
National Consultations, Review and Reporting
Voluntary National Report – United States of America

I. HIGHLIGHTS AND INTRODUCTION

The United States has worked to better understand and reduce hazards for much of its history. The first legislative act of federal disaster relief in the United States occurred in 1803 (see FEMA history). Agencies like the National Weather Service (NWS) and the U.S. Geological Survey (USGS) seek to characterize meteorological, geophysical, hydrological, and ecosystem health hazards. The U.S. Environmental Protection Agency (EPA) and the National Institute for Standards and Technology (NIST) examine health and technological hazards. Federal entities like these, as well as the tireless work of state, tribal, territorial, and local governments, communities, academia, the private sector, and non-governmental organizations, have helped the nation become more resilient to hazards over time. For example, the United States has a robust early warning system for meteorological hazards and a burgeoning system for earthquake early warning. Ever-improving building codes, and the enforcement of those codes, ensure that infrastructure, homes, and businesses can withstand nature’s extremes. Health surveillance and environmental monitoring systems help protect the health of the U.S. population and its precious natural resources.

In its efforts to implement the Sendai Framework since 2015, the United States built upon its past disaster reduction work. The United States made important advancements in interdisciplinary vulnerability risk and resilience research, hazard assessment, forecasting, and public messaging about evacuation.

Making these advancements has not been straightforward due to the highly decentralized nature of governance in the United States. The United States consists of 50 states, five territories, and 574 federally recognized Tribal Nations, many of which have sovereign lands. States, Tribal Nations, and Territories are made up of numerous counties, townships, or county-equivalent designations. In large part, disaster mitigation, preparedness, and response take place at these sub-national levels. Further, a large portion of responsibility for disaster preparedness, mitigation, and recovery falls on the individual. Due to the dispersed and individualistic nature of disaster response, mitigation, and recovery activities in the United States, quantifying the implementation of the principles of the Sendai Framework has been challenging at a federal level, as has the collection of complete disaster loss information.

In coming years, the United States will continue to encourage state, local, tribal, and territorial governments (SLTT) to mitigate hazards and prepare for disasters. Addressing climate change and reducing hazard risks are key areas of focus for the United States. Large-scale investments in mitigating the climate crisis and impacts of other hazards are central to the Biden Administration’s agenda. These investments have never been so important, as the United States—and the world—continues to face disasters of increasing frequency and severity, compounded by the continuing COVID-19 pandemic. The U.S. government (USG) is committed to working with its domestic and international partners to reduce...
disaster impacts and support resilience and adaptation to the effects of climate change. The United States will also aim to better understand and account for less tangible disaster losses, including short- and long-term impacts to green and blue infrastructure, mental and physical health, cultural and indigenous lifeways, as well as ripple effects on local, regional, and national economies.

**Green Infrastructure** refers to any vegetative infrastructure system which enhances the natural environment through direct or indirect means. Blue infrastructure refers to water elements, like rivers, canals, ponds, wetlands, floodplains, and water treatment facilities. Such natural and nature-based infrastructure is often discussed in relation to “Nature-Based Solutions” (NBS), which are generally defined as actions (e.g., planning, design, management, restoration, engineering) that take into account natural features or processes to promote resilience. NBS approaches include a suite of ancillary environmental, societal, and economic co-benefits which may come at a lower cost in comparison to approaches using hardened or “gray” infrastructure alone. NBS has a demonstrable record of reducing losses resulting from natural disasters, including but not limited to flooding, drought, fire, and landslides. Including NBS as a part of the “critical infrastructure” toolkit paves the way for a more comprehensive resilience approach to disaster risk reduction. A critical step to ensuring positive investment outcomes for NBS includes establishing consistent and up-to-date monitoring and valuation of these resources.

The United States also supports international collaboration on disaster risk reduction through scientific and technical cooperation, including by promoting the open and free exchange of data related to natural hazards and disasters; strengthening multi-hazard early-warning systems; supporting diversified, resilient livelihood strategies; and enhancing capacity-building to develop risk assessments and manage disaster response. We also support and appreciate the integration of climate change adaptation and disaster risk reduction efforts.

Incorporating disaster risk reduction into humanitarian assistance strengthens the ability of people to cope during future crises and incorporating it into development programs protects economic and development gains against potential shocks. It also helps build the capacity of governments at all levels and strengthens community and household resilience to manage risks and recover faster in the face of recurring disasters.

Global collaboration is at the heart of achieving success. We can save lives, alleviate suffering, and lessen the economic and social impact of disasters if governments partner broadly with communities; civil society; non-governmental organizations (NGOs); educational, scientific and technical institutions; local and regional governments; the private sector; and other stakeholder groups.

II. **MTR SF METHODOLOGY AND PROCESS**

The Science for Disaster Reduction (SDR) Interagency Working Group of the White House National Science and Technology Council’s (NSTC) Subcommittee for Resilience Science and Technology (SRST) is the U.S.’s focal point for the United Nations Office of Disaster Risk Reduction (UNDRR). Thus, the SDR undertook responding to the UNDRR’s request for a Mid-Term Review (MTR) of the implementation of the Sendai Framework.

The SDR collected information pertinent to the MTR using four main approaches. First, in 2021 the SDR worked with a group of subject matter experts (SMEs) across the U.S. government to identify gaps, challenges, and opportunities for disaster loss reporting in the United States. *Progress in Disaster Science* published the findings of this report as a peer-reviewed journal article. Portions of this paper have been excised to inform this MTR report. Second, the SDR disseminated a call for information (CFI) to better
understand how the principles of equity have been incorporated into federal disaster risk reduction (DRR) activities. This CFI has provided excellent examples of such efforts, as well as elucidated challenges to achieving more equitable outcomes in U.S. DRR activities. Third, the SDR conducted a listening session with 41 federal SMEs in DRR to consider advances in DRR activities, emergent issues, and opportunities and challenges to addressing emergent concerns. This listening session was followed by the distribution of a brief voluntary survey covering numerous topics related to the aims of the MTR. Fourth, the SDR held a listening session with 77 representatives from the private sector, non-governmental organizations, local government, Tribal emergency management, as well as the federal government to address questions about DRR activities, partnerships, and emergent issues. This listening session was run through the University of Colorado, Boulder’s Natural Hazards Center Annual Workshop. In addition to the stakeholder groups listed above, a number of youth attended this event, participated in the listening session, and provided feedback.

III. RETROSPECTIVE REVIEW

A. Progress towards the Outcome and Goal

Measuring progress toward the Outcome and Goal of the Sendai Framework requires the collection and analysis of disaster loss information related to mortality, livelihood, economic loss, and damage and destruction of critical infrastructure due to disasters. Such disaster loss data informs the work of disaster professionals across the country. For example, the American Red Cross uses data from the National Oceanic and Atmospheric Administration (NOAA), which documents the increasing cost and frequency of large-scale weather and climate disasters, to focus their efforts on climate-vulnerable communities in order to better prepare them for more extreme weather events. Local governments use disaster loss information to educate community members of their risks, as well as prepare for impacts to local government budgets due to loss of tax revenue from coastal properties that may be underwater in the future. The insurance industry uses historic disaster data every day to price property insurance policies. Researchers bring together data from disparate sources to understand the costs associated with disasters. Disaster loss information is also crucial to community members when advocating for policy changes.

Since 2015, the United States has implemented multiple sector-wide measures to prevent hazard exposure and vulnerability. Select examples include:

- The RISE After Disaster Act of 2015 expands the Small Business Administration’s disaster-specific programs to improve disaster recovery and growth of small businesses following disasters.
- From 2015 through 2017, the U.S. Virgin Islands (USVI) Department of Health received funding from the Centers for Disease Control and Prevention (CDC) to build a public health laboratory. The laboratory allowed USVI to locally test and sequence samples of infectious diseases. Previously, USVI sent samples to the mainland for testing and results often took months. The laboratory proved to be critical infrastructure during a Zika virus epidemic in 2016, and particularly during COVID-19. All U.S. states and territories now have a public health laboratory.
- In 2018, the U.S. government built on previous efforts to create the Cybersecurity and Infrastructure Security Agency (CISA) within the U.S. Department of Homeland Security to reduce risks to critical cyber and physical infrastructure in the United States.
• In 2018, the U.S. Department of Education (ED) created Disaster Recovery Unit to provide emergency aid for unhoused and displaced students and immediate aid for restarting school operations in the aftermath of presidentially-declared disasters.

• From 2020 to 2022, NOAA invested substantial funding in the development and operationalization of two new supercomputers. The enhanced computing and storage capacity will allow NOAA to deploy higher-resolution models to better capture small-scale features like severe thunderstorms. More realistic physics models to better capture the formation of clouds and precipitation, and a larger number of individual model simulations to better quantify model certainty.

• The 2022 Homeland Security for Children Act specifically directs FEMA to integrate the needs of children in strategies, policies, and plans for emergency preparation, protection, response, recovery, and mitigation.

• The 2019 Natural Hazards Mitigation Saves report, represents the most exhaustive cost-benefit analysis of different natural hazard mitigation measures. The report shows an average savings of $6 for every $1 invested through grants for hazard mitigation measures, such as adopting and enforcing building codes where an average of $13 is saved.

In 2018, FEMA updated the Threat and Hazard Identification and Risk Assessment (THIRA) and Stakeholder Preparedness Review (SPR) to better fit the changing needs for threat and risk identification. The new methodology asks communities to identify their threat/hazard that poses the greatest risk to their community and then identify what they will need to meet those risks. The annual measure in SPR reports on progress made or lost as communities approach those gaps. Communities utilize a standardized set of targets that increases the validity and relevance of data analytics based on the THIRA/SPR. Increasing data accuracy is critical to a better understanding of preparedness and in assessing disaster risks across the SLTT communities. The THIRA/SPR is continually maturing and evolving to meet the risk picture and the needs of the communities as they work towards their goals.

Through preparedness grant programs such as the Emergency Management Performance Grant (EMPG) Program and the Regional Catastrophic Preparedness Grant Program (RCPGP), FEMA has advanced preparedness activities to proactively address the potential effects of disaster risk by focusing on underserved communities and climate resilience. Additionally, FEMA is improving how it captures, compiles, and analyzes EMPG Program outcomes to identify regional and nation-wide areas that require additional resources and priority to address the effects of all-hazards and disaster risk.

Equity Actions: Focus on Underserved People and Community

• FEMA is working to instill equity as a foundation of emergency management through the implementation of the 2022-2026 FEMA Strategic Plan.

• Due to the changing climate, FEMA is identifying new disaster risks and how those risks impact historically marginalized and underserved people. To mitigate these impacts, FEMA continues to build equity into its programs and services and increase understanding of ways in disasters disproportionately impact low-income people and people of color.

• To understand how risks impact recovery, FEMA has initiated a process to collect demographic information from people who register for FEMA assistance. This information, which has not previously been within FEMA’s authority to collect, will soon give FEMA Recovery the ability to
track the equitable delivery of its programs and services and how different disaster risks based on demographics might affect Recovery.

- FEMA is proactively taking steps to address known disparities borne out of different types of disaster risk and vulnerabilities.
  - To support survivors that are more vulnerable to disaster risks, FEMA has proposed regulatory updates that reduce administrative burdens, increase available assistance, and expand program eligibility.
  - FEMA is committed to reducing administrative barriers for survivors through the implementation of Executive Order 14058, “Transforming Federal Customer Experience and Service Delivery to Rebuild Trust in Government” by focusing on the customer experience and developing strategies for streamlining the processes for the Individual Assistance (IA) and Public Assistance (PA) programs.
  - Similarly, FEMA is reducing administrative barriers and streamlining disaster assistance by working with the U.S. Small Business Administration (SBA) and the U.S. Department of Housing and Urban Development (HUD) to jointly address data/information sharing barriers. With their support FEMA can develop a unified disaster survivor application for assistance and share data on disparate outcomes for vulnerable populations.
  - Finally, FEMA transformed its assistance to tribal governments in 2017 and the implementation of FEMA’s Tribal Declaration Pilot Guidance gave tribal governments the ability to request their own disaster declarations directly from the President rather than through a state or territory. FEMA continues to work diligently to address the disaster risks experienced by tribes, by integrating new program flexibilities for tribes, developing specific guidance and additional technical assistance for tribes, consulting directly with tribes, and building a community of practice to better support the needs of tribes.

- FEMA Recovery addressed some of the disproportionate disaster risks for lower-income survivors by making a series of equity-related policy updates. FEMA implemented the following actions for all future disasters for which Individual Assistance is offered to disaster survivors:
  - Providing financial assistance to applicants with disaster damage that did not cause their home to be unlivable to clean and sanitize their home to help prevent additional losses and protect the health and safety of the household.
  - Performing inspections for applicants that are pending verification for identity, occupancy, and/or ownership, and providing additional support to verify these requirements at the time of inspection and through additional outreach.
  - Providing financial assistance to applicants for the cost of real property needs (limited to wheelchair ramp, grab bars, and a paved path) due to a disaster-caused disability, when these items were not present in the home before the disaster.
  - Providing financial assistance to repair real property components impacted by disaster-caused mold growth.
  - Expanding the types and acceptable dates of documentation that disaster survivors can provide to verify home ownership and occupancy.
Implementation of the Federal Flood Risk Management Standard

FEMA is implementing the Federal Flood Risk Management Standard (FFRMS), established to encourage federal agencies to consider and manage current and future flood risks in order to build a more resilient nation. It requires agencies to prepare for and protect federally funded buildings and projects from flood risks.

- The Hazard Mitigation Grant Program partially implemented the standard in August 2021.
- The Public Assistance (PA) program partially implemented the standard in July 2022.
- The Individual Assistance (IA) program is in the process of implementing the standard.

FEMA Regional Office Plans

The FEMA Regional Offices have several initiatives underway to incorporate equity into their planning efforts. Most regions are conducting reviews of their All-Hazard Plans (AHPs) and incident specific annexes to identify specific areas for equity considerations. For example:

- Going beyond traditional planning assumptions such as identifying the populations with food insecurities during agricultural events;
- Developing analytical tools that explore disaster impact with consideration of equity concerns using the CDC Social Vulnerability Index (SVI) and impacts to a community’s climate change resilience; and,
- Highlighting any locations that are underserved or underrecognized by SLTT governments as well as any damage or potential impact from the ongoing climate change into their deliberate plans.

FEMA also encourages SLTT partners to highlight underserved or underrecognized communities in their plans.

Additionally, several regions have begun hiring Emergency Management Specialist Response Planner (Climate & Equity) positions to ensure dedicated efforts are applied to achieving this strategic goal.

Lastly, the voluntary activity of reporting annual disaster losses to the Sendai Monitor has increased awareness and collaboration across the federal government to collect and synthesize robust, representative disaster loss information for the nation. As a result of the SDR requests, some federal agencies initiated new or expanded existing disaster loss information collection activities.

B. Progress in Risk Assessment, Information and Understanding

Since 2015, the U.S. continues to improve the understanding of, forecasting for, and communication about numerous natural hazards. The U.S. National Hurricane Center has significantly decreased its hurricane track forecast errors and now has a lower average track error rate and higher consistency than any individual model overall. The USGS has conducted numerous post-fire debris flow hazard assessments, updated the U.S. National Seismic Hazard Model, and initiated development of the next generation of hazard assessments for the Nation’s highest-threat volcanoes.

The United States also made significant strides in better assessing and understanding its overall risk and exposure to hazards. The FEMA National Risk Index is a new online mapping tool that provides an overview of multiple hazard factors to provide a relative risk measurement for each United States
county and census tract. This index is developed using expected annual loss, as well as measures of social vulnerability and community resilience. This tool provides a holistic view of community risk to natural hazards.

Since the 1970s, flood insurance rates have been predominantly based on relatively static measurements, emphasizing a property’s elevation within a zone on a Flood Insurance Rate Map (FIRM). Risk Rating 2.0 incorporates many more flooding variables. Risk Rating 2.0 is not just a minor improvement, but a transformational initiative that enables FEMA to set rates that are fairer and ensures rate increases and decreases are equitable. FEMA is building on years of investment in flood hazard information by incorporating private sector data sets, catastrophe models and evolving actuarial science. With Risk Rating 2.0, FEMA now has the capability and tools to address rating disparities by incorporating more flood risk variables such as flood frequency, multiple flood types (e.g., river overflow, storm surge, coastal erosion, heavy rainfall), distance to a water source, and property characteristics such as elevation and the cost to rebuild. Previously, policyholders with lower-valued homes paid more than their share of the risk while policyholders with higher-valued homes paid less than their share of the risk. Because Risk Rating 2.0 considers rebuilding costs, FEMA can equitably distribute premiums across all policyholders based on home value and a property’s unique flood risk.

![National Risk Index](image)

Figure 1: The National Risk Index’s equation for calculating risk
FEMA regularly uses information about social vulnerability to inform operational decisions like identifying geographic areas that might need additional assistance registering for Individual Assistance. In these cases, FEMA may use this information to locate a Disaster Recovery Center (DRC) in a low-income area that does not have easy access to public transportation. Additionally, FEMA may use this information to provide targeted Disaster Survivor Assistance (DSA) support. DSA is a program that sends teams of FEMA staff door-to-door to inform individual survivors about registering for FEMA assistance. Climate change and equity are driving new conversations about vulnerability and risk and informing policy and procedural changes within FEMA to better prepare for the future of emergency management.

The U.S. Department of the Interior (DOI) oversees or administers well over 10% of the nation’s lands. Consequently, it has invested in developing a Strategic Hazard Identification and Risk Assessment (SHIRA) project to better understand its short and long-term exposure to geophysical, meteorological, technological, ecosystem and human health hazards. The SHIRA project allows DOI to quickly assess hazard exposure at a national, regional, and unit-level and enables prioritized decision-making based on this information.

Cross-disciplinary hazards research has also continued to expand in the United States. This work examines cascading and compound hazards as well as the interaction of hazards with underlying socioeconomic, geographic, or health issues in the communities they impact. For example, the SDR has a working group focused on the interplay of community health and exposure to wildfire hazards. This work is made possible by federal agencies working together across disciplines to share geospatial data. With this improved data sharing capacity, it is possible to link hazard exposure data with community variables such as those related to health and income.

The United States has improved lifesaving communication about evacuations in response to deadly storm surges and successfully reduced the number of direct deaths from hurricanes. Now, the National Hurricane Center is increasing post-storm messaging to reduce impacts from indirect risks, such as carbon monoxide poisoning from the improper use of generators. Further, U.S. agencies have explored new ways of communicating hazards information, such as publishing hazard information in languages other than English and leveraging social media to reach and develop trust with local communities experiencing a disaster. For example, during the 2018 eruption of Kilauea volcano, local, national, and international audiences alike turned to the USGS Volcano Science Center’s social media accounts to see eruption imagery, learn about eruptive events, and ask questions to be answered directly by the volcanology experts managing the accounts. Additional innovations, such as integrating flood hazard information into real-estate search engines, makes hazard information immediate and relevant to the American public, and helps them make informed choices about their hazard risk.

Since 2015, the United States placed increased emphasis on equity and the incorporation of traditional ecological knowledge into federal research and initiatives related to disaster risk reduction. These efforts have been reinforced and invigorated by the Biden Administration’s Executive Order On Advancing Racial Equity and Support for Underserved Communities Through the U.S. government (EO 13985) and executive memorandum: White Commits to Elevating indigenous Knowledge in Federal Policy Decisions that “commits to elevating Indigenous Traditional Ecological Knowledge (ITEK) in federal scientific and policy processes.” Efforts to address the needs of underserved communities include: a) research initiatives to better understand the unique challenges faced by individuals in these communities in the face of a disaster or hazard event; b) conducting vulnerability assessments to better understand
where and what resources should be concentrated for DRR; c) providing locally vetted guidance on protective actions shared in local languages through media accessible to target communities; and d) developing guidelines and trainings for staff working in the DRR space, as well as conducting internal assessments of whether the agency is meeting its own equity goals. The U.S. government places a great deal of emphasis on conducting participatory, or co-developed DRR-related research with underserved or indigenous communities to meet some of these goals.

C. Progress in Risk Governance and Management

Since 2015, Congress has passed multiple pieces of legislation with the goal of reducing risks from disasters in the United States, including:

- **H.R.3684 - 117th Congress (2021-2022): Infrastructure Investment and Jobs Act**

D. Progress in Investment in Risk Reduction and Resilience

The United States seeks to move away from reactive disaster spending towards proactive, data-driven investments in community resilience. One example of such an investment is the FEMA Building Resilient Infrastructure and Communities (BRIC) program. This program provides grants to SLTT communities to develop innovative resilience projects to reduce their risks from disasters. BRIC includes initiatives that prioritizes assistance to communities most in need, advancing greater equity in disaster risk reduction. In the United States, commercial and residential real estate shoppers are also demonstrating an increased interest and investment in disaster-resistant structures. Through BRIC, FEMA
directs resources to help eliminate disparities in disaster outcomes. For instance, FEMA prioritizes and selects projects from tribes, Economically Disadvantaged Rural Communities (EDRCs) and other disadvantaged communities. By implementing a phased approach, this selection strategy allows FEMA to expedite award and implementation of mitigation solutions to communities who need it most.

In shifting the federal focus from reactive disaster mitigation spending towards a proactive investment is also a priority for BRIC, which directs efforts towards system-wide community mitigation so communities can better withstand the impacts of the next hurricane, flood, or wildfire.

Communities across the United States use BRIC projects to enhance their understanding of future conditions, plan project outcomes, and implement nature-based or green infrastructure mitigation strategies. In short, BRIC projects incentivize risk reduction while building greater climate resilience. FEMA investment in the BRIC program goes beyond funding. Through non-financial Direct Technical Assistance, FEMA provides direct support to assist communities to increase their capacity for natural hazard resilience.

Congress enacted the Infrastructure Investment and Jobs Act of 2021 (Public Law No. 117-58) as a $550 billion investment to protect federal infrastructure (e.g., highways, rail lines, ports, and the electric grids). The act provides funding from 2022-27 to protect federal infrastructure from natural disasters by making them more resilient to potential damage, mitigating the risk of recurring damage, and alleviating the cost of future repairs. The act also created a “Disaster Relief Mobilization Study” to better understand whether bicycles should or could be used by first responders in areas with low levels of vehicle ownership and insufficient transportation routes. The legislation requires the Department of Transportation (DOT) to create a national Center of Excellence and multiple regional Centers of Excellence for Resilience and Adaptation. These Centers of Excellence are meant to increase resiliency of surface transportation infrastructure to natural hazards. A new Community Wildfire Grant Program will fund at-risk communities, including tribal communities, to develop and implement wildfire protection plans and activities. Funding from DOI will provide equipment for early wildfire detection and real-time monitoring. The act contains many more provisions, including funding for watershed and flood protection operations and coastal storm risk management.

E. Progress in Disaster Preparedness, Response and ‘Build Back Better’

With the Biden Administration’s Build Back Better framework, President Biden points to a recovery from the COVID-19 pandemic wherein Americans are more secure, healthier, better educated, in better economic standing, and treated equitably. This framework also outlines an aggressive approach to combating climate change including the development of clean energy, investment in green and blue infrastructure, and creation of jobs.

FEMA also aims to ensure that communities “build back better” following disaster events. Through Public Assistance funding, FEMA helps communities become more resilient by restoring damaged buildings to meet current building codes, improving structures to protect against future damage, and relocating structures outside of high-hazard areas.
F. Collaboration, Partnership and Cooperation

The United States has numerous coordination mechanisms and partnerships focused on disaster risk reduction including the Science for Disaster Reduction (SDR) Interagency Working Group, which provides disaster-specific interagency coordination. The National Earthquake Hazards Reduction Program is a federally established partnership of four key agencies (the National Science Foundation (NSF), FEMA, NIST, and USGS) that work together to “improve the Nation’s understanding of earthquake hazards and to mitigate their effects.” Similarly, Congress established the National Windstorm Impact Reduction Program, an interagency partnership of NIST, FEMA, NOAA, and NSF, to reduce loss of life and property from windstorms. Coordination groups such as the National Tsunami Hazard Mitigation Program bring federal agencies together with SLTT partners to better protect communities from loss of life and economic losses due to tsunamis. Additional legislation such as the Safeguarding Tomorrow through Ongoing Risk Mitigation (STORM) Act, a part of the Infrastructure Investment and Jobs Act of 2021, authorizes FEMA to make grants to eligible states to establish rotating loan programs to provide loans for hazard mitigation activities.

As part of the development process for the National Risk and Capability Assessment (NRCA), FEMA organized working groups composed of interagency SMEs, including Emergency Support Function and Recovery Support Function leads, to identify the catastrophic threats and hazards of greatest concern, establish national capability targets based on the potential impacts of those threats and hazards, and estimate current federal capabilities and gaps against those national targets. FEMA will use this information to identify risk reduction strategies to close national gaps and better prepare the nation for catastrophic incidents. In addition, collaboration with these partners not only facilitated the development of the NRCA, but also increased awareness amongst the participants of the plethora of priorities and capabilities that each of the interagency partners possesses.

A number of private companies have partnered with public organizations or developed their own charitable branches to reduce disaster risk in communities. For example, Airbnb has partnered with FEMA and local communities to provide free and discounted housing for those affected by natural disasters. Google’s Crisis Response Team disseminates NWS and USGS hazard alerts for floods, wildfires, and earthquakes to users in potentially impacted areas.

The National Fire Protection Association (NFPA) is a global non-profit organization that partners with the USDA Forest Service, DOI, and the National Association of State Foresters (NASF) on the Firewise initiative that provides a “collaborative framework to help neighbors in a geographic area get organized, find direction, and take action to increase the ignition resistance of their homes and community and to reduce wildfire risks at the local level.”

Groups like the Insurance Institute for Business and Home Safety (IBHS) work to provide research and recommendations on how to construct homes to be more resilient to disasters. Their six-story tall wind tunnel is a controlled environment that IBHS uses to research the effects of windstorms, hailstorms, and wildfires on two-story buildings. Some of these recommendations have informed standards created by the International Code Council and state-specific building codes.

Local civic organizations such as Rotary and Kiwanis Clubs, as well as Neighborhood Response Teams like as those found in San Francisco, are also crucial to disaster preparedness and response activities in each community. These groups can offer important trainings, educational materials, and preparedness materials to the communities they serve. Non-profit organizations like the American Red Cross also help to forge hyperlocal partnerships with community-based organizations to best meet the needs of specific communities.
International Collaboration and Cooperation

The U.S. Agency for International Development (USAID) has been working for decades with countries and communities on early warning and early action to save lives and livelihoods and protect assets. A good example of this effort is the Flash Flood Guidance System implemented by the World Meteorological Organization (WMO) enabling the National Meteorological and Hydrological Service to monitor and issue warnings of flash floods in over 60 countries reaching about 3 billion people.

USAID and the U.S. National Oceanic and Atmospheric Administration (NOAA) are also partnering with countries to improve early warnings of climate and weather hazards through the Weather Ready Nations Initiative. This program is increasing observations and prediction of climate, weather and water related hazards, developing multi-hazard early warning systems, and advancing local capacity that will help participating countries anticipate extreme weather and climate impacts to save lives and property and enhance livelihoods.

The U.S. Geological Survey (USGS) works in collaboration with USAID to operate the Volcano Disaster Assistance Program and the Earthquake and Landslide Disaster Assistance Teams, which make use of USGS scientific and technical expertise to support USAID’s volcano, earthquake, and landslide disaster response and capacity-building activities abroad. USGS and National Aeronautics and Space Administration (NASA) imagery from the Landsat satellite and other remote sensing data contributes to drought monitoring for the USAID Famine Early Warning Systems Network (FEWS NET).

USAID currently co-chairs the Coalition for Disaster Resilient Infrastructure (CDRI) Governing Council together with India. U.S. involvement in CDRI directly supports President Biden’s Partnership for Global Infrastructure and Investment, a global initiative to help fill an infrastructure financing gap. The U.S. will build on ongoing collaborations with CDRI’s 36 members on smart solutions that address the vulnerability of people and the infrastructure they rely on.

USAID is dedicated to increasing collaboration and partnerships with the private sector, as they are a key stakeholder in the resilience of any country, and are testing innovative approaches to fostering long-term, sustainable collaborations between the private sector and humanitarian actors.

U.S. Peace Corps volunteers are also working to support disaster preparedness, climate-smart agriculture and help local communities around the world to strengthen climate DRR and change adaptation.

Finally, the United States participates in many multilateral fora aimed at enhancing resilience and disaster response. Among these is the UN Economic and Social Commission for Asia and the Pacific (ESCAP) Committee on Information and Communications Technology (ICT) & Science, Technology and Innovation and their work on ICT Disaster Risk Reduction (ICTDRR). ESCAP’s ICT Committee oversees the Asia-Pacific Information Superhighway (AP-IS) initiative. In January 2022, the United States joined Armenia as co-chair of the AP-IS Working Group on Digital Connectivity, which in part seeks to support member states’ efforts to increase digital infrastructure resilience in the event of disaster. USAID Regional Mission for Development for Asia, which has increased engagement with ESCAP, has a strong regional presence focused on humanitarian assistance and disaster risk reduction, including through the CDRI. In September 2022, USAID organized the seminar "How to Build Resilient ICT Ecosystems in the Indo-Pacific," which focused on the importance of increasing connectivity for all and building a multi-stakeholder model that is resilient and secure.
IV. CONTEXTUAL SHIFTS, NEW AND EMERGING ISSUES AND CHALLENGES

The COVID-19 pandemic and the increased frequency and severity of disasters due to climate change have posed unique challenges to the disaster workforce. As the COVID-19 pandemic has shown the world, hazardous events can and will continue to occur concurrently. Understanding how to intervene with available resources and technology may be the difference between a hazard event and a disaster. The compounded and cascading nature of many hazards demands creativity and adaptation in an already stressful and often dangerous environment. The U.S. government must critically consider the short- and long-term mental health impacts to stressed, burnt-out responders and survivors are critical to consider. Focusing on the mental health of disaster responders and survivors may help the United States better recover from and respond to disaster events in the future.

Climate change also exacerbates other issues including social disruption, conflict, and physical displacement, requiring different approaches to preparation. Preparation actions include effective communication with decisionmakers and the public about how to mitigate and prepare for climate-induced or exacerbated hazards. Climate related hazards also raise concerns about worsening housing, lack of food, and physical security within low- and middle-income communities. The increasing frequency, severity, and intensity of hazards events due to climate change also threatens aging infrastructure.

The continuing degradation and aging of critical infrastructure and the systemic risks associated with this issue will be exacerbated in the future:
- Shifting/expanding risk profile due to climate change (i.e., parts of the country that normally do not experience significant disasters will be more prone to windstorms, wildfires, flooding, etc.). Weather-related events will also become more frequent and impactful.

Continued risk from public health-related threats and hazards, including novel viruses and man-made biohazards that impact the entire nation as a whole. To address these continued risks, interventions such as the following can be made:
- Continuing to address and anticipate the impacts of climate change
- Reducing the disproportion of how underserved communities are more affected by and less resilient to disasters
- Ensuring equitable access to government resources

An opportunity also exists to coordinate across Nature Based Solutions (NBS) related projects for potential inclusion in the Sendai Monitor in the future. Currently, NBS projects are designed, and implemented at local scales owing to community-specific needs, challenges, and regulatory processes. These projects are funded through numerous federal, state, and local channels spanning the public and private sectors. As such, the task of inventorying and monitoring the myriad existing NBS projects is temporally and spatially disjointed. A first step to improving the utility of future reporting on such projects could begin with identifying opportunities for alignment across existing monitoring efforts and reporting structures. While accounting for NBS within the emergency management community is still a novel and underrepresented endeavor nationally, there is growing potential for incorporating this work into hazard mitigation planning, federal mitigation and resilience grants, and national assessments.
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U.S. baseline efforts for Sendai reporting should begin with tracking trends in natural infrastructure investments and losses related to natural disasters. For nation-wide data that can already span back to as early as 2015, we must turn to ongoing mapping efforts that span the continental U.S. While we are making vast improvements in the spatial and temporal resolution of land cover imagery, available products and tools vary widely across sectors (e.g., academia, government, private, etc.). Combining the occurrence of specific natural disasters (e.g. fire and coastal storms) with specific land cover types (e.g. forest and coral reefs) could offer unique insight into temporal trends in blue and green infrastructure damage and loss. Additional avenues for reporting metrics are being explored across federal agencies, but with an emphasis on how to improve our ability to report disaster-related losses moving forward.

Other emerging issues of concern include an increasing lack of public trust in the government and scientists, the rise of dis- and misinformation related to hazards and mitigation strategies, and the rise of anti-expert extremist groups.

V. PROSPECTIVE REVIEW AND RECOMMENDATIONS

A. Recommendations for realizing the Outcome and Goal of the Sendai Framework

In order to improve its understanding of disaster losses, national consultations with the DRR community suggested that the United States:

- Develop a means of reporting on less tangible losses like impacts to ecosystem services, long-term mental and physical health impacts, or supply chain ripple effects.
- Standardize disaster loss reporting across the nation. This could be achieved by developing a national database for disaster losses.
- Develop a funded mandate to support a dedicated office, agency, or group to act as the federal focal point for disaster loss data collection and analysis.
- Mandate standardized disaster loss data collected by federal agencies.
- Mandate standardized disaster loss reporting on loss or damages incurred by federal agencies.
- Incentivize disaster loss reporting from SLTT partners. Develop and implement user-friendly, standardized reporting systems that can be integrated at all levels of government.
- Develop methods for industries and government agencies to share disaster loss reporting in a way that would not expose important vulnerabilities.
• Communicate disaster loss information in a geographically specific way that helps local communities appreciate and address the losses pertinent to them.

While the collection of standardized and consistent disaster loss data is very important, the lessons these data can teach are equally important. Storytelling, backed by historical loss data, is key to helping individuals and communities understand the true impacts of disasters and the importance of taking action to prevent losses. Showing the human impact of the losses incurred is an important part of helping the general population learn and prepare for future hazards. Psychological and sociological research is needed to help people more effectively understand their exposure and vulnerability to current and future hazards in a way that will motivate them to take preparedness actions.

In order to mitigate disaster risks, there must be an “whole of community” approach that coordinates SLTT partner efforts with private agencies, non-governmental organizations, and voluntary agencies. At the federal level, agencies must continue to work closely with each other. Federal agencies must coordinate investments, data sharing, and resources and use their authorities to build community resilience and to stay connected.

Additional recommendations include:

• Federal investment in infrastructure and projects that mitigate emerging risks from climate change with a particular focus on supporting underserved populations that cannot afford insurance and cannot afford to improve their homes.

• The integration of standard metrics and performance measures, along with a consistent method of measuring and evaluating progress is critical to understanding success. The application of this approach would enable a greater independent and objective perspective of success and areas for future improvement. It would also enable greater understanding of the root cause analysis, and ability to pursue targeted measures to address systemic or emerging risks.

• Consistent, nation-wide risk analysis on past disasters, to include how well a community did or did not prepare/respond/recover and adjust how government agencies deliver resources to ensure that all communities have the same abilities and capabilities to prepare for and recover from disasters (resilience).

In addition, FEMA should continue to mature the existing assessments and allow for a focused and streamlined way of assessing risk. FEMA’s Threat and Hazard Identification and Risk Assessment (THIRA) and Stakeholder Preparedness Review (SPR) has evolved with the maturation of SLTT community assessment capabilities. Using standardized capability targets along with community specific targets creates a more robust picture of threat, hazard, and risk. Continued analysis of the utility of standardized targets across the whole community will ensure that FEMA is gathering the most complete, equitable picture possible of resilience. Instead of changing assessments as part of a large overhaul, FEMA should be continually maturing those that have gained ground with SLTT communities and build better resource materials to assist them with the process to include enhanced data collection and management systems.
Stakeholder recommendations for meeting the Sendai Framework goals include:

- Reduce barriers that limit the ability of communities and households affected by an incident to build back in a more resilient way (including forward-looking design or relocation to safer areas).
- Develop more support and capacity for the social dimensions of DRR beyond technical interventions.
- Continue to improve communication and collaboration between federal agencies engaged in DRR efforts and stakeholders.
- Shift from hazards-focused to risk-based approach when delivering science to support decision-making.
- Continue to support groups like SDR where all federal agencies engaged in DRR have a chance to hear from others and share data focused on risks.
- Continue to identify seams and gaps, identify where information sharing can be enhanced and where IT or other barriers may exist.
- Recognize AI and machine learning will play an important role in analysis of risk and develop further capabilities in this space.

B. Progress in Risk Governance and Management

The National Risk and Capability Assessment (NRCA) is a suite of connected risk and capability assessments that FEMA has developed to help better measure national preparedness and ready the Nation for the most catastrophic threats and hazards. Through the NRCA, FEMA is looking to identify:

- National requirements for capability through the National Capability Targets
- Community Capabilities that we gather data on through the SPR data that all states, territories, areas designated through the Urban Area Security Initiatives (UASI) grant program, and some tribes submit every year; and
- National and federal capabilities through the National Stakeholder Preparedness Review (National SPR), which FEMA is currently in the process of developing.

As part of the development process for the NRCA, FEMA’s National Preparedness Assessment Division (NPAD) coordinated closely with partners throughout the federal government, including those within the Emergency Support Function Leadership Group (ESFLG, Recovery Support Function Leadership Group (RSFLG, and the Mitigation Framework Leadership Group (MitFLG) to establish National Capability Targets, estimate national capability, and identify national gaps against those targets. The datapoints from the NRCA will serve as a baseline for future engagements with federal agencies to identify strategies for addressing those national gaps and better prepare the nation for catastrophic threats and hazards. All these datapoints were and will be fully reviewed by the Homeland Preparedness and Response Interagency Policy Committee (IPC) of the National Security Council (NSC) for concurrence.

FEMA’s all-hazards preparedness grant programs (EMPG and RCPGP) have adjusted priorities to focus on the emerging threat of climate change and ensure that underserved communities are not disproportionately affected in their ability to recover from disasters. Through these programs FEMA also encourages regional and cross-state collaboration, such as evacuation planning and mutual aid agreements.
Progress in Investment in Risk Reduction and Resilience

Threat and Hazard Identification and Risk Assessment and Stakeholder Preparedness Review

The Disaster Recovery Reform Act of 2018 (DRRA) requires FEMA to use the Threat and Hazard Identification and Risk Assessment (THIRA) and Stakeholder Preparedness Review (SPR) data from communities in combination with additional data resources, such as after-action reports, to draft and release the annual National Preparedness Reports (NPR). The NPR continues to evolve and improve as the data quality and data analytics evolves and improves.

FEMA also creates Preparedness Capability Assessments (PCAs) using the THIRA/SPR data. A PCA is a slide-based summary of a specific community’s capability to stabilize each of the seven Community Lifelines (Safety and Security; Health and Medical; Communications; Hazardous Materials; Food, Water, and Shelter; Energy (Power & Fuel); and Transportation) in the event of a specific incident. PCAs consolidate THIRA/SPR data and after-action report content to provide context for potential gaps. PCAs can be developed for steady-state planning purposes or can be quickly assembled to inform response officials in the event of an imminent incident. In addition to PCAs, FEMA creates ad-hoc analysis products that provide hazard-specific snapshots. These snapshots provide either a national or regional summary analysis of a threat or hazard, targets most challenged by the threat or hazard, and corresponding capability, gaps, and other information relevant to the data request.

Any stakeholder with access to the THIRA/SPR data can analyze and use the data to report Planning, Organizing, Equipping, Training, and Exercising (POETE) gaps. The analysis is a combination of THIRA/SPR quantitative data and qualitative free-text information describing the gaps. The analysis is suited for quick reference and includes a visualization of POETE gaps using a colored heat-map design with organized, summarized free-text findings.

Updating the NFIP’s Rating Methodology Under Risk Rating 2.0: Equity in Action

FEMA is building on years of investment in flood hazard information by incorporating private sector data sets, catastrophe models and evolving actuarial science. Risk Rating 2.0: Equity in Action (see section 3B) uses the following risk information to inform preparedness through flood insurance coverage:

- **Flood risk**: Rating 2.0: Equity in Action, uses the full range of flood risk across a suite of catastrophe models. The methodology leverages industry best practices and cutting-edge technology to enable FEMA to deliver rates that are actuarily sound, equitable, easier to understand and better reflect a property’s flood risk.

- **Multi-model approaches**: FEMA’s multi-model approach is like NOAA’s multi-model-approach to determine potential hurricane tracks and magnitudes.

- **Catastrophe models**: The National Flood Insurance Program (NFIP) licensed three sets of commercial catastrophe models: AIR Worldwide, KatRisk, and CoreLogic. In addition to the commercial flood models, FEMA developed two additional models based on government data and models. This includes using existing FEMA mapping data and NFIP policy and claims data along with other federal government data from USGS, NOAA, and the U.S. Army Corps of Engineers (USACE) including flood frequency, multiple flood types, distance to a water source and property characteristics like elevation and the cost to rebuild.
- **Expected claims**: It is important to note, insurance premiums are based on the expected claims during the one-year policy period and should reflect current risk. Future rates will be updated to reflect any changes in that risk. Actuarial rates do not pre-fund for changes in risk beyond the policy period.

- **Emerging threats**: Shifting the priorities of FEMA’s grant programs to reflect current and emerging threats (pandemic, climate change, etc.) and emphasizing regional and cross-state collaboration to act as a force multiplier in response and recovery activities.

**C. Collaboration, Partnership and Cooperation**

Within FEMA’s Recovery Directorate, the Recovery Support Function Leadership Group (RSFLG) strives to improve the effectiveness and unity of effort of coordinated federal recovery responsibilities, as well as to resolve operational, resource, and policy issues related to federal interagency recovery actions at a national level. The RSFLG, a federal interagency body designed to identify and facilitate solutions related to the National Disaster Recovery Framework, engages interagency leadership in an effort to exchange information and coordinate planning, exercises, and decision making.

Local and state politicians often have to make hard, and sometimes unpopular, choices to enhance their community’s long-term resilience. Such decisions include tightening and enforcing building codes, changing building zones for hazardous areas, or raising taxes to cover the costs of future mitigation or recovery projects. Creating more collaborative activities between SLTT governments may help to distribute the responsibility and costs of these hard decisions.

An increase in public-private partnerships is also very important to achieving Sendai Framework goals. These partnerships are vital for everything from developing more hazard-resistant materials to collecting high-quality hazard event loss data. Public-private partnerships can also serve to advance science and technology vital to the forecasting of, response to and recovery from hazard events.

The federal government needs an integrated interagency continuous improvement system that encourages the identification of challenges and sharing of observations from real-world events and major exercises. This culture of learning would embrace areas for improvement, as well as highlight strengths, innovations and potential best practices across the federal government and in coordination with SLTT governments. This information would both enhance future preparedness activities of all parties and provide learning and insight to guide disaster operations.

**International Collaboration and Partnerships**

Moving forward, the United States will continue to work in partnership with national and local governments, UN, NGOs, CSOs, PIOs, private sector, academia and others to advance the capacity of countries and communities to reduce the impact of disasters globally. USAID, through its Bureau for Humanitarian Assistance (BHA) provides the foundations for transformative change and self-reliance through our support of early recovery, risk reduction, and resilience (ER4) programs around the world. In 2022, USAID/BHA developed the *Strategic Framework for Early Recovery, Risk Reduction and Resilience*. ER4 efforts aim to improve the well-being of vulnerable people—from individuals to whole countries—by strengthening their capacities to manage risk; to anticipate, withstand, recover from, and
adapt to shocks and stresses; and to support positive, transformative change. USAID/BHA’s ER4 programs, particularly those with a risk reduction component are specially designed to align with the goal and priorities of the Sendai Framework.

At COP26, the United States launched the President’s Emergency Action Plan for Adaptation and Resilience (PREPARE) that aims to help more than half a billion people in developing countries to adapt to and manage the impact of climate change by 2030. PREPARE activates a whole-of-government effort that brings the force of 18 U.S. federal agencies to accelerate adaptation action and support in countries and communities vulnerable to the impacts of climate change. In 2022, the White house released its PREPARE Action Plan that outlines key areas where the United States will work with partners to catalyze adaptation actions. PREPARE contributes to reducing the impact of climate-related disasters and responds to the UN Secretary General’s call to ensure “Early Warning for All” by 2027 contributing directly to Sendai Target G: Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030.