and reports their assessment to the Simulation Coordinator for appropriate action.

⁴⁵ Ibid.

e) The Logistics Team

The Logistics Team consists of at least 20 people including school administration staff and senior students.

The Team:

1. Prepares the equipment and supplies the Task Teams and teachers require during drills, including first aid kits, evacuation backpacks, flash lights, and whistles.
2. Performs regular checks and maintenance of equipment to ensure it is functional during an evacuation.
3. Checks and updates the evacuation backpacks at the beginning of each school semester.
4. Provides the water and snacks for students and teachers at the assembly area.
5. Prepares the WC privacy screen, toilet paper, trash bags, and hand sanitizers (if the assembly area does not have adequate toilet facilities).

f) The Administration and Finance Team

The Administration and Finance Team could consist of 3-5 school administration staff.

The Team:

1. Purchases the equipment⁴⁶ and supplies (water, snacks, medical etc.) requested by the Logistics Team.
2. Keeps records of the internal and external partners, supplies and equipment the school may require after a tsunami.

g) The Documentation Team

The Documentation Team consists of at least 5 people including staff, school medical staff, and senior students (both a boy and a girl).

The Team:

1. Identifies important educational and administrative documents, makes copies of these documents and stores them in a safe place (such as on external USB drives that the Team can carry with them during an evacuation).
2. Brings the list of students, staff, and their emergency contacts during an evacuation.
3. Maintains the medical records of students and staff with health problems (including their medication information and how long medications can last unrefrigerated⁴⁷) and brings the hard copies of these records during an evacuation.
4. Records the process of conducting drills, which can be used to enable the school to improve its drills in the future.

⁴⁶ See section 5 for comprehensive list of equipment.

⁴⁷ Shake out, Earthquake Preparedness Guide for People with Disabilities and Others with Access and Functional Needs.

4. SCHOOL PREPAREDNESS PLANS

This section provides guidance for how schools can design, implement, and evaluate plans to support tsunami preparedness, for both before and after a tsunami event.

1) Producing a risk and resource map to identify assembly areas, temporary evacuation shelters, and safe evacuation routes

i. Produce a tsunami risk and resource map for the school and community

A tsunami risk and resource map is typically a sketch of an area or a place showing the hazard risks it is vulnerable to and the resources or facilities available that can be used to respond to the risks.

Tsunami prone schools can develop a risk and resources map that includes data on past tsunami experiences to understand how potential tsunamis could affect the school and the community and use this information to draw a risk and resource map.

The School Emergency and Disaster Preparedness Committee who is responsible for producing the map should engage the school authorities, staff, and student representatives in developing the map. External partners including local authorities, parents, local NGOs, and others should be involved in the process of mapping the risks surrounding the school. The process of making the map can also contribute to increasing the community's awareness of and preparedness to tsunamis.

The steps below explain how a school can develop a tsunami risk and resources map.

a) Collect data on past tsunami experiences

The School Emergency and Disaster Preparedness Committee should contact local authorities to access data on past tsunamis that occurred in the area and affected the schools⁴⁸. If such data is not available, the Committee should organise consultations with local authorities, community members, and local NGOs to collect anecdotal evidence of tsunami events and their impacts on the school and surrounding areas. If possible, the local authority or School Committee should reach out to tsunami expert agencies for risk information or joining the consultations.

LESSONS FROM THE PROJECT:

Gender-sensitive Approach to Tsunami Preparedness

While disasters do not discriminate, they may have differential impact on boys and girls. Schools should follow a gender-sensitive approach by:

- Ensuring that girls and female teachers are well represented in the Committee and all Task Teams.
- Addressing special needs of adolescent girls in the event of an evacuation (for instance, those that may be menstruating).
- During the hot debriefs, discussing issues related to safety and privacy for both boys and girls.

Ensuring that feedback is provided and adequately addressed in updating the preparedness plans.

Source: UNESCO, A Teacher's Guide to Disaster Risk Reduction, 2014.

<http://unesdoc.unesco.org/images/0022/002289/228963e.pdf>

⁴⁸ UNDP is supporting countries in the Asia-Pacific region to develop disaster loss and damage databases to record historical disaster data for risk informed development planning by Governments.

b) Synthesise the historical information with the present situation

Based on the past experiences, the consultations should focus on assessing the potential risk and resources including:

- To what extent tsunamis could affect the school and community and which areas could be threatened by tsunami inundation;
- Which student groups are more vulnerable such as very young children and students with disabilities;
- Potentially hazardous facilities, such as old buildings and gas stations in the surrounding areas;
- Areas or buildings which are more durable or are far from coastal zones, that can be assembly areas;
- Buildings or places that can be used as temporary shelters, such as schools, hotels, and hospitals.

EXPERT ADVICE:

How High Should an Assembly Area be to Be Safe?

Where normal sea waves are between 1-2 meters high, tsunami waves can be 10-30 meters high. Experts from Thailand's National Disaster Warning Center recommend an assembly area that is 6-10 meters above sea level.

Source: Learning Center for Earth Science and Astronomy Website.
<http://www.lesa.biz/earth/lithosphere/geological-phenomenon/tsunami>

c) Draw the tsunami risk and resource map

Before drawing the map, the Committee and its partners should decide:

- What is the spatial area that the map will cover? (i.e. the school and neighbouring community)
- Symbols that are going to be used to describe buildings and facilities in schools and communities (e.g. classrooms, canteens, playgrounds, libraries, hospitals, hotels, religious buildings etc.) The symbols must be easy to understand for all.
- Which colours will be used to identify different levels of risk for different buildings? (e.g. red could be 'very risky', yellow 'moderately risky', and green 'least risky').

Recommended steps to draw the map⁴⁹:

- Write the title of the map, the areas covered by the map, the names of the people who participated in drawing the map; the date the map was made, an explanation of the symbols and colours, and which direction is North.
- Show the topographies and facilities of the school and community using symbols
- Mark areas threatened by tsunami inundation.
- Colour areas and facilities using different colours to indicate different levels of risk.

⁴⁹ UNDP Thailand, A Guidance for School Tsunami Evacuation Drill, 2018

ii. Identify potential assembly areas and temporary evacuation shelters⁵⁰

The Committee, community members, and local authorities should identify potential assembly areas, either within or outside the school grounds, and mark them on the tsunami risk and resource map.

The assembly areas should be:

- An open space that is safe from potential hazardous materials and debris;
- As far away as possible from coastal zones (the safe distance will be based on the estimation of the possible inundation of water);
- At as high an elevation as possible;
- A place where public facilities such as toilets and clean water are accessible (or can be built);
- Able to be reached in a few minutes by walking or running; the time needed to get there should be estimated when determining assembly areas.



*Students can play an active role in mapping safe and dangerous areas around the school.
Photo: UNDP Myanmar*

In the event that a school may not be safe to return to, the evacuated staff and students will be taken to temporary evacuation shelters.

Buildings selected as temporary evacuation shelters should be:

- Located in a safe area that is easily accessible and not too far from the assembly area;
- Designated for the school only so that students are in a safe environment; and
- Equipped with electricity, water supply, and toilets.

iii. Identify tsunami evacuation routes

The risk and resource map will help to identify potential evacuation routes from the school to the assembly areas. Alternative evacuation routes should also be identified to be used in worst case scenarios such as landslides occurring at the base of steep slopes or rainfall creating floods along local streams, storm sewers, and canals. Arrows can be drawn on the map to indicate the primary and alternative evacuation routes.

⁵⁰ For more information please see: Save the Children, Limiting and planning for schools as temporary evacuation centres in emergencies: Policy brief and practice guidance for Pacific Nations, 2017.
https://reliefweb.int/sites/reliefweb.int/files/resources/55716_55716stc01439schoolsasevacuationcen.pdf

Primary and alternative evacuation routes should:

- Move people away from coastal areas;
- Be safe and wide enough to allow for a huge influx of people to move through them at the same time;
- Enable people with physical disabilities to also use them to evacuate safely;
- Avoid areas where hazardous materials such as broken glass, fallen trees, and cut electrical wires can fall and cause obstructions;⁵¹
- Avoid frequently flooded areas;⁵²
- Avoid going near storage areas of combustible or hazardous materials.⁵³



Preparedness plans ensure every students' safe evacuation. Photo: UNDP Thailand

This mapping exercise can guide the making and placing of tsunami warning signs for the community in the local language which highlight⁵⁴:

- **Historical markers** indicating how far and high the tsunami water went during previous tsunamis.
- **Warning signs** indicating potentially dangerous areas during a tsunami such as hills and slopes that are prone to landslides. Students can also make warning signs for roads to alert people to avoid using motor vehicles when a tsunami occurs.
- **Evacuation routes and assembly area signs** indicating tsunami evacuation routes that can lead people to the assembly areas.

2) Drafting the school preparedness plan

The school preparedness plan should provide⁵⁵:

- Simple step-by-step instructions that provide clear information on the school's preparedness procedures and enable school members to be able to follow and implement the plan.
- Backup plans for certain situations. For example, if the principal is absent during a drill, then the most senior person who is present at the school should act as the Simulation Coordinator.

⁵¹UNISDR Asia and the Pacific, Guidance Notes: School Emergency and Disaster Preparedness, 2010.

⁵² Ibid.

⁵³ UNISDR Asia and the Pacific, Guidance Notes: School Emergency and Disaster Preparedness, 2010.

⁵⁴ UNESCO Viet Nam, Assessment and Preparedness Toolkit.

⁵⁵ UNISDR Asia and the Pacific, Guidance Notes: School Emergency and Disaster Preparedness, 2010.

The school should include the following components to ensure the school preparedness plan is thorough and fit for purpose⁵⁶:

- **General information** including the total number of school members, the list of school buildings, the names and contact numbers of the School Emergency and Disaster Preparedness Committee, and the contact numbers of emergency services near the school, such as the nearest fire departments and hospitals.
- **Information on the School Emergency and Disaster Preparedness Committee and Task Teams**, including the list of the members in each Team and the teams' duties.
- **A Risk and Resource Map** including information on potential assembly areas, temporary evacuation shelters, and tsunami evacuation routes, including alternative evacuation routes.
- **The early warning system** to inform school members of any natural or official warning signs of a tsunami by using sirens or whistles.
- **The design of a drill exercise** to test, evaluate and update the plan.
- **Procedures to inform parents and guardians** of a real tsunami event by using local radios and telephone trees.
- **A school property inventory of tools and equipment**, including where they can be located.
- **An alternative warning system or contingency plan** in case of a power failure during an earthquake or a tsunami event.
- **Schedule** to provide continuous education for students after a tsunami event.
- **The means of routinely making copies** of important educational and administrative documents and *storing* them in a safe place.

LESSONS FROM THE PROJECT

Organising Disability-inclusive Drills in Thailand

The drill planning process helped identify students who may need special care while evacuating such as elementary school students or students with disabilities. In Thailand, three of the schools had students with physical disabilities.

An expert from the Disability Council of Thailand was invited to train the school authorities on disability inclusive disaster risk reduction (DiDRR) and share practical ways on how to involve students with disabilities in the planning process and evacuation drill. Students with mobility issues were evacuated on wheelchairs during the drills.

The instructional drill video that was produced includes the importance of supporting students with disabilities or injuries so that no one is left behind.

⁵⁶ Ibid.

3) Testing and updating the school preparedness plan

Producing a good school preparedness plan is an iterative and ongoing process of practicing drills and preparedness measures, evaluating their effectiveness, and implementing policies and measures to improve them. Schools can test their preparedness plans by practicing drills and updating plans based on the analysis of the results of the post-drill debriefs. The School Emergency and Disaster Preparedness Committee is responsible for this. By practicing drills, schools can assess the feasibility of their preparedness plans, the first aid skills of school members, the effectiveness of warning dissemination systems, and school members' understanding of the plan⁵⁷.

Drills also enable schools to identify weaknesses in their plans which may require further clarification or adjustment. Once a school has updated their preparedness plan, they can test the effectiveness of the changes during the next drill⁵⁸. This process enables schools to tailor their plans to meet the needs of their school members in their unique context (including their location, topography, distance from the sea, and culture)⁵⁹.

Schools should try different scenarios when they use drills to test their plans⁶⁰. For instance, a school can conduct a drill under a scenario where some teachers are injured during an earthquake, necessitating Class Monitors to lead their classmates in the evacuation. Schools should initially test their plans using simple scenarios, and progress to more complex scenarios which engage an increasing range of stakeholders. School members can be informed of drills in advance, or schools can practice drills without prior announcement in order to assess different aspects of their preparedness plans⁶¹. Drills should be always treated as though they are a real tsunami event⁶².

Below is an example from the project of a tsunami evacuation drill conducted by Babanga School in the Solomon Islands to test their school preparedness plan:

Name of the drill: Exercise Babanga The date of the drill practice: 20 October 2017 Date plan was last updated: 14 October 2017
Authorisation <ul style="list-style-type: none">The Principal, the Deputy Principal, and the School Board members.
Exercise Design Team <ul style="list-style-type: none">The School Emergency and Disaster Preparedness Committee, the School Board members, and teachers of Babanga Primary School.
Objectives <ul style="list-style-type: none">To test the Babanga School Tsunami Preparedness Plan and identify corrective actions.To evaluate the effectiveness of the Babanga School Preparedness Plan for both local and distant tsunamis.To assess school members' understanding of their roles and responsibilities.To increase awareness of and provide knowledge on tsunamis to all school members.

⁵⁷ UNESCO Viet Nam, Assessment and Preparedness Toolkit

⁵⁸ Ibid.

⁵⁹ Pacific Tsunami Museum, Tsunami Evacuation Guidelines for Schools in Hawai'i, 2012.

⁶⁰ International Finance Corporation, Disaster and Emergency Preparedness: Guidance for Schools, 2010

⁶¹ Ibid.

⁶² Ibid.

Key stakeholders and exercise participants		
<ul style="list-style-type: none"> • The School Emergency and Disaster Preparedness Committee • School Board members • School staff and students • Community members • The Red Cross 		
Exercise Scenario		
A strong 8.1 magnitude earthquake occurs near Babanga School. The school receives a tsunami warning issued by the National Disaster Management Office.		
Actors	Key Activities	Equipment
STEP 1: Hear a loud sound simulating an earthquake		09:30 am
Simulation Coordinator	Activates a siren to simulate an earthquake.	
STEP 2: Drop. Cover. Hold		09:30 am
Teachers	<ul style="list-style-type: none"> -Move students away from windows, glass, doorways, and unfastened furniture. -Ensure the classroom doors are open. - If teachers and students hear the siren whilst they are outdoors, move students quickly away from buildings, trees, and any other potential danger. 	
Students	<ul style="list-style-type: none"> -“Drop, Cover, Hold” under sturdy desks. -If students are outside of their classrooms, follow teachers’ instructions and Drop down to their knees, Cover their heads and necks with their arms and hands, and Hold until the siren stops. 	
STEP 3: Evacuate hazard zones		09:33 am
Early Warning Team	Informs the Simulation Coordinator of an official tsunami warning.	
Simulation Coordinator	Activates a siren and makes an announcement that a tsunami has occurred.	
Evacuation Assistants	Support school members to evacuate from school buildings and make their way to the assembly area.	Helmets, vests, and flashlights
Teachers	<ul style="list-style-type: none"> -Lead students from the front during an evacuation. -Keep students grouped by their classes. 	Evacuation backpacks
Class Monitors/ Student Captains	<ul style="list-style-type: none"> -Ensure no one is left behind in their classrooms. -Support teachers from the rear of the group by checking everyone stays together. 	
Students	<ul style="list-style-type: none"> -Walk out quickly and calmly from their classrooms in queues. -Cover their heads with bags until they arrive at the assembly area. -Follow instructions of teachers and Evacuation Assistants to the assembly area. 	
Safety and Security Team	-Carries out a final sweep in the school building once the school has been evacuated.	Helmets, flashlights, school site/floor map, and marking pens
Interjection: A male student breaks his leg during the evacuation and is rescued by the Safety and Security Team.		09:40 am

STEP 4: Meet at the assembly area		09:45 am
Teachers	Keep their students grouped by their classes.	
First Aid and Relief Team	Perform first aid on injured students and staff.	First Aid Kit
Logistics Team	Provide water and snacks to students and staff.	Water and snacks
STEP 5: Confirm headcount		09:50 am
Teachers	-Use student attendance sheets and start counting the students by roll call. -Report to the Simulation Coordinator on the status of the students, including any students that are missing and may be injured or unwell.	Evacuation backpacks (student attendance sheet)
Simulation Coordinator	Reports the names and identifying features of the missing students to the Rescue Team.	
Rescue Team	Searches for missing students or staff.	
Students	Follow the instruction of teachers.	
STEP 6: Simulation coordinator signals end of drill		10:00 am
Interjection: The Simulation Coordinator receives the 'all clear' message from the National Disaster Management Office.		10:00 am
Simulation Coordinator	Announces that the drill has ended.	
Teachers	Return to classrooms with their students.	
STEP 7: Assess drill to improve for the real event		10:30 am
Teachers	-Conduct hot debriefs with their students after returning to their classrooms. -Report the results of debriefs to the Simulation Coordinator.	
Simulation Coordinator	Conducts an initial hot debrief with the School Emergency and Disaster Preparedness Committee, staff, teachers, student representatives, and external observers.	
Drill Exercise Termination		

Adapted from: UNDP Solomon island, Tsunami Signage Installation & Simulation Exercise Trip Report: Titiana & Babanga Schools, Gizo Western Province, 8th - 20th October 2017.

5. EQUIPMENT

The school preparedness plan lists basic equipment that is required for preparedness and response to a tsunami event.

The equipment is required for:

- Safe evacuation in the event of a drill or real event including communications equipment;
- Address special needs of students with disabilities or injuries.

The proposed lists below are indicative and depending on the resources available to the school, can be adjusted.

i. Basic equipment required by all teachers⁶³

All teachers should have evacuation back pack with the following items:

1. Student attendance sheet.
2. Classroom number sign (for the assembly area).
3. Copy of the tsunami risk and resource map.
4. Pens and notepads.
5. Trash bag (bio hazard) and plastic bags.
6. Hand sanitisers and tissues.
7. Flashlight.
8. Walkie talkies/ mobile phones.



Teachers take a headcount in the safe area. Photo: UNDP Vanuatu

Proposed contents of the First Aid Kit⁶⁴:

- 25 adhesive bandages (assorted sizes).
- 3 absorbent compress dressings.
- Adhesive tape (1 roll).
- Gauze pads (5 packs).
- Alcohol swabs (100 counts) or antiseptic wipe packets.
- Hand sanitiser.
- Q-tips (100 counts).
- 2 Airway masks/breathing barrier
- Ice pack (2 packs)/instant cold compress.
- Antibiotic ointment packets (5).
- Antiseptic wipe packets (5).
- packets of aspirin (3).
- Scissors and tweezers.
- 25 pairs of non-latex gloves.
- Thermometer (1).
- First aid instruction booklet.

⁶³ Adapted from: Save the Children, Participatory School Disaster Management Toolkit, 2015; UNISDR Asia and the Pacific, Guidance Notes: School Emergency and Disaster Preparedness, 2010; Pacific Tsunami Museum, Tsunami Evacuation Guidelines for Schools in Hawai'i, 2012.

⁶⁴ Pacific Tsunami Museum, Tsunami Evacuation Guidelines for Schools in Hawai'i, 2012. Available from: http://www.discovertsunamis.org/pdf/School_Guidelines_for_Tsunami_Conference_Final.pdf.

ii. **Basic equipment required by the Task Teams**⁶⁵

The Early Warning Team	The Simulation Coordinator
<ol style="list-style-type: none"> 1. Helmets and vests 2. Whistles 3. Emergency radio and batteries 4. Walkie talkies 5. Megaphones or mobile phones 6. Pens and notepads 	<ol style="list-style-type: none"> 1. Helmet and vest 2. Whistle 3. Emergency radio and batteries 4. Walkie-talkie 5. Megaphone <p>Note that the Simulation Coordinator can use any equipment that can make a loud noise to notify people about tsunami warnings.</p>
The Drill Operations Task Teams	The Logistics Team
<p style="text-align: center;">Evacuation Assistants</p> <ol style="list-style-type: none"> 1. Helmets and vests 2. Walkie talkies 3. Flashlights 4. The tsunami risk and resource map 5. Pens and notepads <p style="text-align: center;">The First Aid Team</p> <ol style="list-style-type: none"> 1. Helmets and vests 2. Walkie talkies 3. First aid kits (items listed below) <p style="text-align: center;">The Rescue Team</p> <ol style="list-style-type: none"> 1. Helmets and vests 2. Walkie talkies 3. Flashlights 4. Whistles 5. Gloves 6. Rope 7. School site/floor map 8. Stretcher/ wheelchairs 9. Duplicate keys for school buildings <p style="text-align: center;">The Safety and Security Team</p> <ol style="list-style-type: none"> 1. Helmets and flashlights 2. Walkie talkies 3. School site/floor map 4. Marking pens/ masking tape/ duct tape 5. Master key for school buildings 	<ol style="list-style-type: none"> 1. Helmets and vests 2. Water bottles 3. Non-perishable snacks 4. WC privacy screen, toilet paper, pads for women and girls, and trash bags 5. Hand sanitisers 6. Blankets
The Administration and Finance Team	The Documentation Team
<ol style="list-style-type: none"> 1. List of equipment and supplies and their locations 2. List of external partners 	<ol style="list-style-type: none"> 1. List of students and staff and their emergency contacts 2. Class schedules 3. Hard copies of health and medical records of students and staff with disabilities or health problems 4. Pens and notepads

⁶⁵ Adapted from: Pacific Tsunami Museum, Tsunami Evacuation Guidelines for Schools in Hawai'i, 2012; Save the Children, Participatory School Disaster Management Toolkit, 2015.

6. TSUNAMI AWARENESS RAISING

Regular awareness and education activities are a vital part of the schools' tsunami preparedness process. By involving students, teachers, and neighbouring communities in learning about tsunamis and evacuation planning, schools ensure that all parties are aware of the risks and know how to respond to a tsunami warning.

i. Increasing tsunami awareness amongst students

In addition to basic tsunami information that may be part of regular school curriculum, schools can access additional resources for age-appropriate learning materials.

Learning materials for students:

- **Guidebooks** on tsunami and evacuation drills;
- **Comics** (e.g. from the International Federation of Red Cross and Red Crescent Societies: Preparing for disasters: Tsunamis, Earthquakes);
- **Flyers, brochures, and booklets;**
- **Videos** highlighting survivor's testimonies, and providing knowledge on evacuation drills and on past tsunamis;
- **Workbooks** (e.g. The University of the West Indies Seismic Research Centre (UWI SRC): Student Workbook from the Tsunami Smart Teacher Education Resource Kit);
- **Games:** e.g. bingo and role-plays;
- **Quiz nights and meetings** with tsunami survivors to raise students' awareness about tsunamis.



All participants of school drills in Thailand were awarded with a certificate that displayed key tsunami safety messages. Photo: UNDP Thailand

ii. Increasing tsunami awareness amongst students' parents

Schools should also prepare materials for parents with information on their role during school tsunami drills including inviting some parents to observe and evaluate the drills.

Parents need to know how information is share and how they can support their children during a tsunami emergency.

Parents need to know:

- How information is shared during a tsunami emergency;
 - How and to where their children are evacuated;
 - Where their children can be collected from after it is safe to get them – from the school, the assembly area or the temporary evacuation centre;
- Emergency contacts in schools to seek for more information about the evacuation;
- What items/equipment to donate to the school that would be useful during drills or in times of tsunamis⁶⁶.



*Parents were invited to observe the drills.
Photo: UNDP Viet Nam.*

iii. Increasing tsunami awareness in the community

Schools can increase awareness of tsunamis in the community through:

- **Campaigns:** Schools can organise media campaigns to disseminate tsunami information through channels such as leaflets, flyers, posters of tsunami themed-days, tsunami warning signs, and evacuation map banners. The information can be disseminated in public places such as intersections, markets, and communal public areas⁶⁷.
- **Themed-days:** Students can organise tsunami themed-days. Students can exhibit murals and distribute flyers they designed for the event⁶⁸. The School Emergency and Disaster Preparedness Committee can prepare booklets and guidebooks to provide additional information on tsunamis and drills⁶⁹.

Furthermore, increasing awareness and providing knowledge on tsunamis for students, their parents, and their communities will empower people to engage in grassroots initiatives that build community risk reduction capacity, such as performing local vulnerability assessment and mapping initiatives, identifying hazards, developing resilience action plans, and implementing those plans⁷⁰.

⁶⁶ International Finance Corporation, Disaster and Emergency Preparedness: Guidance for Schools, 2010.

⁶⁷ The State Ministry for Research and Technology Indonesia, Guideline Tsunami Drill Implementation for City and Regency

⁶⁸ UNESCO Viet Nam, Assessment and Preparedness Toolkit.

⁶⁹ The State Ministry for Research and Technology Indonesia, Guideline Tsunami Drill Implementation for City and Regency.

⁷⁰ UNESCO, A Teacher's Guide to Disaster Risk Reduction: Stay Safe and Be Prepared, 2014.

LESSONS FROM THE PROJECT

Raising Awareness on Tsunamis

Celebrity ambassador: Campaign “Schools of Son Tinh” in Viet Nam named a TV presenter Ms. Thuy Van their celebrity ambassador. Ms. Van participated in key events and gave several media interviews for television and newspaper about disaster preparedness.



Celebrity ambassador Thuy Van. Photo: UNDP Viet Nam

Certificate of completion: All participants of school drills in Thailand were awarded with a colorful and well-designed certificate that displayed key tsunami safety messages. It will likely to be displayed in children’s home together with other keepsakes.

Community play night: Tsunami awareness ideas were delivered through dialogues and role plays in Bangladesh. These school events were opened to people in nearby villages.

In remote areas, they became enjoyable community events.

Drawing competition: The campaign in Viet Nam concluded with the national award ceremony for the drawing competition that was run in every participating school. The national event enjoyed large donor and media attention.

Photo booth : After a long drill day, students in Thailand had fun in a photo booth using thematic props (painted tsunami waves; flags etc.) they created during drill preparations. Photos help students memorise and the purpose of the event.

Photo competition: To commemorate 13 years from the last tsunami in Thailand, schools organised a photo competition to explore students’ perceptions towards tsunamis.

Rock concert: Inviting young pop and rock musicians to perform in campaign events in Viet Nam generated significant media coverage and social media attention for disaster awareness.

Videos: Some countries produced short educational videos on how to conduct a tsunami drill in schools. In the Philippines, it resulted in organising drills in every tsunami-prone schools in Eastern Visayas region.

7. SUPPORTING STUDENTS AFTER A TSUNAMI

The School Emergency and Disaster Preparedness Committee should plan for how teachers can support their students after they experience a tsunami⁷¹. Children are more likely to experience serious trauma than adults, and teachers' support can be crucial for students to recover as teachers interact with their students on a daily basis and are often one of the few adults they trust. Students' parents may not be able to take care of their children fully as they too are suffering trauma.

Students who have gone through a tsunami event can have trauma from the losses of their families, friends, and houses. A typical response of students to these losses is grief. Whilst some students can verbalise their feelings, many students cannot express themselves and instead reveal their grief through behavioural changes.

Behavioural changes:

- **Acting out:** becoming physically or verbally aggressive.
- **Anxiety:** demonstrating regressive behaviours such as bed-wetting, thumb sucking, or become extremely fearful.
- **Perfectionism:** constantly trying to become perfect in their behaviours, attitudes, and languages. This is because they feel they must hold everything together as their lives are falling apart. Students showing these symptoms are often overlooked.
- **Somatic responses:** frequently complaining about having headaches, stomach aches, or other vague pains.
- **Cognitive functioning:** showing changes in their cognitive functioning in terms of concentration, learning, reasoning, and a general decline in performance at school.



Teachers should become more sensitive in order to support their students after a tsunami event. Photo: UNDP Sri Lanka

In order to support their students after a tsunami event, teachers should become more sensitive to changes in their students' language or behaviours⁷².

⁷¹ Ibid.

⁷² UNESCO, A Teacher's Guide to Disaster Risk Reduction: Stay Safe and Be Prepared, 2014.

Teachers can support students by conducting a number of exercises, such as:

- 'Checking in' in the morning and 'checking out' in the afternoon, to encourage and give a space for students to share their feelings if they wish to, and to help students understand it is normal to have conflicting emotions after experiencing a tsunami.
- Relaxation exercises at the beginning and end of classes, to help students release their anxiety, fear, and nervousness. The three key components of relaxation exercises are typically breathing, visualisation, and physical movement, and teachers can pick exercises that are culturally appropriate.
- Drawing classes, to help students express themselves visually where they feel unable to do so verbally.
- Engage the parents to better support their students, both at school and at home.
- Hold group meetings amongst school staff, both to share feedback on exercises and relaxation techniques to better support their students, and to give each other emotional support. As the teachers also experienced the tsunami, they are likely to be suffering from trauma as well and could be at risk of becoming overwhelmed without the support of their peers.

The Committee should also plan for how the school could support students with severe trauma that goes beyond the school's capacities to manage. For instance, the Committee can connect these students to local hospitals in order to provide them with the appropriate professional treatment and support they need.

For more information please see: UNESCO, A Teacher's Guide to Disaster Risk Reduction: SAFE AND BE PREPARED, 2014. <http://unesdoc.unesco.org/images/0022/002289/228963e.pdf>



Safety drills in schools create lots of excitement among students and communities. Most importantly, the drills help to prepare students and their families for natural hazards like tsunamis. Photo: NEMO Tonga

4. ANNEXES

Annex 1: Background information on tsunamis

This section will discuss the different types of tsunamis and some examples of ideal response times to (i) Distant tsunamis and (ii) Local tsunamis.

A tsunami is a series of waves caused by an earthquake beneath the ocean floor or a major landslide into the ocean⁷³. A tsunami's effects include not only the rapid flooding of low-lying land, but also dangerously strong currents. As the water travels inland, these currents scrub the ground and pick up large debris, giving the waves an additional element of destructive force⁷⁴.

Whilst some tsunamis occur far away (distant tsunamis) and take hours to reach shores, other tsunamis are generated near the coasts of countries (local tsunamis) and can reach their shores in just a few minutes. It is important to know the difference between these different types of tsunamis as this determines how people are able to respond to them.

i. Distant tsunamis

A distant tsunami is caused by a great earthquake that occurred far away in the ocean, up to a thousand kilometres away, and can take over three hours to travel from its source to the coast⁷⁵. Distant tsunamis occur less frequently than local tsunamis but can have devastating impacts. People

⁷³ A Guide to Tsunamis for Hotels: Tsunami Evacuation Procedures. IOC Manuals and Guides, 69. (IOC/2012/MG/69).

⁷⁴ Oregon Tsunami Working Group, Local Planning Guidance on Distant Tsunami Response, 2012.

⁷⁵ Intergovernmental Oceanographic Commission. Third Edition. Tsunami Glossary, 2016. Paris, UNESCO. IOC Technical Series, 85. (English, French, Spanish, Arabic, Chinese) (IOC/2008/TS/85 rev.3).

will not feel the earthquake that preceded the distant tsunami, as it occurred so far away⁷⁶. However, it is critical to identify when a tsunami has been generated because of the speed of tsunami waves, which can move over eight hundred kilometres per hour, as fast as a commercial jet plane⁷⁷. These waves can move from one side of the Pacific Ocean to the other within a day, and across the Indian Ocean within twelve hours.

Ideal response time

A distant tsunami will give the school around three to four hours of preparation for evacuating people from school buildings and moving them safely to the assembly area before a tsunami arrives at the coast. The school will firstly receive a **tsunami watch** issued by the National Disaster Management Office and Meteorological Services Office (or the equivalent government departments in each country) through radio and television broadcasts. A tsunami watch informs the school that a magnitude 7.0 or larger earthquake has occurred which could cause a tsunami which could soon affect the area where the school is located⁷⁸.

The Early Warning Team then monitors whether this tsunami watch is cancelled or whether it is upgraded to a tsunami warning⁷⁹. The Early Warning Team also observes if there are any natural warnings of a tsunami event. The school prepares for a possible evacuation of students and staff from school buildings, including potentially using alternative evacuation routes.

Once the likelihood of a tsunami occurring has been verified, the school will receive a **tsunami warning** from the National Disaster Management Office or Meteorological Services Office. It will state that a tsunami with significant coastal flooding and powerful currents is expected (or imminent) at the coastline of the community and may continue for several hours after the arrival of the first wave⁸⁰.

Whilst it is possible to accurately predict the speed and direction of a distant tsunami, it is more difficult to predict the height of the tsunami's waves. This determines how dangerous a tsunami will be, and tsunami waves can be small and harmless or huge and devastating⁸¹.

Schools should prepare for the worst-case scenario. Schools should also be aware that they may not be able to receive the tsunami warning due to power or communication system failures, so if any natural warnings of a tsunami are observed after the initial tsunami watch, then the school should immediately evacuate all students and staff⁸².

⁷⁶ Pacific County Emergency Management Agency, Do you know the difference between a Local Tsunami and a Distant Tsunami? 2015.

⁷⁷ Intergovernmental Oceanographic Commission. 2014. Tsunami, The Great Waves, Revised Edition. Paris, UNESCO, 16 pp., illus. IOC Brochure 2012-4. (English.), revised 2014. Language versions at: <http://unesdoc.unesco.org/ulis/cgi-bin/ulis.pl?lin=1&catno=148609>.

⁷⁸ Oregon Tsunami Working Group, Local Planning Guidance on Distant Tsunami Response, 2012.

⁷⁹ Ibid.

⁸⁰ National Oceanic and Atmospheric Administration, Tsunami Brochure.

⁸¹ UNESCO/IOC, A tsunami Warning, 2005.

⁸² The World Bank, Tsunami and Earthquake Warning Systems.

ii. Local tsunamis

A local tsunami is generated by a nearby earthquake that occurred within two hundred kilometres, and can reach the coast within minutes or up to an hour⁸³. A local tsunami is preceded by a strong earthquake which makes it hard for people to remain standing, or by a slow shaking of the ground for a longer time⁸⁴. The first wave of a local tsunami may reach coastal areas within minutes of the earthquake stopping⁸⁵.

Historically, 90 per cent of tsunami casualties have been caused by local tsunamis⁸⁶. A local tsunami may also be preceded by the rapid rise and drop of the sea level, which exposes reefs, rocks, and fish on the seabed⁸⁷. Furthermore, a loud “roaring” sound which is similar to that of a train or a jet plane can be heard from the ocean as a tsunami gets close to the coast⁸⁸.

Ideal response time

Earthquakes may be the only tsunami warning signals for a local tsunami and the school should respond to this natural warning immediately⁸⁹. The school may not have enough time to receive official warnings for a local tsunami because of its short arrival time. The school may not even receive any official warnings from tsunami warning centres or local governments because of power and communication system failures caused by the earthquake⁹⁰.

⁸³ Intergovernmental Oceanographic Commission. Third Edition. Tsunami Glossary, 2016. Paris, UNESCO. IOC Technical Series, 85. (English, French, Spanish, Arabic, Chinese) (IOC/2008/TS/85 rev.3).

⁸⁴ A Guide to Tsunamis for Hotels: Tsunami Evacuation Procedures. IOC Manuals and Guides, 69. (IOC/2012/MG/69).

⁸⁵ Oregon Tsunami Working Group, Local Planning Guidance on Distant Tsunami Response, 2012.

⁸⁶ Intergovernmental Oceanographic Commission. Third Edition. Tsunami Glossary, 2016. Paris, UNESCO. IOC Technical Series, 85. (English, French, Spanish, Arabic, Chinese) (IOC/2008/TS/85 rev.3).

⁸⁷ International Tsunami Information Center, What to do? Sensing a Tsunami, 2013.

⁸⁸ State of Hawai'i, Tsunami Safety Booklet.

⁸⁹ Intergovernmental Oceanographic Commission. 2014. Tsunami, The Great Waves, Revised Edition. Paris, UNESCO, 16 pp., illus. IOC Brochure 2012-4. (English.), revised 2014. Language versions at: <http://unesdoc.unesco.org/ulis/cgi-bin/ulis.pl?lin=1&catno=148609>.

⁹⁰ The World Bank, Tsunami and Earthquake Warning Systems.

Annex 2: About the Regional Project “Partnerships to Strengthen School Preparedness for Tsunamis in the Asia-Pacific Region”, 2017-2018

Goal: Funded by the Government of Japan, the United Nations Development Programme (UNDP) implemented a regional project aimed at supporting 90 tsunami-prone schools in 18 Asia-Pacific countries to assess their tsunami risk, design emergency evacuation plans, carry out tsunami awareness activities and safety drills.

Project Countries: The 18 project countries are: Bangladesh, Cambodia, Fiji, Indonesia, Maldives, Malaysia, Myanmar, Pakistan, Papua New Guinea, Philippines, Samoa, Sri Lanka, Solomon Islands, Thailand, Timor-Leste, Tonga, Vanuatu, and Viet Nam.

Technical Partners: Led by the UNDP Bangkok Regional Hub, the project is implemented in collaboration with Tohoku University, International Tsunami Information Centre, Indian Ocean Tsunami Information Center of UNESCO, Indonesian Institute of Sciences, Fujitsu Ltd., the Embassies of Japan in the project countries, and the Japan International Cooperation Agency.

Project Highlights:

- **World Tsunami Awareness Day 2018:** The project results were acknowledged by María Fernanda Espinosa, President of the United Nations General Assembly, in her speech at the high-level event in New York. UNDP and UNISDR launched a video to emphasize the importance of inclusion in tsunami preparedness.
- **Asian Ministerial Conference for Disaster Risk Reduction 2018:** A special event on Promoting Inclusion in Tsunami Risk Management was co-organized with UNISDR.
- **CNN Campaign:** A promotional video, produced by the Government of Japan to highlight their prominent partnerships, featured a tsunami drill in Indonesia. The video was aired 48 times on CNN across the regions.
- **Commemoration of the Great Japan Earthquake and Tsunami:** The Japanese TV channel NHK World News and the leading newspaper Mainichi News published stories on project activities in the Asia-Pacific.
- **World Bosai Forum 2017:** An interactive photo exhibition of the tsunami awareness drills was displayed at the event.
- **World Tsunami Awareness Day 2017:** Project results were presented at the high-level events in New York attended by Permanent Representatives from Japan, Maldives, Chile, and Indonesia to the United Nations. A project’s multi-country video prompting the drills was launched at the event.

PROJECT RESULTS

2017-2018

61,175 PARTICIPANTS: students, teachers and members of school administration participated in the drills.

115 SCHOOLS have developed evacuation plans and conducted tsunami education.

18 COUNTRIES have actively engaged in the implementation of the regional project.

Project Achievements

- Database of schools in tsunami risk areas in 18 countries was developed
- Standard education materials on tsunami awareness in multiple languages were produced
- Tsunami/ multi-hazard education and safety drills in schools were conducted
- Mobile application was developed and tested to assess schools' tsunami/multi-hazard preparedness
- Regional guidelines on strengthening school tsunami preparedness were produced
- Dedicated website and #90Drills hashtag were created to communicate project news and results

Project Impact

- **Cambodia:** The Training of Trainer module for teachers was developed to guide them through the process of conducting drills. Save the Children in Cambodia adapted and scaled up the teachers training module and conducted several drills together with UNDP country office in Cambodia.
- **Fiji:** The National Disaster Management Organization used a simultaneous drill in five schools to practice monitoring of large-scale evacuations. A mobile application geoBing App was tested allowing communities to send real-time geotagged data or geotagged incident reports to Emergency Operation Centres before first responders were mobilised.
- **Indonesia:** Eight hotels in Bali signed an agreement with the local government to use their buildings as safe evacuation zones in the event of a tsunami. Inspired by the drills in Aceh, the Mayor of Banda Aceh released a circular letter, dated 15 March 2018, to the Head of Education Agencies, Religious Affairs Agencies, and Aceh Province Disaster Management Agencies to implement safety programmes in all schools.
- **Pakistan:** Impressed by the drills, the National Disaster Management Authority requested UNDP Pakistan to provide technical expertise to draft the National Coastal Earthquake and Tsunami Response and Preparedness Policy framework.
- **Viet Nam:** Catalysed by high visibility drills and awareness events, the Ministry of Agriculture and Rural Development and the Ministry of Training and Education signed a five-year plan to include disaster education in school curriculum, raise awareness of officers, teachers, school-aged students, and university students towards better understanding of disasters risk reduction.

Strengthening School Tsunami Preparedness for Tsunamis in the Asia-Pacific Region

Donor: Government of Japan
Implementing Agency: UN Development Programme
Duration: June 1, 2017 – November 30, 2018,
Funds: US\$1.6 million



Annex 3: STEP-A: Sample questionnaire Earthquake and Tsunami Preparedness for Students

I. RESPONDENT INFORMATION	
1.	Full name
2.	Sex <input type="checkbox"/> Female <input type="checkbox"/> Male
3.	Grade
4.	Date of survey

II. SCHOOL DETAILS	
	School Name
	Level <input type="checkbox"/> Primary <input type="checkbox"/> Junior Secondary <input type="checkbox"/> Senior Secondary
	Types <input type="checkbox"/> Public <input type="checkbox"/> Private
	Address
	Phone number
	Postal Code
	Village
	Sub-district
	District/ City
	Province
	Country
	Latitude/ Longitude <i>(geo-tagging for mobile app users)</i>

III. KNOWLEDGE OF DISASTER						
17.	Which of these are natural hazards?					
	a.	Earthquake	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Tsunami	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Volcano eruption	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	Violence and conflicts	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	e.	Traffic accidents	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	f.	Floods	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	g.	Landslides	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	h.	Drought	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	i.	Typhoon, cyclone, or tornado	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
18.	What do you know about disaster?					
	a.	An event or series of events that cause great number of deaths	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	An event or series of events that cause significant damages to personal properties and/or to the environment	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	An event or series of event that is beyond our power to prevent	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	An event or series of events where the affected people requires outside help	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
19.	Do you think your school can be affected by:					

	a.	Earthquake	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Tsunami	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
20.	Which of these can cause an earthquake?					
	a.	Movement of earth plates	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Volcano eruption	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Landslides	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	Typhoons and lightning	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	e.	Oil drilling	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
21.	Which of these can happen after an earthquake?					
	a.	Tsunami	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Landslides	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Typhoon, cyclone, or tornado	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	Building Fire	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	e.	Crop failure	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	f.	Volcano eruption	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
22.	Can we precisely estimate the day and time of when an earthquake will happen?					
			<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
23.	Which of these are the signs of earthquake that can cause a disaster?					
	a.	Cloudy weather and it looks like it is going to rain	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Cupboards falling down	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Walls are shaking and windows are breaking	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	It is difficult to stand and make people falls down	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	e.	Thunders, lightning and strong winds	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
24.	What can we do to reduce the impact of earthquake in school?					
	a.	Nail and tie cabinets to the wall	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Ensure doors open outward	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Protect window glass to avoid shattered glass	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	Place students with special needs in the most accessible areas of the exit	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	e.	Place objects and class ornaments on top of cabinets	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
25.	If there is an earthquake and you are in a classroom, what would you do?					
	a.	Run immediately outside when it occurs	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Drop, cover, and hold under a sturdy table	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Stay away from cupboards and hanging figurines	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	Stay away from glass windows and walls	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	e.	After the earthquake over, go outside with in an orderly manner	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	f.	Immediately call our parents or the authorities	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
26.	Does every earthquake cause tsunami?					
			<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
27.	Which of these event can trigger a tsunami?					
	a.	Underwater earthquake	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Underwater volcano eruption	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Underwater landslides	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	Typhoon, cyclone or tornado	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	e.	Violence and conflicts	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
28.	Where do you think places that are relatively safe from tsunami?					
	a.	Tsunami Evacuation Buildings/ Tsunami Shelters/ Escape Buildings	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No

	b.	Higher ground or hills	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Near the river	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	On the bridge	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	e.	Far away from the beach	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
29.	Do you know what a local tsunami is?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
30.	Do you know what a distant tsunami is?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
31.	What are the signs that a tsunami is about to happen?					
	a.	A strong earthquake that causes people to fall down	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	A mild earthquake with shaking of more than 20 seconds	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Sudden recede or rise of sea water	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	Large wave in the horizon	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	e.	Cloudy weather and strong wind	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	f.	Wild animals (e.g.: elephants, horses, snakes) move towards the beach	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
32.	If you are at the beach and there is a sudden recede of sea water, what would you do?					
	a.	Run away from the beach	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Move closer to the shoreline and pick up some fish	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Do nothing	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
33.	If you are in school, what would you do if there is a tsunami approaching?					
	a.	Move to a safe location	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Follow teacher instructions	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Go home	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	Contact your parents	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
34.	What are the things that can make you better prepared for earthquake and tsunami?					
	a.	Increase our knowledge about earthquake and tsunami	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Store books and school equipment in a safe and easy to reach location	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Take part in earthquake and tsunami survival training	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	Know evacuation routes and signs	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No

IV. EMERGENCY PREPAREDNESS PLAN (EP)						
35.	Have you ever looked for the things that can cause harms to you in your school?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
36.	What have you done to be better prepared for earthquake and tsunami?					
	a.	Take part in survival training	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Have a disaster go-bag	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Knows where the safe route and signs for evacuation	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	Knows the safe location for evacuation	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	e.	Lists important phone numbers and address of family members and friends	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	f.	Knows location of important emergency services such as: hospitals, fire fighters, police stations, Red Cross, and electrician	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	g.	Knows where mom, dad, and other family members will go in the event of an emergency	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
37.	Do you know whether your school has the following:					
	a.	Evacuation map and routes	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No

	b.	Tool and equipment for evacuation	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Evacuation signs	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	Assembly/ safe meeting point	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	e.	Safe location	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	f.	First aid kit and essential medicines	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	g.	School clinic	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	h.	School health program (e.g.: Youth Red Cross)	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
38.	In the event of an emergency, do you know what to do?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
39.	In the past year, have you ever taken part on the following school drills:					
	a.	Earthquake	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Tsunami	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
40.	Have you or your friends ever taken part in the process of emergency preparedness planning in your school?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
41.	Would you like to be involved in making your school to be more prepared for disasters?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No

V. EARLY WARNING SYSTEM (WS)						
42.	Do you know the agreed signs of tsunami warning in your school?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
43.	Can you receive tsunami warning in your school?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
44.	If there is a tsunami warning, what would you do?					
	a.	Run away from the beach and move to a high ground	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Look at the sky and the animal behaviour	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Immediately go to the safe location	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	Follow teacher instructions	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	e.	Calm yourself and not to panic	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	f.	Run towards the beach and look at the water condition	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
45.	Do you know that a tsunami warning can be terminated without any tsunami?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
46.	How do you know that the situation is safe from tsunami threat?					
	a.	After receiving info that the tsunami warning is terminated	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	After going to the beach to check the situation	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	After the authorities announced all clear	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
47.	In the past year, have you ever taken part in tsunami early warning testing in your school?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No

VI. RESOURCE MOBILISATION CAPACITY (RMC)						
48.	Do you know how to find information about earthquake and tsunami preparedness?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
49.	Do you or your friends in schools have the following skills:					
	a.	First aid skills	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Scouting skills (e.g.: ropes, erecting tents, and making a stretcher)	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Evacuation drills and training	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
50.	If any answer in #48 is "Yes", have you or your friends ever taught the skills above to others (e.g. friends, families, or neighbours)?		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
51.	Where have you learned information about earthquake and/ or tsunami?					

	a.	Teachers in school	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Parents	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Electronic media (TV, radio, and others)	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	Social media (Facebook, Instagram, whatsapp, BBM, etc.)	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	e.	Online media (CNN.com, National Geographic Online, or other websites)	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	f.	Printed media (Newspaper, magazine, or others)	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	g.	School books or other learning materials (poster, leaflet, booklet, etc.)	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	h.	Friends	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	i.	Experts, scientists, and academics on disasters	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	j.	Non-government organisations (such as Red Cross)	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	k.	Religious leaders	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	l.	Government employee	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
52.	Have you ever learned about the followings in your school?					
	a.	Earthquake	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	b.	Tsunami	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	c.	Early warning for tsunami	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	d.	First aid	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	e.	Rescue and evacuation from earthquake and/ or tsunami	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
53.	Have you ever discussed about earthquake and tsunami with your friends or family?					
54.	Do you know how to be safe from earthquake and tsunami?					



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