

Advancing Disaster Resilience for All in Asia-Pacific

APEC EMERGENCY PREPAREDNESS WORKING GROUP

JUNE 2024



**Asia-Pacific
Economic Cooperation**

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**Asia-Pacific
Economic Cooperation**

ABOUT

The Advancing Disaster Resilience for All in Asia-Pacific is an Asia Pacific Economic Cooperation (APEC) Emergency Preparedness Working Group (EPWG) self-funded project by the United States, co-sponsored by Australia, Canada, Chile, Indonesia, Japan, Chinese Taipei, and Viet Nam.

The United States wishes to thank co-sponsor and participant economies for their contributions to this project and, more generally, for their notable efforts to strengthen disaster preparedness and resilience across the Asia-Pacific region. The United States also expresses gratitude to academic partners who contributed expertise to project discussions and case studies, among them the Asian Disaster Reduction Center (ADRC) and the University of Hawaii.

Key Terms

- Disaster Resilience
- Disaster Risk Reduction
- Whole-of-Community
- Climate-Driven Disasters
- Risk Landscape
- Collaborative Governance
- Nature-Based Solutions
- Artificial Intelligence

Executive Summary

The Advancing Disaster Resilience for All in Asia-Pacific project is an initiative of the United States to build capacity and foster resilience across the Asia-Pacific region during its Asia-Pacific Economic Cooperation (APEC) 2023 host year. This two-part project assesses the current disaster landscape in the region and identifies the effective disaster risk reduction (DRR) and resilience strategies APEC economies are adopting as they confront extreme weather events exacerbated by climate change.

To promote information sharing, the U.S. Federal Emergency Management Agency (FEMA) hosted a virtual panel discussion in June 2023 with subject matter experts from the Asia-Pacific region to explore how economies are preparing for extreme conditions caused by an increasingly complex disaster landscape. The panel “APEC in an Increasingly Complex Disaster Landscape” engaged leaders in a robust discussion regarding challenges and opportunities in DRR, including efforts to build effective local partnerships, prepare the workforce for year-round hazards, and bring innovative technology such as artificial intelligence, social media, and drones into preparedness plans.

Participating APEC economies also submitted case studies, captured in this report, to share successful disaster resilience efforts across the Asia-Pacific. The case study criteria emphasized policies, initiatives, and programs that foster DRR for all, build a disaster resilient APEC, and/ or support the emergency management workforce. Each case study includes concrete examples of best practices and lessons learned for APEC economies experiencing frequent and severe hazards. The actions captured in this report are meant to memorialize these efforts and inform APEC’s disaster preparedness as the region navigates increasing environmental uncertainty.

The cases covered a wide range of programs, investments, and innovative approaches to advancing disaster resilience for all, including:

- Australia: Establishing a National Coordination Mechanism;
- Australia: Australia's Commitment to Disaster Risk Reduction through the Disaster Ready Fund;
- Canada: Canada's First Strategic Pan-Canadian Disaster Risk Assessment Report
- Indonesia: Indonesia's Support of the 2023 Türkiye Earthquake: A Case Study on Emergency Response Collaboration Beyond APEC;
- Chinese Taipei: Sustainable Agricultural Communities by "Plant Back Better" (PBB) Initiative;
- Chinese Taipei: Supporting the Emergency Management Workforce;
- United States: FEMA Extreme Heat Summit; and
- Viet Nam: Improving the Resilience of Vulnerable Coastal Communities to Climate Disaster-Related Impacts.

Through these case studies, participating economies showed that investments in collaborative governance, inclusive data collection at the community-level, and innovative whole-of-community engagement can help the APEC region effectively prepare for, respond to, and recover from an increasingly uncertain disaster landscape.

These takeaways also demonstrate how cross-economy training, inter-department/agency collaboration, and information-sharing through APEC's EPWG can support economies' efforts to adapt to new and emerging threats.



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BACKGROUND

The Asia-Pacific region is experiencing frequent catastrophic disasters leading to weather, climate, water, and seismic incidents that cause about 3000 deaths and USD 3.8 million in economic damages each month[1]. The compounded impacts of year-round disasters, concurrent emergencies, and increasing climate shocks are transforming the landscape of risk in the region—in fact, it is now considered the most disaster-prone region in the world according to the United Nations Population Fund.

Amidst this changing environment, APEC economies are prioritizing emergency preparedness practices that lessen economic shocks and reduce disaster risk for all—especially for historically underserved communities who are often the most disproportionately affected by disasters.

APEC’s emergency preparedness efforts, as coordinated through the EPWG, align with **APEC’s Putrajaya Vision 2040** and **Aotearoa Plan of Action**. The Putrajaya Vision fosters a “dynamic, resilient and peaceful Asia-Pacific community by 2040, for the prosperity of all our people and future generations”[2] while the Aotearoa Plan of Action seeks to “address all environmental challenges, including climate change, extreme weather and natural disasters, for a sustainable planet.”[3]

Similarly, the EPWG advances the **Bangkok Goals on the Bio-Circular Green Economy** to “enhance adaptive capacity, strengthening resilience and reducing vulnerability to the adverse effects of climate change and associated risks, including through mainstreaming adaptation measures into policies, strategies and planning, as well as disaster and emergency preparedness and management.”[4]

This project incorporates these APEC-wide priorities to inform discussions and resulting outputs. To that end, this report identifies three key themes:

- **Foster DRR for All:** Understanding how disasters have disproportionate impacts on vulnerable communities;
- **Build a Disaster Resilient APEC:** Assessing the impact of frequent and severe disasters on APEC’s resilience to complex emergencies; and
- **Support the Emergency Management Workforce:** Identifying how to develop the skills and capacity of the emergency management profession to build a disaster resilient Asia-Pacific.

[1] [The Asia-Pacific Riskscape: How do the changes in weather, climate and water impact our lives?](#) | ESCAP.(unescap.org)

[2] [APEC Putrajaya Vision 2040 | 2020 Leaders' Declaration](#) | APEC

[3] [Aotearoa Plan of Action](#) (apec.org)

[4] [Bangkok Goals on Bio-Circular-Green \(BCG\) Economy | 2022 Leaders' Declaration](#) | APEC



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OBJECTIVES

This project aims to help APEC economies better understand the impacts of a changing climate on community resilience in the Asia-Pacific region. Through the “**APEC in an Increasingly Complex Disaster Landscape**” talk, participants explored how the increasing frequency and severity of extreme weather events are impacting the APEC region and the strategies adopted by APEC economies to proactively adapt to these complex risks, including through DRR and resilience-building efforts at the local, economy-wide, and regional level.

The project advances the updated **APEC Disaster Risk Reduction Framework and Action Plan**, endorsed by APEC leaders in November 2023 at the conclusion of the U.S. Host Year.

The case studies complement this discussion by providing specific examples of how economies are approaching disasters and prioritizing resilience, workforce readiness, and whole-of-community DRR in emergency management. This report serves as a roadmap for collaboration across the EPWG, academia, non-profit and private sectors, and as a resource to identify innovative approaches that can be implemented in the APEC region.



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CASE STUDIES

AUSTRALIA

Establishing a National Coordination Mechanism

Context

The National Coordination Mechanism (NCM) was established in March 2020 to manage the non-health consequences of COVID-19. It has evolved from its original design parameters to become an effective tool for all hazard preparedness, response, and recovery. The current version has outperformed the first iteration of the NCM.

In 2022, severe flooding in southern Australia closed the east-west rail link and the main north-south highway, causing severe supply chain disruptions. More than 80% of inbound freight to Western Australia was blocked, and critical goods and services to the Northern Territory and eastern Australia were also impacted, triggering the National Coordination Mechanism.

“Many Western Australian and Northern Territory residents couldn’t access essential goods and services, with some communities completely isolated as a result of the flooding event”

Actions

For this event, the NCM organized 24 emergency meetings with Australian Government authorities, state and territory authorities, industry and the not-for-profit sector. These enabled senior officials, Australian state and territory government representatives, and decision-makers from the road, rail, sea freight, food and grocery, water, and agricultural sectors to collectively identify, explore, and stabilize the full range of consequences of the supply chain disruptions.

Through the NCM, the Australian Government facilitated the repair of the rail route, coordinated the Australian Defence Force’s delivery of emergency supplies to remote communities, and recalibrated economy-wide road regulatory barriers to enable wider access to the freight network, and ensured temporary exemptions for sea freight. Through the NCM, the Australian Government cut through administrative hurdles and engaged public and private elements of the Australian freight system simultaneously to generate immediate solutions to the event.



Flooding in the town of Lismore. March 2022.
Source: Shutterstock

Challenges

In addition to the flooding, this crisis occurred during the COVID-19 pandemic, which compounded supply chain issues due to public health measures, which included internal border closures, reduced workforce in the freight industry, and pandemic-driven bulk buying in jurisdictions not impacted by the weather event. With industry already managing significant business impacts, Australia’s freight network was put under economy-wide pressure, and not just in the flood affected areas.

AUSTRALIA

Australian anti-competition laws also posed legal risk to industry. The NCM worked with the Australian Competition and Consumer Commission to gain temporary exemptions that allowed industry cooperation without the risk of fines or other penalties. This enabled coordination and cooperation between land freight—particularly rail freight—providers and the food and grocery sector to prioritize essential goods for flood-affected communities.

Outcomes

As a result of the NCM, Australian Government authorities, states and territories and industry gained a collective understanding of the key issues they might face in future disasters and developed relationships to enable a faster coordinated response. It also enabled the development of key tools and policy levers, such as a temporary listing of priority goods and services that was agreed to between public and private sectors, and the use of time-limited exemptions from competition law to enable the prioritization and timely delivery of essential goods and services to impacted communities. These actions reduced the severity of the impact on these communities, ensuring goods and services were received by those in need. It also prepared all stakeholders for more efficient and effective responses in future.

Australia's Commitment to Disaster Risk Reduction through the Disaster Ready Fund

Context

In response to the Royal Commission into National Natural Disaster Arrangements, Australia announced the establishment of the Disaster Ready Fund (DRF) in 2022, which called for greater economy-wide preparedness for disasters.

Under the program, Australia will provide up to AUD 200 million each year starting July 1st, 2023, for disaster risk reduction initiatives, with funding expected to be matched by project applicants (which may include state and territory governments), where possible. Australia's disaster risk reduction obligations and priorities—as detailed in the Sendai Framework for Disaster Risk Reduction 2015-2030 and the National Disaster Risk Reduction Framework—guide the DRF.

Actions

Following the passing of the legislation to establish the DRF in 2022, the National Emergency Management Agency (NEMA) worked with all levels of government and community to develop the program guidelines for Round One of the DRF.



AUSTRALIA

Round One was open to state and territory governments who have primary responsibility for emergency management and were expected to work closely with key stakeholders, including local governments and First Nations communities to identify and prioritize suitable projects. NEMA received over 300 proposals through Round One, which were assessed in accordance with a robust and transparent process. Round One delivered AUD 200 million in Commonwealth funds for disaster risk reduction across Australia.

Challenges

Round One of the DRF has been well received by states, territories, and local communities, and feedback from key stakeholders has been largely positive. However, stakeholders noted challenges. In particular, the timing of Round One guidelines (guidelines were released in January 2023 and applications closed in March 2023) presented difficulties for some stakeholders in relation to securing matched funding and developing applications throughout Australia's high risk weather season.

Stakeholders also expressed a desire for a more streamlined application process (this was administered in house by NEMA for Round One), including a desire among some stakeholders to apply directly to NEMA, rather than through states and territories, and for clearer arrangements regarding economy-wide project proposals (e.g., those being delivered across multiple jurisdictions or of economy-wide significance) and co-contribution waivers.

Round Two (and future rounds) provides an opportunity to address these challenges, while building on the outcomes of Round One to ensure the strategic intent of the program is delivered.

Round One of the Disaster Ready Fund (DRF) generated significant interest, with more than 300 applications submitted and over AUD 460 million in Commonwealth funding requested. NEMA managed a robust and transparent process to assess the applications in accordance with the published program guidelines. The AUD 200 million Commonwealth investment in 2023-24 for Round One comprised 187 projects, including: almost AUD 65 million for 74 infrastructure projects; around AUD 84 million for 74 systemic risk reduction projects; and over AUD 51 million for 39 projects that will deliver both infrastructure and systemic risk reduction outcomes.

Round One funding will deliver vital infrastructure such as cyclone shelters, sea walls, flood warning systems and flood levees to help reduce the vulnerability of communities facing high levels of disaster risk, as well as initiatives that strengthen the resilience of government networks and at-risk communities in the face of future disasters. [5] Following significant consultation with stakeholders on the experience of Round One, Guidelines for Round Two of the DRF were released on 15 December 2023. [6] Round Two will provide up to AUD 200 million in Commonwealth funds in 2024-25.

[5] [Disaster Ready Fund - Round One | National Emergency Management Agency \(nema.gov.au\)](https://nema.gov.au/sites/default/files/inline-files/Disaster%20Ready%20Fund%20Round%20Two%20Guidelines%202024-25.pdf)

[6] <https://nema.gov.au/sites/default/files/inline-files/Disaster%20Ready%20Fund%20Round%20Two%20Guidelines%202024-25.pdf>

Canada's First Strategic Pan-Canadian Disaster Risk Assessment Report

Context

Canada faces a shifting disaster landscape, in part due to climate change. The region is experiencing more frequent, intense, and severe floods, wildland fires, and extreme heat events. Reducing disaster risks, particularly through proactive climate adaptation, has been more cost-effective than emergency response and recovery. Robust prevention, mitigation, preparedness, response, and recovery systems are essential to reduce disaster and climate-related impacts.

To advance disaster risk reduction for all, and to build a disaster resilient APEC, Canada developed the "National Risk Profile" (NRP). The NRP is a report that aims to identify gaps in Canada's emergency management system and to generate a dialogue on how to support informed decision-making to reduce disaster risk and build resilience in the face of disasters. It also includes key objectives of Canada's climate adaptation and emergency management strategies.

Actions

The NRP is being developed in phases by assessing different hazards. The first iteration of the NRP focused on assessing Canada's risk and capabilities for floods, wildland fires, and earthquakes as these are the costliest and most impactful disasters for Canadians.

Additionally, the first NRP public report includes a section on the cascading impacts of pandemics like COVID-19 on these natural hazards.



National Risk Profile

A national emergency preparedness and awareness tool

First Public Report – May 2023 (Revised in January 2024)

"The NRP embodies the relationship between risk information and disaster resilience by showing that disaster risk reduction and resilience requires contributions from whole-of-community. The methodological approach enables other APEC economies to conduct similar efforts and research to better inform disaster risk reduction and climate change adaptation policies and programs."

The NRP combines Canada's All-Hazards Risk Assessment and emergency management capability assessments with federal probabilistic modelling and external research to provide a comprehensive, forward-looking pan-Canadian picture of disaster risk.

CANADA

The methodological approach of the NRP reflects its goal as a multi-purpose tool for reporting and building awareness. It provides a foundation for disaster risk reduction, climate change adaptation planning, and evidence-based decision-making in emergency management, thereby supporting resilience-building for all of Canada.

Challenges

NRP stakeholders sought to include diverse, comprehensive data sets. However, obtaining information and data from a variety of communities, including First Nations, was difficult and gaps remain today. There were also strategic communication challenges for the NRP. Translating technical information and detailed results associated with the assessments into accessible report content for consumption by varied audiences—including the general public—was difficult.

The NRP assessment and report development process experienced challenges due to complexities in data collection and analysis, leading to compressed deadlines in both analysis and report drafting. Data limitations were also an issue as the increased use of surveys throughout the pandemic, combined with competing priorities among stakeholders, risked survey fatigue. This was particularly acute among emergency management representatives coping with the pandemic and other emergencies.

Outcomes

The first public report of the NRP was released in May 2023 as part of Emergency Preparedness Week, which is a pan-Canadian event supported by Public Safety Canada. As an emergency preparedness and awareness tool, the NRP provides a snapshot of Canada's disaster risk and emergency management capabilities. It is a strategic and coordinated pan-Canadian assessment of existing measures that support whole-of-community disaster risk reduction and capability enhancements by integrating scientific evidence and expert opinions.

The findings of the NRP provide a foundation for a proactive whole-of-society approach to evidence-based planning and decision-making for disaster risk reduction and climate change adaptation in Canada.

It demonstrates the potential losses and impacts that could result from intense and severe disasters (e.g., heavy financial burdens for jurisdictions and individuals, long-term psychosocial impacts, losses to cultural heritage) while also demonstrating the importance of risk-informed development that reduces current risk and prevents the creation of new risk.

To facilitate public awareness of how the NRP was developed and its key findings, Public Safety Canada developed a series of communications products in tandem with the report's release.



A forest fire lights up the night sky in the Okanagan Valley.
Source: iStock

INDONESIA

Indonesia's Support of the 2023 Türkiye Earthquake: A Case Study on Emergency Response Collaboration Beyond APEC

Context

Indonesia shares similar hazards with other APEC economies. These risks are primarily associated with its remote island setting and exposure to tsunamis as well as coastal and climate threats. Given these shared threats, Indonesia works closely with the University of Hawaii and other partners to build capacity and improve coordination to strengthen disaster preparedness.

Training and education efforts are focused on disaster management, humanitarian assistance, and knowledge exchange using whole-of-community engagement which includes decision-making authorities, civil society, universities, and community-based organizations. The University of Hawaii's National Disaster Preparedness Training Center (NDPTC) and the United States Agency for International Development (USAID) INVEST DM project have supported the development of disaster management capabilities in Indonesia for many years.

To strengthen Indonesia's emergency preparedness and advance economy-to-economy collaboration with the United States, a delegation of senior officials from Indonesia visited FEMA headquarters in Washington, DC in the summer of 2022 and held knowledge exchange sessions at FEMA's Center for Domestic Preparedness (CDP), the Emergency Management Institute (EMI) and with NDPTC and other National Domestic Preparedness Consortium (NDPC) regional offices and training partners. NDPTC also supported Indonesia's efforts to aid emergency response operations beyond the APEC region.

“International partnerships aimed at the development of the emergency management workforce should focus on inclusive collaboration, community resilience, access to essential services, all hazards mitigation, and equity for vulnerable, marginalized communities.”

In response to the Türkiye earthquakes in February 2023, President Joko Widodo sent a large team from Indonesia, led by Badan Nasional Penanggulangan Bencana (BNPB), to provide humanitarian assistance in Türkiye. NDPTC provided technical and administrative assistance throughout the deployment, including sharing training materials on winter weather, personal protective equipment guidance, mapping and remote sensing and support of operations support, volunteer coordination, local government communications, situation reports, and satellite damage assessment from international agencies, as well as local information research on the Hatay Province.

Challenges

Leadership is vital to effective humanitarian assistance and requires collaboration with diverse agencies across multiple disciplines.

INDONESIA

The mission to Türkiye demonstrated both the complexities of international engagement and the advanced capabilities of BNPB, requiring the rapid deployment of personnel, equipment, and supplies as well as effective communication, coordination, and collaboration with international partners.

Personnel deployed in the field need training to increase capabilities and manage unique challenges including search and rescue, medical care, and temporary sheltering. Indonesia has extensive experience with earthquakes but has limited experience operating in winter weather environments. NDPTC shared its winter weather training course with BNPB and provided additional training on damage assessment and disaster response to support humanitarian assistance. Improving skills and capabilities through knowledge exchange and cross-discipline training is key to the success of a limited team mission.

Logistic arrangements for foreign missions require comprehensive and innovative planning. Teams should be self-sustaining and locally procured when possible. Detailed planning and daily evaluation are essential for the effective adjustment of activities. Mitigation lessons from the mission include strengthening building code enforcement, prepositioning family tents in local communities, and industrial capability to produce prefabricated temporary shelters in a short time.

Outcomes

As a result of the USAID INVEST DM capacity-building collaboration, Indonesia was able to send a 181-member humanitarian assistance team to Türkiye in response to the February 2023 earthquakes, the largest international assistance effort conducted by Indonesia to date. In addition to USD 2 million in supplies from the on-call disaster fund to support search and rescue and field hospital operations, all of the teams' operational costs were covered.

The emergency medical team (EMT) established a 24-hour field hospital that served 444 patients in Hassa Town from February 15 to 28, 2023, Hatay Province. Inter-agency EMT personnel came from BNPB, military, police, Muhammadiyah, and Dompot Dhuafa, and included physicians, nurses, midwives, and public health specialists.

More than 140 tons of humanitarian aid included blankets, tents, sleeping bags, sweaters/jackets, other clothing, ready-to-eat meals, hygiene kits, and electricity generators. Also included were anti-tetanus serums and medical supplies.

The Türkiye engagement demonstrates Indonesia's increased capabilities and international commitment to support disaster relief efforts as a direct result of inter-agency capacity-building and preparedness efforts within the APEC region. The economy-to-economy crisis management collaboration between Indonesia and other APEC economies positioned Indonesia to support a significant response effort outside APEC.

Due to climate change and other stressors, there is continued need for improved response, relief, and recovery capabilities. The final report acknowledged the need to improve winter-weather capabilities, self-sufficient electricity management, coordination, and a more systematic after-action review (AAR).

CHINESE TAIPEI

Sustainable Agricultural Communities by “Plant Back Better” (PBB) Initiative

Context

Canada faces a shifting disaster landscape, in part due to climate change. The region is experiencing more frequent, intense, and severe floods, wildland fires, and extreme heat events. Reducing disaster risks, particularly through proactive climate adaptation, has been more cost-effective than emergency response and recovery. Robust prevention, mitigation, preparedness, response, and recovery systems are essential to reduce disaster and climate-related impacts.

To advance disaster risk reduction for all, and to build a disaster resilient APEC, Canada developed the “National Risk Profile” (NRP). The NRP is a report that aims to identify gaps in Canada’s emergency management system and to generate a dialogue on how to support informed decision-making to reduce disaster risk and build resilience in the face of disasters. It also includes key objectives of Canada’s climate adaptation and emergency management strategies.

Actions

As a first step to implement the PBB, Chinese Taipei has been working with the Philippines on public-private partnerships to conduct a pilot project: the Best Practices at Barangay Lanit, Jaro Iloilo City, the Philippines.

“This APEC-funded project explored the feasibility and application model for engaging key stakeholders in our society to map a pathway for sustainable, resilient development and climate adaptation countermeasures for food security”

Chinese Taipei promoted PBB initiatives and calls to action to mitigate vulnerability and enhance self-sufficiency through disaster-resilient vegetable and flower crops fostering sustainable and inclusive growth under APEC.

The PBB project mainly focuses on promoting capacity-building by adopting smarter disaster-resistant vegetable farms. It also prioritizes disaster risk reduction for building up community resilience with respect to local knowledge. The three goals of PBB are as follows:

1. **Helping vulnerable areas:** Promote capacity-building by adopting smarter and more disaster-resistant vegetable planting.
2. **Preparing for disasters:** Mainstream DRR for building up community resilience with respect to local knowledge.
3. **Recovering from disaster impacts:** Revitalize local economic activity efficiently and effectively.

Challenges

Once the PBB Phase 1 came to harvest time, the original plan was for the ATI community to sell its agricultural products to buy next season’s seeds and build an economic model.

CHINESE TAIPEI

However, due to the COVID-19 pandemic, ATI residents generously shared their harvest for free with neighbors to help them during the lockdown. Though the economic model failed to stand up, PBB did help to solve vegetable scarcity during a critical time. Specific challenges indeed:



Photo of Iloilo City, Western Visayas, Philippines. Source: Pexels

- **Finding an Appropriate Location for the Project:** The approved budget was limited to deliver a small-scale project. Strong leadership and willingness to cooperate with other community stakeholders proved to be key elements for the project to succeed.
- **Including and Integrating Knowledge of Disaster Risk Management and Agriculture:** PBB is designed for both building resilience and climate change adaptation at the community level. Therefore, the project needed diverse expertise to solve relevant issues.

- **Obtaining Local Community Support:** Since the project required land for the crops, it was highly appreciated to have the Mayor of Iloilo City secure land and provide comprehensive assistance during project implementation.
- **Building Public-Private Partnerships:** Due to the long-term partnership between the National Resilience Council and the APEC Emergency Capacity Building Center, the two institutions helped execute the project.
- **Building Community Trust:** The project included two workshops to listen to the community's needs and build trust around project activities and implementers.

Outcomes

Chinese Taipei is leading the development of PBB gardening kits and Guiding Principles for APEC Resilient Communities on “Plant Back Better” Initiatives. To facilitate the implementation of the APEC PBB, the Emergency Capacity Building Center (EPCC) will continue to promote food supply projects during climate extremes and disasters. ECBC will also identify challenges related to providing capacity-building programs through cross-fora collaboration on cross-cutting issues.

From science to action, Chinese Taipei adopted smart Information and Communications Technology (ICT) approaches for PBB initiatives to connect APEC resilient communities to improve food supply reliability, supporting the sustainability and competitiveness of business in the APEC region. Promoting PBB initiatives for more APEC resilient communities through smart ICTs is an example approach of how real-time information connectivity supports greater emergency preparedness.

CHINESE TAIPEI

Supporting the Emergency Management Workforce

Context

Since 2009, Chinese Taipei has leveraged lessons from Typhoon Morakot to further cross-agency information, integration, and implementation of innovative emergency management practices in support of the emergency management workforce.

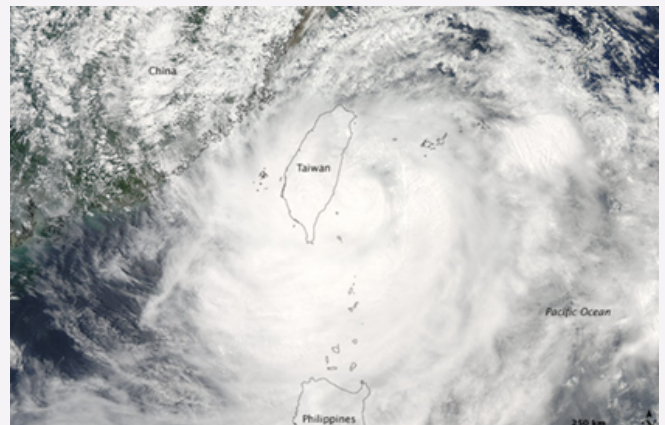
Beyond economy-wide collecting efforts and participation of all decision-making authorities in Chinese Taipei, the support and involvement of the research community has been essential to develop innovative protocols and operations in the event of emergencies like typhoons or earthquakes.

“Early warning tools, applications of Information and Communications Technology (ICT), data-driven decision support, and early evacuation policies are key examples of how Chinese Taipei uses science to advance emergency preparedness and disaster risk reduction. The process is an end-to-end collaboration and focuses on information intelligence to meet the demands of target users.”

Actions

Bringing all key stakeholders to take action requires the following steps:

- **Standardization of data formats, data sharing, and exchange protocols:** To enable an information-based environment, introducing a Common Altering Protocol (CAP) and an open-data platform helps facilitate the collection and distribution of information.
- **Building a common operational picture (COP)** for better coordination among decision-making authorities provides a virtual platform to provide quality visualization and enhance situational awareness.
- **Multiple channels to reach end users:** A Public Warning System powered by cell broadcast service and an instant messenger app are two tools providing extensive information coverage.
- **Integrating, overlapping, and visualizing data produced by diverse sources:** For a better and more comprehensive perception of disaster-related information, aggregating and right-sizing heterogeneous data sets can offer more valued-added information like demographic data overlap with potential risk maps.



Typhoon Morakot Captured by Moderate Resolution Imaging Spectroradiometer. Source: NOAA Observatory

CHINESE TAIPEI

Challenges

Maintaining quality data with consistent updates is difficult, especially when trying to keep up with the dynamic pace of social developments. To meet this challenge, all data producers are responsible for long-term maintenance. A related issue is the attitude towards sharing openly. It takes intentional effort to engage stakeholders to accept the concept that open data and information-sharing are mutually beneficial.

Reliable internet access is also a challenge to keeping connected. To operate a stable “end-to-end” information system, a broadband internet infrastructure is crucial and should cover all corners of society, especially areas with high risk. There needs to be investment in technology and capacity building to harness the benefits of the next high-tech generation, but investments on these innovations—such as the Internet of Things (IoT), AI, edge computing, and other emerging technologies—can be difficult to manage. These are part of the larger challenge that, in modern society, the degrees of risk perception are important to comprehend as they ultimately impact willingness to take proper actions. Responding to urgency ultimately leads to lower disaster impacts.

Outcomes

Using big data: As more sensor networks (e.g., IoT and smart devices) are applied to large-scale data collection, big data is a growing trend affecting the quality of disaster risk reduction, emergency preparedness, and emergency operations efforts. How to use big data depends on its quality, transmission, exchange, storage, display, and dissemination throughout the whole data lifecycle for disaster risk management.

A smart way to use information for emergency operations: Integrating diverse data sets based on the specifics of individual requests is crucial to solve issues related to disaster risk management. For example, demographic structure, weather forecast, real-time rainfall monitoring, threshold values to trigger flood or landslide and supporting resources are essential for a successful execution of early evacuation before a typhoon makes landfall.

An environment to build resilience: However, digital preparedness requires comprehensive coordination in advance. To further make the most of data for enhancing public awareness and decision-making, producing open data is important to reach targeted groups of users to encourage them to take the necessary actions to protect themselves and their communities. Once a policy of open data is established, it needs enablers to set up a well-regulated environment for original data producers, data aggregators, app or system developers, transmission channel providers and final message receivers.

UNITED STATES

FEMA Extreme Heat Summit

Context

Extreme heat is an increasingly frequent and deadly natural hazard. It poses significant risk to communities' health and safety as well as to critical infrastructure, agriculture, and the economy. Events of this nature often disproportionately impact underserved communities as they do not have the same level of infrastructure or mitigating resources to protect themselves. In addition, extreme heat can have a significant impact on first responders and emergency management workforces.

The 1995 heatwave in Chicago, Illinois was among the deadliest extreme heat events in the United States. The event led to over 700 fatalities, disproportionately affecting historically underserved communities. Due to the significant impacts of the event, the City of Chicago commissioned a report which led to increased and improved use of cooling centers and increased partnerships between city agencies for planning and response during these events.

The summit provided a forum for senior leadership to learn more about the hazard and discuss impacts of past events, planning for future events, and identified efforts to mitigate the impacts of and build resilience to extreme heat.

Actions

In response to growing concern about the impacts of extreme heat, FEMA's Midwest region located in Chicago and its National Exercise Division co-hosted a Summit on Extreme Heat in May 2023.

"We have the greatest opportunity to build resilient communities with bold, big projects that eliminate effects of extreme heat. The challenge is to build a pathway to success, and the way we do this is the relationships and engagements we build upon today." - FEMA Region 5 Regional Administrator Tom Sivak



Record-breaking temperatures in Southern California lead to dangerous heat advisories and power grid issues. Source: iStock

Over 20 subject matter experts convened to engage with interagency senior leadership. The Summit included sessions that guided meaningful discussion on each of the below topics:

- Overview of the Extreme Heat Hazard
- Details on the Regional Impacts
- Preparedness and Messaging
- Critical Infrastructure Impacts
- FEMA's Authorities and Capabilities
- Occupational Health Impacts
- Hazard Mitigation Case Studies
- Next steps

UNITED STATES

Challenges

Participants discussed the challenges to reduce deaths attributed to extreme heat, improve resilience against the effects of high temperatures, and engage whole-of-community responders to protect the most vulnerable. Extreme heat events increasingly cover large regional geographies, straining medical and emergency resources across jurisdictions, therefore communication is a key challenge to manage such a large response. Additionally, extended high temperatures can trigger cascading energy infrastructure, transportation, and rail infrastructure failures. Heat impacts cause widespread disruption to economic activities. It is difficult to prepare high-risk areas because the scope and scale of infrastructure improvements requires complex mitigation and large funding commitments.

The Summit facilitated unprecedented extreme heat collaboration between senior leadership, federal partners and subject matter experts who identified actions to build resilience and mitigate the impacts of extreme heat including:

Immediate Actions

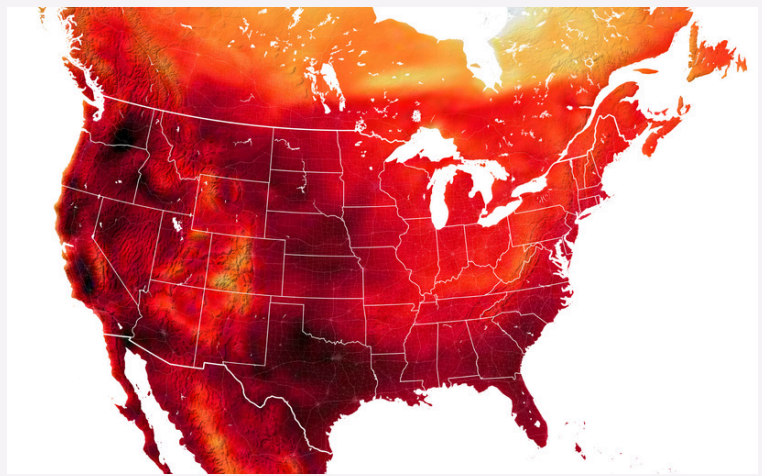
- Promote a campaign for the United States to educate on the impacts of extreme heat through Ready.gov.
- Educate communities and conduct community outreach around extreme heat, its impacts, and steps that can be taken to mitigate those impacts.

Short-term Actions

- Amplify tools, resources, and research from other organizations. This includes conducting case studies and supporting community engagements to identify best practices, challenges, and success stories on extreme heat mitigation efforts such as through Heat.gov.
- Plan and conduct other Extreme Heat Summits.
- Identify global initiatives addressing extreme heat where the United States can learn and contribute.

Medium/Long-term Actions

- Leverage the FEMA Hazard Mitigation Grant Program for extreme heat.
- Consider incorporating heat annexes in planning.
- Provide recommendations on building code updates to ensure extreme heat is taken into consideration for new development.



The above map shows daily high temperatures on July 31, 2022. Late July saw the heat continuing in the Great Plains and Southeast, while rising in the West and Northeast. Newark, New Jersey, saw a record-breaking five straight days of triple-digit temperatures. Source: NOAA

Improving the Resilience of Vulnerable Communities to Disaster Related Impacts

Context

Frequent storms and flooding impact vulnerable coastal communities in Viet Nam—with around 60,000 houses damaged or destroyed each year—causing serious economic damages.[7] Rural communities reliant on natural resource-driven economic activities like agriculture or fishing are at particularly high-risk for experiencing severe disaster shocks. Additionally, rapid urbanization along coastal provinces exacerbates risks as coastal hazards increase.

An estimated 930,000 people are affected annually by flooding with an estimated impact on the GDP of USD 2.6 billion.[8] In October and November 2020, Vietnam experienced the worst flooding of the past decade when the Inter Tropical Convergence Zone combined with six consecutive tropical depressions, storms, and tropical typhoons that resulted in widespread flooding in most of Central Vietnam...severely affecting 1.5 million people [and] resulting in economic damage worth USD 1,443,850.[9] To address these ongoing risks, Viet Nam is investing in a series of interventions to improve the resilience of vulnerable coastal communities.

“Viet Nam is strengthening storm and flood protection for coastal communities through resilient housing, planting and rehabilitation of mangrove forests, and systematized climate risk assessments for the public and private sectors”

- Through this project, Viet Nam has also implemented nature-based solutions to create new storm surge buffers by regenerating and replanting 4,000 hectares of mangroves in coastal areas vulnerable to climate change.[11] These new buffers will be maintained by community-based management. Additionally, ecosystem monitoring programs support the longevity and resilience of coastal livelihoods and economic activities.

Actions

- Efforts to advance disaster risk reduction in Viet Nam include a recent project incorporating storm and flood-resilient design features in new houses, for up to 20,000 coastal people at high-risk from adverse weather events. Community-based climate and disaster risk mapping informed this work with direct grants offered for additional flood and storm resilient features for 4,000 houses.[10]



Flooding following a tropical storm in Hoi An, Viet Nam. Source: iStock

VIET NAM

The project led to the development of standardized climate and economic risk assessments for use by the private and public sectors in all 28 coastal provinces of Viet Nam. To achieve this, the project supported updating a disaster database and establishing a risk data repository for sharing information.[12] Viet Nam has also delivered policy support for staff at the economy-wide and regional levels to apply disaster information to climate resilient planning. Through this, Viet Nam analyzed innovative financial mechanisms to improve access to finance for low-income households seeking disaster preparedness and adaptation measures.

Challenges

Community participation was essential to the success of these efforts. However, there were barriers for entry and engagement. One way the project sought to address gaps in community participation was to creatively foster a spirit of healthy local competition, including televised song and video contests involving target groups, such as school-aged children. This, along with the use of social media and the engagement of trusted messengers, helped ensure the success and long-term viability of the series of coastal resilience efforts.



Flooding in Ho Chi Minh City, Viet Nam. Source: iStock

Outcomes

The project and resulting programs produced concrete results, including reducing casualties and improving livelihoods, enhancing resilience capabilities, supporting economic development, and increasing workforce capacity at a local and economy-wide level. Since the project's inception in 2017, its interventions have benefited 79,831 people, of which 51% were women. The investments in coastal resilience have also helped develop a pool of community-based disaster risk management trainers that have since provided trainings for 541 communes in 28 coastal provinces.[13]

To expand the reach of information, project teams developed online videos on disaster prevention and response on mass media platforms such as economy-wide TV channels and social networks. The project also supported the installation of community early warning systems in 24 communes in seven (7) coastal provinces.

Due to this success, Viet Nam collected and systemized community-level disaster and climate risk-related information to inform local development planning. These data sets are integrated into the Viet Nam Disaster Monitoring System (VNDMS) to enable decision-making authorities and other stakeholders to access the available drought, flood, storm surge, and climate change risk maps online for seven coastal provinces.

[7]FP013: Improving the resilience of vulnerable coastal communities to climate change related impacts in Viet Nam | [Green Climate Fund](#)

[8] World Bank Group, Climate Change Knowledge Portal.

[9] [Disaster Management Reference Handbook - Vietnam \(December 2021\) - Viet Nam](#) | [ReliefWeb](#)

[10] [Taking shelter: Building coastal resilience in Viet Nam by UNDP Climate - Exposure](#)

[11] [Taking shelter: Building coastal resilience in Viet Nam by UNDP Climate - Exposure](#)

[12] FP013: Improving the resilience of vulnerable coastal communities to climate change related impacts in Viet Nam | [Green Climate Fund](#)

[13] [fp013-annual-performance-report-cy2021.pdf \(greencclimate.fund\)](#)



**Asia-Pacific
Economic Cooperation**

PANEL DISCUSSION

Panel Discussion: APEC in an Increasingly Complex Disaster Landscape

Synopsis

Extreme weather and the widespread impacts of climate change pose significant risks to communities across the Asia-Pacific region. From rising sea levels, drought, wildfires, extreme heat, degradation of critical infrastructure and supply chains, and mass movement of populations, the increasing frequency and severity of weather-related disasters is challenging the region's ability to prepare for, respond to, and recover from complex emergencies.

This virtual talk convened Asia-Pacific economies to discuss best practices and lessons learned from their experiences adapting to and addressing climate-induced disasters.

Objectives

- Discuss how the increasing frequency and severity of extreme weather events are impacting the APEC region and outline implications for the emergency management community;
- Highlight how economies are developing strategies and overcoming barriers to proactively adapt to climate change risks; and
- Provide an opportunity for economies to discuss their work in progressing disaster risk reduction and climate-disaster resilience.

Outcomes

- Advance conversations on disaster resilience, identify how severe weather events are impacting the APEC region, and discuss implications for the emergency management community; and
- Progress APEC Putrajaya Vision 2040, Aotearoa Plan of Action, and Bangkok Goals through EPWG activities.

During the event, emergency preparedness leaders from Chile, Japan, the United States, and the University of Hawaii shared specific challenges and priorities to build local partnerships, utilize cultural resources to disseminate risk information, prepare the workforce for year-round hazards, and bring innovative technology such as artificial intelligence, social media, and drones into preparedness plans.



**Asia-Pacific
Economic Cooperation**

TAKEAWAYS FOR APEC ECONOMIES

TAKEAWAYS FOR APEC ECONOMIES

The Advancing Disaster Resilience for All in Asia-Pacific Project highlights APEC's efforts to strengthen crisis management in an increasingly complex disaster landscape. APEC economies seeking to build more resilient communities may benefit from this collection of case studies and the experiences, best practices, challenges, and outcomes included in this report. The United States, as project overseer, in collaboration with contributing APEC economies: Australia, Canada, Chile, Indonesia, Japan, Chinese Taipei, and Viet Nam present the following takeaways:

The Growing Disaster Landscape in the APEC Region

- APEC economies are facing more frequent and severe disasters. **These conditions are testing crisis management organizations and the emergency management workforce.** APEC is a premier platform to strengthen disaster resilience for all in the APEC region.
- **Understanding disaster risk across all sectors of society and at all levels of the decision-making apparatus of each APEC economy is fundamental** to reaching regional and global disaster risk reduction goals.
- **Investments in disaster risk reduction and emergency preparedness are often more cost-effective** than response and recovery efforts following catastrophic disasters.
- **Disaster risk reduction efforts** and initiatives geared toward greater mitigation and adaptation **can save lives and lessen infrastructure impacts.**

Increasing Equity and Inclusion in the APEC Region

- **Whole—of—community (whole—of—society) contributions are necessary** in the development of better risk information tools that contribute to societal resilience (Viet Nam, Canada, Australia, Chinese Taipei).
- **Locally driven actions have longer-term impacts and help build community trust** in crisis management institutions and processes (Viet Nam, Australia).
- **Leveraging real-time big and open disaster risk data** that considers changing socioeconomic conditions can contribute to disaster readiness across APEC (Canada, Australia, Chinese Taipei).
- **At the core of whole-of-community engagement in DRR is the inclusion of rural and indigenous people, women, elderly groups, people with access and functional needs, youth, children, and other groups disproportionately impacted by disasters** in emergency management decision-making. Identifying unique ways in which to encourage these groups to engage in DRR is a growing priority for APEC economies (Australia, United States, Chinese Taipei).
- **Limitations in data access and the availability of data sets for vulnerable communities are persistent challenges** that limit the inclusion of diverse perspectives and sources into quantifiable analyses (Canada, United States).



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FUTURE ACTIONS

APEC economies should consider a renewed approach to disaster resilience that prioritizes whole-of-community engagement in the development and implementation of resilience and disaster risk reduction activities. Actions that increase understanding of changing risks, promote cross-discipline training, and build the climate literacy of the emergency management workforce will help economies confront emerging risks. It is critical to leverage the knowledge and expertise of communities and identify both within their own economies and from partners throughout the region, how to maximize collective efforts, ideas, and perspectives.

APEC economies should support the gathering of disaggregated data and share methodological approaches in such a way that enables other APEC economies, academia, the private sector, and other whole—of—community (whole—of—society) partners to conduct exercises and research. Such research and data-sharing efforts could include not only an emphasis on closing gaps in data access and availability to better understand the needs of vulnerable communities, but also tools and training to incorporate data from new technology such as artificial intelligence, social media, and advanced weather instruments.

There is an opportunity for working groups across APEC to promote innovation in disaster risk management to help crisis management organizations navigate climate impacts in a coordinated and collaborative way. APEC should endorse or require projects that leverage community buy-in and use culturally relevant, bottom-up approaches. This will increase participation and implementation of crucial preparedness measures at the household and local level.

Similarly, APEC should endorse a whole—of—community (whole—of—society) approach as a fundamental principle incorporated throughout the disaster management cycle. This principle can be applied through the EPWG Key Tenets and then put forward as an expectation for projects and project proposals. Preparedness exercises that include whole-of-community stakeholders can help anticipate and overcome these barriers to ensure that all actors, from the community to the regional level, are prepared for emerging risks.

APEC should seek investments in:

Collaborative governance that can help bridge gaps in readiness for emerging threats like extreme heat. Involving diverse stakeholders in the development of policies, programs, and initiatives to lessen disaster shocks can result in greater community resilience. By intentionally creating and maintaining platforms for the inclusion and participation of stakeholders, APEC can move the needle in disaster management for its economies.

Comprehensive governance frameworks, data-driven risk reduction plans, local community inclusion, and locally-driven action help increase APEC's readiness for new and emerging disaster risks.

APEC should prioritize projects that:

Feature coordination, collaboration, and communication between public and private sector entities, and other actors such as civil society, academic institutions, non-profit organizations, and similar. This type of arrangement can accelerate innovation in disaster management, reduce disaster shocks, and help establish long-term collaboration for more resilient APEC economies.

Contribute to the development of flexible, scalable, and adaptable organizations because they are best positioned to meet the demands generated by complex emergencies.

APEC might also consider:

Collaborating with partners beyond the APEC region to strengthen preparedness, response, and recovery capabilities. Wide-scale new disaster threats are not limited to APEC economies and best practices are widely available outside the region. Collaboration with neighboring economies or economies that face the same risks can add new scales of economy and offer innovations not yet applied in the APEC regions.

APEC economies demonstrate that the region is engaging society at every level to promote resilience. Collaboration at all levels of the decision-making apparatus in each APEC economy is essential. Using data from each of these levels and from a broad, inclusive set of stakeholders will allow economies to learn from previous disasters and prepare for future ones in a manner that acknowledges the disproportionate impact of climate change on historically underserved communities.

Finally, ensuring that local communities are active participants in planning will allow them to mitigate and respond to disasters to create a resilient and sustainable future for all.