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World Tsunami Awareness Day 2020

Japan: Ten years after triple disaster

PacWave20: Tsunami warning tested in 46 countries

Hamaguchi Award recognises education



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UN Office for Disaster Risk Reduction

Tsunami News

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Disaster risk governance saves lives – UN Secretary-General

In his message on 5 November 2020, World Tsunami Awareness Day, UN Secretary-General **António Guterres** stressed the need for strong disaster risk governance to prepare for tsunamis and other disasters.

“We live in a multi-hazard world where risk is systemic and embedded in the very fabric of human development,” he said.

“When tsunamis strike, they are a supreme test of the governance and institutions that have been put in place to manage disaster risk.”

Mr. Guterres drew parallels between the humanitarian impact of tsunamis and the coronavirus pandemic.

“We are struggling with what some describe as a tsunami of death and disease due to COVID-19,” he said, adding that, *“the metaphor comes easily because living memory remains strong of the 2004 Indian Ocean tsunami, in which more than 227,000 people perished.”*

“Pandemic preparedness can borrow much from the progress we have made in reducing large-scale loss of life from tsunamis,” he added.

This message was echoed by **Mami Mizutori**, Special Representative of the UN Secretary-General for Disaster Risk Reduction, who said: *“What is true for this biological hazard is true for many other hazards man-made, natural and technological, that are threatening our planet. Prevention pays and it is always better to be ready than unprepared.”*

Ms. Mizutori, who also heads the UN Office for Disaster Risk Reduction (UNDRR), said that countries in Asia, the Caribbean and South America had learned from experience the hard lesson that tsunamis are the most deadly and destructive of all sudden onset disasters.



“Today, these regions have created a culture of tsunami awareness among the general public, educating coastal communities at risk and ensuring that people recognize the warning signs so that they take prompt action to evacuate to a safe place,” she said.

The Sendai Framework for Disaster Risk Reduction 2015-2030, the global plan to reduce disaster losses by 2030, calls for a substantial increase in the number of national and local disaster risk reduction strategies in place by the end of 2020 with all countries to have multi-hazard early warning systems in place by 2030. Now 101 countries report having national disaster risk reduction plans in place and 69 have access to multi-hazard early warning systems.

“This is a good start but many countries are still unprepared and are not yet ready to anticipate a tsunami,” said Ms. Mizutori.

“My message is that disaster risk governance matters. Clear vision, guidance, coordination and competence are essential to the success of raising tsunami awareness around the world. Lives will be saved, injuries reduced, and economies spared if we get the planning right,” concluded Ms. Mizutori.

'Ready for the Next Wave'



Tsunami risk to feature in "the Ocean Decade"

Tsunami risk is to feature in the **UN Decade of Ocean Science for Sustainable Development 2021-2030**, known as "the Ocean Decade." The announcement was made at a high-level event to mark World Tsunami Awareness Day by **Dr. Vladimir Ryabinin**, Executive Secretary of the Intergovernmental Oceanographic Commission (IOC) and Assistant Director General of UNESCO.

"I know that the tsunami community is preparing a programme on tsunamis and other hazards related to sea-level to support the Ocean Decade and the achievement of Target E of the Sendai Framework to substantially increase the number of countries with national and local disaster risk reduction strategies" said Dr. Ryabinin in his opening remarks.

He said that plans were in place for several communities in the Caribbean and Pacific to be recognised as "Tsunami Ready" by IOC-UNESCO in addition to the 26 communities already certified in the Caribbean, Pacific and Indian Ocean. Despite being relatively rare, tsunamis are often more sudden, deadly and costly than any other hazard. According to the Human Cost of Disasters 2000-2019 report, released by UNDRR, earthquakes and tsunamis accounted for 58% of total disaster deaths over that twenty year period.

To mark World Tsunami Awareness Day 2020, Geneva-based ambassadors from hazard-prone countries, joined senior UN representatives in a high-level panel, **'Ready for The Next Wave'**, to share progress on tsunami preparedness. The 60-minute 'virtual' panel was convened by UNDRR and UNESCO and chaired by Ecuadorian Ambassador to the UN and Chair of the UNDRR Support Group, **Emilio Izquierdo**.

Discussion centred around efforts to meet the targets set by the Sendai Framework, the global plan to reduce disaster losses. **Ambassadors from Japan, Indonesia, Maldives, Jamaica and Portugal** focused their remarks on strengthening disaster risk governance and reducing tsunami risk through accurate and timely tsunami warning systems.



Investing in risk governance

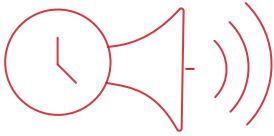
Offering his condolences to the people of Turkey and Greece following the 30 October 2020 earthquake and small tsunami in the Aegean Sea, Ambassador **Izquierdo** said that the disaster underlined why strengthening disaster risk governance is so vital, requiring clear plans, coordination and empowered institutions to act in the public interest.

Ms. Mami Mizutori, the UN Secretary-General's Special Representative for Disaster Risk Reduction and head of UNDRR, highlighted progress made by 101 countries in developing DRR strategies but stressed that only 40% of Least Developed Countries and Small Island Developing States currently have access to multi hazard early warning systems.

One success story is the Bangladesh Cyclone Preparedness Programme run by the Government and the Bangladesh Red Crescent Society. It was established after hundreds of thousands of people died in the Bhola cyclone of November 1970. Fifty years later, the country was struck by a severe category 3 tropical storm, Cyclone Bulbul.

"Over two million people were evacuated before the cyclone struck. The reported death toll was 19 people," said Ms. Mizutori. *"This is what progress looks like when you have a successful DRR strategy and good risk governance in place."*

Investing in DRR has been a global priority for Japan whose international assistance programme has provided training in DRR for some 85,000 people globally, including government officials, local leaders and students. Japan also provides 80 countries with assistance to develop and revise their DRR plans.



Early warning and awareness

Japanese Ambassador **Kazuyuki Yamazaki**, highlighted the effectiveness of Japan's early warning system which was used to good effect during the March 2011, Great East Japan Earthquake and Tsunami. The system was able to trigger alerts to the public via TV broadcasts and SMS within one minute of the earthquake striking.

When the 2004 Indian Ocean Tsunami struck Maldives, most inhabited islands were inundated, and one third of the population was affected. Maldivian Ambassador **Asim Ahmed** explained how lessons learned from the tsunami led Maldives to incorporate its DRR policies, strategies and activities within the country's national strategic action plan which has a strong focus on running DRR awareness programmes in schools and other public institutions.

Indonesia was the country hardest hit by the Indian Ocean Tsunami, but has since built significant national and local capacity in DRR. Indonesian Ambassador, **Hasan Kleib**, explained how a national disaster management authority established in 2008 now works with 512 local disaster management offices. The country faces technical challenges in developing an effective early warning system for its entire archipelago of 922 inhabited islands.



International cooperation

Globally, cooperation between nations is strengthening tsunami warning systems. The Caribbean faces a constant threat of earthquakes, tsunamis and tropical storms. Ambassador **Cheryl Spencer** highlighted how the creation of the intergovernmental coordination group for tsunami and other coastal hazards warning system for the Caribbean, has allowed Jamaica to benefit from timely tsunami bulletins.

In November 2017, Portugal joined France, Italy, Greece and Turkey as a national tsunami warning provider in Europe, covering the Northeast Atlantic. Portugal's Ambassador, **Rui Macieira**, explained how despite the 'low probability but high impact' risk of tsunamis, nationwide earthquake simulation and evacuation drills involving the public are carried out annually as part of the country's national strategy for preventive civil protection.



Disaster museums keep legacy of the past



On 5 November 2020, people from across the globe participated in a unique online event to celebrate **World Tsunami Awareness Day**.

Organised by UNDRR and UNESCO with support from the Government of Japan, the Third World Tsunami Museum Conference brought together representatives of six 'disaster museums' in Japan, Indonesia, Hawaii, Thailand and Turkey who spoke of the vital role museums play in educating people about disasters and risk reduction.

Building on the first and second World Tsunami Museum Conferences held in Japan in 2017 and 2018, the 90-minute event, moderated by TV personality, Femi Oke, was held virtually due to Covid-19 restrictions.

The 2020 conference focused on the importance of preserving memories of past disasters for educating future generations on tsunami risk and sought to demonstrate how museums and testimonies of survivors can raise awareness and educate more at-risk populations, particularly in light of COVID-19.

"All these museums have a unique role in preserving memories of past disasters but also drawing lessons, passing them down and educating future generations on disaster risk," said **Mami Mizutori**, Special Representative of the UN Secretary-General for Disaster Risk Reduction and Head of UNDRR.

"We want to encourage the creation of a global network of museums that inform and share knowledge, enabling people to be better prepared if history repeats itself."

In the last 100 years, 58 recorded tsunamis have killed more than 260,000 people. Over the past two decades, tsunamis have accounted for almost 10 percent of economic losses from disasters, setting back development gains, especially in countries that border the Indian and Pacific Oceans. More than 70% occurred in the Pacific 'Ring of Fire'.

Audrey Azoulay, Director-General of UNESCO and conference panellist, said that 700 million people are living in risk prone coastal areas today. This figure could rise to one billion by 2050.

"Understanding oceans is the best way of protecting ourselves. This also means taking into account traditional knowledge and techniques which UNESCO is committed to preserving and protecting," explained Ms. Azoulay.

Reducing disaster risk is one of the main roles of IOC-UNESCO (Intergovernmental Oceanographic Commission of UNESCO), created in 2016 to further scientific knowledge of the oceans.

"Museums help save lives by preserving the memory of disasters, documenting them and explaining them to the public. So do the testimonies of survivors. By sharing memories and experience of these disasters they show how real the risk is," said Ms. Azoulay.

She emphasized the need to continue efforts to understand, preserve and live with oceans and highlighted the importance of the United Nations Decade of Ocean Science for Sustainable Development 2021-2030 which includes "Safe Oceans" as one of its seven objectives.

Building on the memory of past tsunamis

The 2004 Indian Ocean Tsunami is recorded as the deadliest disaster of the 21st century. On 26 December 2004, a 9.1 magnitude earthquake off the western coast of northern Sumatra triggered huge tsunami waves which killed over 227,000 people across a dozen countries.

The Tsunami Memorial Museum in Banda Aceh, Indonesia, built with support from UNESCO, opened in 2011 in memory of the 170,000 people who died in Indonesia. The museum receives around 600,000 visitors a year. Through interactive exhibits it provides a simulation and chronology of the tsunami's impact and documents subsequent recovery efforts to rebuild shattered communities.

"Its most unique feature is its disaster resilient design. The structure is built to serve as an evacuation shelter for local people who may need to seek shelter on its rooftop if disaster were ever to strike again," explains museum representative **Ms. Hafnidar**.

The most recently constructed tsunami museum is the Iwate Tsunami Memorial Museum in the city of Rikuzentakata, which opened its doors to the public in September 2019. The museum commemorates the Great East Japan Tsunami and Earthquake of 11 March 2011.

"It is our responsibility to ensure that we never let the memory of this sad event fade. The concept behind this museum is based around protecting lives and living in harmony with ocean, earth and nature. The museum aims to share lessons from past tsunamis and contribute to building a disaster-resilient society amongst future generations," explained **Teru Fukui**, Member of the Japanese House of Representatives speaking from the museum.

The Iwate Tsunami Memorial Museum consists of four zones: History, Facts, Lessons Learned and Reconstruction. It guides the visitor through the science of tsunamis and tells the stories of some of the mega tsunamis that have struck the Pacific Rim in recent history. Displays focus heavily on using learning from the disaster to educate and inform the public about disaster resilience.



The Tsunami Memorial Museum in Banda Aceh, Indonesia, was built with support from UNESCO.

Stories of survival

The Third World Tsunami Museum Conference featured a series of moving testimonies from tsunami survivors.

Patricia Ortiz survived the earthquake and tsunami which struck on 4 August 1946, near Samaná, Dominican Republic. The tsunami left 20,000 people homeless, causing widespread devastation across Hispaniola. Now in her 80s, Patricia recalled how the day unfolded.

"The earth opened up and the houses started to collapse in all directions because they were just made from palm planks. Black stinking water rose up from the earth and I saw the sea had retreated to a dark line about 3 kms on the horizon. It came into the town slowly but the water kept rising. I was on my father's shoulders and the water was up to his waist. We tried to reach our house but saw it had been washed into the river along with all the other houses in the neighbourhood. There was nothing left, but at least we were alive."

Petra Nemcova, Czech fashion model and entrepreneur, is also a tsunami survivor and now serves as a UNDRR World Tsunami Awareness Advocate. Petra was vacationing on the island of Khao Lak in southern Thailand when she was caught in the 2004 Indian Ocean tsunami. Tragically, her partner, British photographer **Simon Atlee**, was killed while Petra was lucky to survive with her pelvis broken in four places.

"As a survivor I now feel a huge responsibility to protect people from the threat of future tsunamis so the same amount of suffering never happens again."

Petra is the co-founder of 'All Hands and Hearts' a charitable organisation that uses volunteers to deliver projects that help reduce disaster risk in vulnerable communities.

"When first responders leave after a disaster, often communities are forgotten. Families and communities may have to wait years for a school to be rebuilt and even then, it's not even a safe school. So, we started with a goal to build one school and today we have rebuilt 306 disaster-resilient schools in 15 countries around the world."



Tsunami awareness advocate Petra Nemcova meeting with schoolchildren

Marlene Murray heads the Pacific tsunami museum established in 1994 in Hilo, Hawaii. Hawaii was hit by two major tsunamis in 1946 and 1960 and the community wanted to remember and learn from what happened.

"We started by piecing together the stories, collecting photos and testimonies from survivors and creating exhibits," explained Ms. Murray.

The museum houses displays on all major tsunamis that have occurred globally in recent decades and includes an 'amazing rescues' section. As well as being an education centre the museum serves as a living memorial to those who lost their lives.

"Visitors are often moved to tears. There's just so much sadness when you read and hear the stories of survivors because it usually involves the loss of family members. But it is these testimonies that help to educate people," said Ms. Murray.

Teaching future generations

Suzuki Kenichi is a representative of the Arahama Elementary School Museum in Sendai City, northeast Japan. The school was partially destroyed in the 2011 tsunami and now serves as a memorial to those who lost their lives. 320 students together with staff and members of the local community, made it to safety on the school's rooftop when the tsunami struck.

"We see that children are visibly shocked after what they see and learn at the museum but we want to preserve the memory of the tsunami for future generations so that they can learn from what happened here," said Mr. Suzuki.

Disaster risk education is also the priority of **Osman Bali**, director of the Bursa Disaster Training Centre in Turkey. Formal cooperation with the Ministry of Education means that 80% of visitors to the centre are school children with training also offered to volunteers and staff from the public and private sectors.

"Our focus is on applied disaster risk training through simulation technologies," explained Mr. Bali. The centre is divided into 12 different sections including a tsunami information area. Students can receive training in rooms where earthquakes, storms and floods are simulated. There are also opportunities to learn practical skills such as fire-fighting and first aid.

Director of Lisbon Museum in Portugal, **Paulo Almeida Fernandes**, dates the museum's interest in disasters back to the 1755 earthquake and tsunami which destroyed much of downtown Lisbon.

"It's important to keep alive the memory of this disaster so people don't forget the lessons of the past. The earthquake struck over 250 years ago but it is still visible in the urban landscape today. Two thirds of the buildings were destroyed, 40,000 people died and the city burned for four days. Historical engravings and archaeological artefacts from the period captured what happened," said Mr. Fernandes.

In Thailand, the International Tsunami Museum on Khao Lak, is dedicated to preserving the memory of some 8,000 people killed in Thailand by the 2004 Indian Ocean Tsunami. The museum combines animations, films and displays of photographs together with survivor's stories. It has its own unique tsunami early warning system and in 2019 started a tsunami memorial tour, guiding visitors through areas of the coast affected by the tsunami.

"We are now the most popular tourist attraction in the area but our main purpose is to generate knowledge and awareness of tsunamis and other natural hazards amongst local students. We use public donations to support our student DRR programme," said museum director, **Ratchanikon Krongthip**.

The conference concluded with a virtuoso performance of Bach by violinist **Eijin Nimura**, UNESCO's Artist for Peace.

"I have visited the stricken areas many times to perform for tsunami survivors and I have always put my prayers to music when I perform. It's my hope that Bach's music can be a catalyst towards encouraging people to build a more resilient world," said Mr. Nimura.

It's important to keep alive the memory of this disaster so people don't forget the lessons of the past.

Are you 'Tsunami Ready'?



Currently, 26 communities across 15 countries in the Caribbean, Pacific and Indian Oceans have received IOC-UNESCO "Tsunami Ready" status.

Speaking at the 'Ready for The Next Wave' virtual conference convened by UNDRR and UNESCO to celebrate World Tsunami Awareness Day 2020, **Dr. Vladimir Ryabinin**, Executive Secretary, IOC-UNESCO, said:

"Tsunami warning systems are incredibly science intensive enterprises. This knowledge and technology would be useless if the issue of the last mile is not addressed and people simply do not react. This is the purpose of the tsunami-ready programme to connect science and community action."

The Tsunami Ready initiative is a voluntary, performance-based community recognition program involving collaboration between national and local warning and emergency management agencies, government authorities, scientists, community leaders and the public.

To qualify as Tsunami Ready, communities have to meet twelve indicators under three categories: mitigation, preparedness, and response. Indicators include producing a hazard and inundation map of their village; having a tsunami risk reduction plan and evacuation plan; erecting tsunami evacuation signs; practicing drills and putting in place multiple communications systems to receive and disseminate tsunami warnings such as phone calls, social media, local media and sirens.

In August 2020, two villages in the Indian state of Odisha, Venkatraipur and Noliasahi, became the first communities in the Indian Ocean region to be recognized as Tsunami Ready. These villages have established committees and response teams of young people who are trained in guiding tsunami evacuation, emergency response, and first aid.

"Building their capacity enhances their confidence to prepare for cyclones, floods and any other disasters," explains **Shri Pradeep Kumar Jena**, IAS, Managing Director, Odisha State Disaster Management Authority, who is confident that Odisha's remaining 326 villages will be Tsunami Ready in the next few years.

Galapagos in Ecuador, several communities in Costa Rica, and some additional communities in the Pacific Island Countries are preparing to request the Tsunami Ready recognition by IOC-UNESCO.

Created in 1960, IOC-UNESCO is recognised as the home of ocean science in the United Nations system. It plays a key role in reducing disaster risk with responsibility for the international coordination of tsunami warning systems.

In the wake of the 2004 Indian Ocean tsunami, IOC-UNESCO was mandated to coordinate the development of the tsunami early warning systems in the Caribbean, the Indian Ocean, and the North East Atlantic and the Mediterranean Seas, in addition to the already existing Pacific Tsunami Warning System.

The end-to-end tsunami early warning systems consist of up-stream detection, monitoring, and dissemination of the warning, and the down-stream preparedness, awareness and response of coastal communities.

After 10 years spent developing these early warning systems, it became apparent that the down-stream part of the early warning system needed strengthening and in 2015 the Tsunami Ready initiative was born in the Caribbean aimed at improving levels of awareness and preparedness of vulnerable communities.



In 2020, the village of Venkatraipur village in the Indian state of Odisha became the first community in the Indian Ocean to be recognized as Tsunami Ready. (Credit: UNESCO)

Japan: ten years after triple disaster



On 11 March 2011, a massive 9.1 magnitude earthquake struck 70 kilometres east of Japan's Tohoku peninsula in the northwest Pacific Ocean. Within the space of one hour, tsunami waves had inundated 561 square kilometres of the country's northeast coastline. Over 18,400 people were either dead or missing, 122,000 homes were destroyed and 470,000 people evacuated. The tsunami also damaged the Fukushima Daiichi nuclear power plant, triggering meltdown in three of its reactors.

Rebuilding the shattered coastline has been a gargantuan effort. The Government created the 'Reconstruction Agency' to oversee the task, with a budget of JPY 31.5 trillion (US\$ 315 billion) allocated to a 10-year period of reconstruction and revitalization largely across the three most-affected prefectures, Miyagi, Iwate and Fukushima.

By the end of 2020, 30,000 public housing units together with 18,000 elevated building plots designed for private homes had been constructed. Individual households were helped to build a further 154,000 homes and now, most projects to restore damaged infrastructure such as transport links, schools and hospitals are close to completion.

While the regions' farming and fisheries sectors have largely been restored, sales remain low, due in part to rumours and public fears about contamination of produce from Fukushima. The environmental clean-up operation in Fukushima has been a huge task. Approximately 10 million cubic metres of contaminated soil (out of approximately 14 million cubic metres slated for removal) has been transported to temporary storage facilities.

Of the 43,000 evacuees who remained in temporary accommodation across all affected prefectures in November 2020, over 30,000 originate from Fukushima. They were among 165,000 people forced to flee their homes following the nuclear disaster. As radiation levels have reduced, evacuation orders have now been lifted for 12 municipalities, enabling people to return to their homes and villages. But despite government efforts to promote resettlement, only 20% of the original population has so far returned.



A sea defence wall constructed near Sendai City designed to reduce the impact of future tsunamis. (Credit: IFRC)

Over the past decade billions of Yen have been spent on containing the radiation from the damaged reactors. Work is progressing to safely remove fuel rods and a 1.5 kilometre subterranean ice-wall was built to prevent groundwater from seeping into the damaged reactor buildings. But the stricken plant continues to produce 150 tons of contaminated water each day and it is estimated that it will take 30-40 years to fully decommission.

The Japanese Government's goal to become carbon neutral by 2050, will depend on an energy mix including continued investment in nuclear energy which is expected to contribute 20% of the country's energy needs by 2030. With the Fukushima reactors decommissioned, the prefecture has been earmarked as a renewable energy hub, with plans for 11 solar energy plants and 10 wind farms expected to generate up to 600 megawatts.

Globally, the tsunami triggered a re-evaluation of many countries' reliance on nuclear power and increased demand for liquefied natural gas as a replacement for the low-carbon electricity provided by nuclear power.

However, in terms of nuclear safety and long-term impact on disaster risk management, the late Director-General of the International Atomic Energy Agency, Yukiya Amano, said: "I am confident that the legacy of the Fukushima Daiichi accident will be a sharper focus on nuclear safety everywhere."

Tsunami resilient city rises from the ruins

In Iwate prefecture, the city of Rikuzentakata (pop. 24,000) was almost totally destroyed by the 2011 tsunami. As many as 1,800 people lost their lives including many firemen struggling to close the gates of the tsunami barriers.

A lone tree - the Miracle Pine - survived out of 70,000 that once lined Pine Tree Beach, a popular tourist spot. Due to its poor condition it has since been artificially restored as a symbol of hope to the townspeople.

Disaster risk reduction has been at the centre of the city's effort to build back better.

The world's longest conveyor belt - known as the Bridge of Hope - spanning three kilometres across the Kesen River, was constructed to carry rock and soil quarried from a nearby mountain to raise the ground level of much of the city by ten metres as a countermeasure against future tsunamis.

Areas for housing were constructed at the highest elevation, furthest from the sea. Now the city includes sloping walkways and easy access to shops and buildings for the elderly and people with disabilities.

"Four thousand homes were gone - our aim was to build back better. We wanted to create a new town with inclusivity and accessibility at its core," explained **Kiyoshi Murakami**, former Special Representative of the Mayor and Senior Executive Advisor, City of Rikuzentakata.

"Efforts taken by national and local government to improve early warning systems and evacuation plans are now being organically adopted by communities. People are self-organising and taking responsibility for being disaster ready," said Mr. Murakami.

The Iwate Tsunami Memorial Museum was opened in Rikuzentakata in 2019 as a centre of learning on tsunamis. It has proved popular with tourists and students and is included in the '3.11 Densho Road initiative', which links 230 iconic sites associated with the 2011 tsunami, across four affected prefectures. The project was spearheaded by **Fumihiko Imamura**, Professor of Tsunami Engineering at the International Research Institute of Disaster Science in Tohoku University.

"People's memories of the 2011 tsunami are beginning to fade and it is important that the younger generation learn from the past. These sites are designed to deepen visitors' understanding and awareness of the earthquake and tsunami. They also serve as an income generation opportunity for local communities," said Professor Imamura.

In 2011, a tsunami warning was issued within three minutes of the earthquake striking but it failed to provide an accurate assessment of the true impact of the tsunami waves which in some places were 10 times higher than predicted. Now, a dedicated tsunami warning system has been developed that includes 50 tsunami sensors installed in the sea along the Tohoku coastline.

"The main challenge we have now is changing human behaviour. Even if timely early warnings are provided, people don't necessarily act and evacuate before disasters strike. Public information and education remain the most effective strategies for reducing disaster risk," said Professor Imamura.

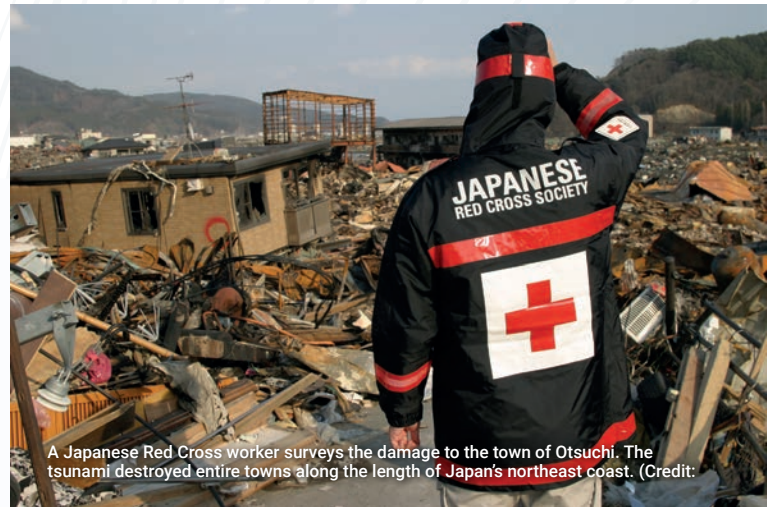


The next ten years

Due to Covid-19 restrictions, 10-year commemoration events of the tsunami in Japan were modest in scale. Coastal communities came together to reflect and remember but also to celebrate the achievements of the past decade. 11 March 2021 marked the last year of the official remembrance ceremony organized by the national government, but reconstruction and recovery efforts will continue.

The lifespan of the Reconstruction Agency has been extended by 10 years, with infrastructure projects expected to be completed within the next five years. The agency's main focus will shift to revitalising local economies and livelihoods. Subsidies and loans are on offer to revive businesses in sectors such as farming, forestry and fisheries. Social welfare needs will also be addressed, including community development programmes that focus particularly on the physical and mental well-being of the elderly.

Recovery in Fukushima Prefecture is more complex. The legacy of the nuclear disaster has led the Government to invest in an extensive programme of regeneration accompanied by measures to dispel rumours and misinformation about radiation levels and build back public confidence. Grants are being offered as an incentive to encourage evacuees to return to areas where evacuation orders have been lifted.



A Japanese Red Cross worker surveys the damage to the town of Otsuchi. The tsunami destroyed entire towns along the length of Japan's northeast coast. (Credit: IFRC)

The Government has ambitious plans to revitalize industries by forging public private partnerships to promote Fukushima as a centre of innovation. Investments are being made in a variety of new industries including robotics, renewable energy, agriculture, forestry and fisheries. Tourism in the region will also receive a boost. During the 2021 Olympic and Paralympic games, events are planned at stadiums in Fukushima and other tsunami affected prefectures.

With a history of devastating earthquakes and tsunami disasters, Japan has long been a leading global advocate for DRR. It was in March 2015 that the Government of Japan hosted the Third UN World Conference on Disaster Risk Reduction in Sendai City, Miyagi Prefecture, which produced the Sendai Framework for Disaster Risk Reduction 2015-2030. Over the past decade Japan has aligned its tsunami reconstruction and recovery efforts with the Framework's overarching goal of reducing deaths and total disaster losses.



A future focus of Japan's Reconstruction Agency will be on community development programmes that benefit the elderly (Credit: IFRC)

150,000 students receive lessons for life



In Asia Pacific, a lack of knowledge, awareness and preparation have been cited as key factors in the high death toll from tsunami disasters.

But since 2017, UNDP's Asia Pacific-wide School Tsunami Preparedness Project has trained over 150,000 students, teachers and school administrators in tsunami preparedness skills and evacuation drills with support from the Government of Japan.

Schools are encouraged to identify safe evacuation routes and shelters. Preparation for mock drills includes five essential steps: early warning, evacuation, search and rescue, first aid and transportation. Learning tools include a guide for school administrators, awareness and educational materials for students and a mobile app to assess preparedness levels.

The two-phase project is now running in 322 schools across 23 countries: Bangladesh, Cambodia, Fiji, India, Indonesia, Kiribati, Malaysia, Maldives, Micronesia, Myanmar, Pakistan, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Sri Lanka, Thailand, Timor Leste, Tonga, Tuvalu, Vanuatu, and Viet Nam.

Pacific Island nations have been able to train 10,000 students and equip schools with preparedness tools for drills and real disaster events.

In Solomon Islands, UNDP has helped train over 1,700 students and teachers while evacuation shelters, tsunami management plans, sign boards and maps have been installed in schools and villages located in disaster prone areas.

In Fiji, the drills tested the mobile application GeoBing App, which gave real time information for early warning, paving the way for the first national tsunami drill. In Samoa, virtual reality headsets were used to prepare children for drills, so they could find out what their surroundings would look like underwater.

In Palau, efforts to institutionalize preparedness have led to a presidential proclamation making September, national preparedness month, and in Papua New Guinea, the Government has now made it mandatory for schools to conduct annual drills.

The project also focuses on inclusivity, aiming to better meet the needs of persons with disabilities. In Fiji, a school's evacuation procedures were revised to address the needs of visually impaired students.

In Bali, Indonesia, eight hotels signed up to be safe areas for neighbouring schools in tsunami emergencies. On the island of Villingili in Maldives, the school preparedness programme extended beyond the island's one school, involving the whole island with the mosque and the hospital designated as the safest shelters.

After the tragic experience of Typhoon Haiyan in 2013, the strongest typhoon in the history of the Philippines, parents and caregivers were willing to participate in the drills. Twenty schools and 20,000 people took part.

The project's second phase which started in December 2019 is aiming to reach more schools through a Training of Trainer model whilst also encouraging governments to commit to school preparedness. In Viet Nam the Government has developed a five-year plan integrating disaster education and drills into the national curriculum.

The Partnerships for Strengthening School Tsunami Preparedness in Asia Pacific is a regional project funded by the Government of Japan (US\$1.5 million since 2017) and implemented by the UNDP Bangkok Regional Hub, the UNDP Pacific Office and UNDP Country Offices.



Schoolchildren in Vietnam taking part in #PrepareToWin, a global advocacy campaign launched in 2019 by UNDP and the Government of Japan to strengthen disaster preparedness in schools. (Credit: UNDP)

PacWave20: Tsunami warning tested in 46 countries



On World Tsunami Awareness Day, 46 countries around the Pacific Rim participated in a live communications test of tsunami early warning systems as part of Exercise Pacific Wave 2020 (PacWave20). The international exercise, held bi-annually since 2006 and coordinated by IOC-UNESCO, tests the effectiveness of both international and national early warning systems.

To test readiness levels, a live message was sent at 00:00 UTC on 5 November 2020 from the IOC's Tsunami Service Providers (TSP) to every country's official tsunami warning authority. National Tsunami Warning Centres then assessed their own tsunami threat and issued warnings to coastal communities as required.

The TSPs in the Pacific include the Pacific Tsunami Warning Center (PTWC) in Hawaii, USA, the Northwest Pacific Tsunami Advisory Center (NWPTAC) in Japan, the South China Sea Tsunami Advisory Center (SCSTAC) in China, and the developing Central America Tsunami Advisory Center (CATAC) in Nicaragua.

The live communications test was among various activities conducted under PacWave20 between September and November 2020. Two regional tsunami drills were organized, including one on 11 November for Central America. This covered Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama. The test was prepared by the Central American Tsunami Advisory Centre (CATAC) and carried out as a table-top exercise due to COVID-19 restrictions.

The exercise simulated a slow 7.8 magnitude earthquake off the Gulf of Fonseca in the Pacific Ocean of Central America. It was characterized by little seismic shaking but large tsunamis, which mirrored the disastrous tsunami of 1 September 1992 on the Pacific coast of Nicaragua which cost over 100 lives, destroyed homes and fishing boats.

It also recalled the tsunami of 26 August 2012 in El Salvador and Nicaragua which cost lives including those of many working on a sea turtle conservation programme. In both cases, the lack of strong shaking led people living in coastal areas to mistakenly believe that the risk of tsunamis was low.



Staff from the National Warning Center of Chile (SHOA) participating in the PacWave20 tsunami warning exercise (Credit: SHOA)

Hamaguchi Award recognises education



Education and public awareness is central to the work of the three winners of the 2020 Hamaguchi Award, announced on 4 November 2020 by the International Promotion Committee for Tsunami/Coastal Disaster Resilience Technology and presented by Japan's Minister of Land, Infrastructure, Transport and Tourism, Mr. Hideo Onishi.

The winners were **Dr. Fumihiko Imamura**, Professor of Tsunami Engineering and Director of the International Research Institute of Disaster Science at Tohoku University, Japan, **Dr. Costas Synolakis**, Professor of Civil Engineering at the University of Southern California, USA, and the Aceh Tsunami Museum in Indonesia.

Established in 2016, the Hamaguchi Award is an international award given to individuals or organizations that have made significant contributions to building the resilience of coastal communities against tsunamis, storm surge and other coastal hazards.

Professor Fumihiko Imamura has conducted research on tsunami disaster risk reduction, mitigation technology, tsunami numerical analysis, and tsunami damage surveys for over thirty years. He also promoted World Tsunami Awareness Day, including by presenting world tsunami risk data that cover the past 400 years.

In the late 1980s, Professor Synolakis published his seminal analytical solution for the run-up of solitary waves on a sloping beach. The MOST (Method Of Splitting Tsunami) model is now the standard operational tsunami inundation model employed worldwide. He has inspired a generation of coastal engineers and is now working on raising the public's awareness of tsunamis through easy-to understand educational media.

The Aceh Tsunami Museum was established as a reminder of the 2004 Indian Ocean earthquake and tsunami, as well as an educational center for disaster mitigation. The museum has worked hard to raise awareness among the younger generations and has educated 600 disaster mitigation campaigners, from 600 junior high schools, on disaster risk reduction.

Professor Synolakis, who joined the ceremony through video, said: *"If I have learned something from my 35 year-experience in studying tsunamis, in different parts of the world, it is that what really works in saving lives is education, education, education."*



2020 Hamaguchi awards ceremony on November 4th 2020, Tokyo Japan.

Tsunami Ladies cook up a resilient future



Photo source: <https://www.undrr.org/news/tsunami-ladies-cook-resilient-future-vulnerable-villages>

Resilience can be created anywhere - even at the kitchen table in countries on opposite sides of the Pacific Rim. For six women from **Chile** and **Japan** who survived tsunamis that devastated their villages, food played a vital role in helping their communities rebuild and recover.

In a newly released documentary, **"Tsunami Ladies"**, producers **Emiliano Rodríguez Nuesch** and **Víctor Orellana** show how the women fed their neighbours and helped revive their local economies after tsunamis that hit Chile in 2010 and Japan the following year.

"It tells the story about the women's role in dealing with the impact of the tsunamis and how they led the process to rebuild their communities, expressed through their knowledge of cooking and seafood," said Raúl Salazar, head of UNDRR's regional office.

The short film was shown for the first time on World Tsunami Awareness Day, 5 November 2020, by the UNDRR Regional Office for the Americas and the Caribbean.

"Explaining prevention and disaster risk reduction through people's stories is a good way to transmit information that so urgently needs to be understood," said Rodríguez Nuesch.

"The 2010 tsunami was a turning point that forced a rethink of disaster risk reduction in Chile, which has since advanced its tsunami monitoring and early warning capacity," said **Ricardo Toro**, national director of Chile's National Emergency Office (ONEMI).

UNESCAP combines response to tsunami and climate risks



Since its establishment in 2005, the ESCAP Trust Fund for Tsunami, Disaster and Climate Preparedness has provided financial and technical support to address unmet needs and gaps in early warning systems in high-risk, low-capacity countries in the Asia-Pacific region. It has promoted innovative pilot initiatives, scaled up successful multi-hazard early warning systems and facilitated regional cooperation.

Originally established with a US\$ 10 million contribution from the Thai Government and subsequent support from Germany, Japan, Sweden and Switzerland, the scope of the Trust Fund was broadened in 2010 to encompass disaster and climate preparedness.

It has since invested in innovative approaches to strengthen early warning systems associated with climate variability. These include national climate outlook forums, or 'Monsoon Forums', which have helped reduce disaster losses in sectors such as agriculture, water and energy by improving understanding of the impact of the seasonal monsoon.

In 2015, the Trust Fund expanded its reach to include Small Island Developing States of the Southwestern Pacific, helping to strengthen their resilience to weather and climate-related disasters through improvements in impact forecasting and climate applications.

The Trust Fund has supported 29 projects across 20 countries. At the regional level, it provided sustained financial support that contributed to the establishment of the Indian Ocean Tsunami Warning and Mitigation System (IOTWMS) as well as the Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES), an intergovernmental institution that provides cost-effective warning products and services, particularly for tsunamis and extreme weather systems.

At the national level, it has helped to establish seismic and sea-level stations in Viet Nam, the Philippines and Myanmar. In Maldives, it has helped link remote islands to the country's National Early Warning System. Since 2009, the Trust Fund has been raising awareness on the near-field tsunami risk posed by the Makran subduction zone to countries in the North Western Indian Ocean. Such a tsunami would be capable of striking coastal communities in less than 30 minutes, posing a major challenge for tsunami early warning in Iran, Pakistan, India and Oman.



The 2004 Indian Ocean Tsunami claimed the lives of over 227,000 people across a dozen countries (credit: IFRC)

The origins of World Tsunami Awareness Day



The origins of World Tsunami Awareness Day, marked annually on 5 November, date back almost 170 years, to 1854 when a massive tsunami, triggered by a magnitude 8.4 earthquake, struck the Kii Peninsula in Japan.

Goryo Hamaguchi, a village leader, recognized the signs of the approaching tsunami and set fire to his newly harvested rice sheaves to attract the attention of his fellow villagers and guide them to safety. His efforts served as an effective early warning that saved the lives of many people who saw the smoke and ran uphill to help put out the flames.

In Japan, this story is known as “The Fire of Inamura (rice sheaves).” And in December 2015, to commemorate the actions of Mr. Hamaguchi, the UN General Assembly designated 5 November as World Tsunami Awareness Day, a UN-observed international day, with 142 countries co-sponsoring a resolution drafted by Japan.

The UN General Assembly has tasked the UN Office for Disaster Risk Reduction (UNDRR) with facilitating the observance of World Tsunami Awareness Day in collaboration with the rest of the United Nations System.

COVID-19 prompts new evacuation guidelines



IOC-UNESCO produced COVID-19 tsunami response guidelines for each of the four regions covered by tsunami early warning systems: The Pacific Ocean, the Caribbean, the Indian Ocean, and the North-eastern Atlantic and Mediterranean and connected seas. A special national version of the guidelines was produced for Indonesia, taking into account the country's tragic recent history of tsunamis.

The Guidelines provide recommended actions during a tsunami warning, such as reviewing plans for assembly areas and evacuation shelters in light of COVID-19 physical distancing and medical isolation needs.

The Guidelines also support national public communication strategies, ensuring the public understand that emergency evacuation orders override the COVID-19 requirement to stay at home. Practical tips such as packing face masks and hand sanitiser in the event of an emergency evacuation are also included.

"There is general acceptance that the life-saving response to an imminent natural hazard should take priority over mitigation measures during a pandemic. However, proper advance planning can assist in adopting procedures to minimize the spread of infection during evacuation and sheltering," said **Thorkild Aarup**, then Head of the Tsunami Unit within the Secretariat of IOC-UNESCO.

In 2020, UNDRR and UNDP, with support from the Government of Japan, developed a Guide for School Administrators, based on best practices from Japan and elsewhere. The Guide provides step by step instructions to take prior to an emergency, during the evacuation and within evacuation centres, to prevent the spread of infectious diseases during a tsunami.

At the 'Ready for the Next Wave' conference, **Ronald Jackson**, UNDP's Head of Disaster Risk Reduction and Recovery for Building Resilience, drew parallels between the pandemic and lessons learned from recent major tsunami disasters:

"What they have in common is that the hardest hit are the ones already most vulnerable and risk prone. Covid-19 has exposed underlying risk and the vulnerabilities that lie unaddressed, despite our decades of efforts at risk reduction."

Speaking at a regional WTAD commemoration event, **Armida Salsiah Alisjahbana**, Executive Secretary of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), echoed these concerns:

"COVID-19 is an important reminder that risks are not local but can cascade to other parts of the system – social, economic and environmental. Therefore, managing risks and raising resilience across all the seventeen Sustainable Development Goals (SDGs) holds the key for a sustainable recovery."



In 2020, UNDRR and UNDP developed a Guide for School Administrators to safeguard children against COVID 19 during emergency evacuations. (Credit: UNDP)

Disaster preparedness is key, 10 years on from Japan quake and tsunami: UN



On the 10th anniversary of the 2011 Great East Japan Earthquake and Tsunami, António Guterres expressed his condolences, "to those who continue to grieve the loss of loved ones."

"And I think of those who remain displaced, unable to return to their homes because of safety concerns surrounding the destroyed Fukushima Daiichi nuclear power plant," added the Secretary-General in a video message issued on 11 March 2021.

He welcomed the findings of a report from the UN Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), which concluded that no adverse health effects among residents of Fukushima had been found that could be directly attributed to radiation exposure.

Mr. Guterres noted that Japan was "leading the world when it comes to disaster prevention" saying the country has invested heavily in building back safer in the past decade.

He described the Sendai Framework for Disaster Risk Reduction, adopted six years ago, as a "global blueprint for a safer world," and argued that to prevent and manage disasters more effectively, "countries need to plan, invest, give early warnings and provide education on what to do."

'Never been so important'

"The whole notion of prevention and preparedness for a tsunami has never been so important," said Mami Mizutori, UN Special Representative for Disaster Risk Reduction and head of the UN Office for Disaster Risk Reduction (UNDRR).

In the last century, tsunamis have claimed more than a quarter of a million lives, killing on average, around 4,600 per event, over the course of 58 recorded instances, according to UN figures.

But Ms. Mizutori warned that "disasters that are becoming much more rampant are all those related to climate emergency. And the number of climate emergency disasters have doubled during the past 20 years compared to the previous 20 years."

UNESCO's Intergovernmental Oceanographic Commission (IOC) is "embarking on the very important developments in the tsunami warnings systems under a new campaign of the United Nations," said Dr. Vladimir Ryabinin, Executive Secretary of the IOC-UNESCO.

On 5 December 2017, the United Nations declared that a Decade of Ocean Science for Sustainable Development would be held from 2021 to 2030. The Ocean Decade provides a framework for ocean science to support countries to achieve the 2030 Agenda for Sustainable Development.

'Tsunami ready'

"We hope very much that by the end of this decade 2030 we will have all tsunami-prone communities; tsunami-ready communities," Dr. Ryabinin said. "They will know what is to be done, they will be equipped with the means to escape from tsunami and when tsunami strikes they will evacuate and save their lives."

It was equally important for people to understand the role of science; to be ocean literate, climate literate and disaster risk reduction literate, said Dr. Ryabinin.

