A Report of the

NATIONAL ACADEMY OF PUBLIC ADMINISTRATION'S

CENTER FOR INTERGOVERNMENTAL PARTNERSHIPS

Disaster Resilience:

Addressing Modern Housing and Infrastructure Resiliency Challenges

NATIONAL ACADEMY OF PUBLIC ADMINISTRATION®

February 2024

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Sponsored by:

Hagerty Consulting

ACKNOWLEDGEMENT

Society cannot stop disasters, whether human-caused or natural, from occurring. These difficult events continue to happen with increased frequency and severity. The outdated funding and oversight mechanisms that are associated with them require new, flexible, and adaptive approaches to generate more economical, effective, efficient, equitable, and resilient outcomes for individuals and communities across the country.

The time is now to adapt our policies, procedures, and programs that govern disaster preparation, mitigation, and recovery for modern challenges. This paper presents a thorough discussion of current programs and recommendations that leaders at all levels can implement now to prepare their communities for events that will certainly occur. Following through on even one of the recommendations developed by this group will result in a more resilient, sustainable future for the United States in the face of predictable disasters and known intergovernmental challenges.

The Academy is grateful to Hagerty Consulting for supporting this work on housing and infrastructure disaster resiliency. They and the roundtable participants listed below contributed their valuable time and expertise to this insightful project.

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ACRONYMS

Academy	National Academy of Public Administration
BRIC	Building Resilient Infrastructure and Communities
Center	Center for Intergovernmental Partnerships
CRO	Chief Resilience Officer
DOC	Department of Commerce
DOE	Department of Energy
DOI	Department of the Interior
DOT	Department of Transportation
DTA	Direct Technical Assistance
EMAC	Emergency Management Assistance Compact
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GAO	Government Accountability Office
HMGP	Hazard Mitigation Grant Program
IIJA	Infrastructure Investment and Jobs Act
IRA	Inflation Reduction Act
LTT	Local, Tribal, and territorial governments
NCSL	National Conference of State Legislatures
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
RESTORE	Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act
SLTT	State, local, Tribal, and territorial governments
THIRA	Threat and Hazard Identification Risk Assessments

EXECUTIVE SUMMARY

Natural and human-caused disasters are occurring with increasing frequency and severity. In the United States (U.S.), the number of billion-dollar disaster events has increased over the last 20 years.1 Without substantial efforts to create more resilient housing and infrastructure, this trend is unlikely to change.

Resilience is the ability to bounce back from a disaster. When disasters occur, localities bear the greatest impact on their housing and infrastructure assets. Local communities are tasked with rebuilding, yet they often need more knowledge, resources, and capacity to do so effectively. Most disaster and emergency response programs work best when every level of government and sector has a stake in the outcome. This is also true when planning for and funding resilience projects. Policies that allow for local execution, state management, federal support, and nonprofit/private participation have been demonstrated to improve the resilience of housing and infrastructure.

The National Academy of Public Administration hosted practitioners and subject-matter experts twice in 2023 to discuss the challenges and opportunities of resilience planning in a federal system. Five themes emerged from those discussions as promising practices for all levels of government:

- **Plan holistically:** Government officials should simultaneously address multiple aspects of long-term disaster resilience planning.
- **Incorporate equity:** All communities must be part of resilience planning to achieve equitable regional enhancement.
- **Collaborate and coordinate:** Disasters do not adhere to jurisdictional or societal boundaries, and neither should resilience efforts.
- **Target vulnerabilities:** SLTTs can use regulatory powers to address place-based challenges.
- **Align and streamline assistance:** All levels of government should enhance program design for greater efficiency, including optimizing funding allocation, speeding up application processes, and simplifying reporting requirements to alleviate the strain on program participants.

This paper provides an overview of the intergovernmental disaster resilience planning system, with links to more detailed information on individual topics. The reader should come away with an understanding of the system's complexity and, crucially, where and when their agencies might need to seek external assistance.

INTRODUCTION

Background

At a time of increasing environmental uncertainties and unforeseen challenges, resilience is a growing imperative for communities, organizations, and governments. This paper delves into the importance of disaster resilience, exploring how proactive measures and planning can mitigate the devastating impact of unforeseen events. These complex scenarios and the strategies to address them often require collaboration and can benefit from consulting with experts for additional understanding and support.

Having worked in disaster recovery for over 20 years, Hagerty Consulting (Hagerty) recognizes that preparing for, mitigating, and recovering from human-caused and natural disasters is becoming more complicated. Billion-dollar damage disasters occur more frequently, significantly impacting housing and infrastructure. In 2023 alone, the U.S. faced 25 such climate- or weather-related disaster events.[2] Recovery from these and lesser disasters is increasingly resource-intensive and time-consuming for officials at all levels.

To gain a better understanding of the longer-term impacts of disasters and the benefits of resilient design, Hagerty asked the Academy's Center for Intergovernmental Partnerships (the Center) to convene experts in the housing and infrastructure disaster resiliency space to identify the most significant challenges to improving resilience and best strategies for overcoming them. The Center conducted two roundtable events to discuss housing and infrastructure disaster resiliency, featuring experts and practitioners from multiple regions and sectors. Participants addressed a series of questions (Appendix B) about how the federal, state, local, Tribal, and territorial (SLTT) governments can address challenges to improve the nation's disaster resiliency.

> FEMA is developing national resilience guidance. Officials expect to share a draft for public review and comment in early 2024 and publish a final document later in 2024.

Disasters Threaten Housing and Infrastructure

Natural and human-created disasters threaten communities and individuals--upending lives, damaging housing and infrastructure, and interrupting vital services. For instance, the 2023 Lahaina (Hawaii) wildfire took almost 100 lives and destroyed approximately 2,000 structures, including 1,500 residential buildings. The intensity of the fire also impacted in-ground water and wastewater infrastructure along with above-ground utilities and roads. Similar

> Community members should not assume they will be immune to disasters and severe weather events based on past experiences. Investing in resilience and mitigation is the most effective approach to limiting future adverse impacts.

scenarios occur whenever a fire, flood, earthquake, volcano, chemical spill, building collapse, or other disaster occurs in or near populated areas.

Disasters harm housing and residential communities in several ways. They can cause physical damage to homes, making them uninhabitable. Evacuation, even as it likely saves them, disrupts people's lives and routines. Displacement can create a surge in demand for substitute housing, simultaneously creating a shortage of units and increasing costs. Disruption can undermine the viability or vitality of a community, sharply curtail economic activity, shift government agencies' focus to immediate needs, and create fiscal chaos.

Disasters can also cause physical damage to local infrastructure, such as roads, bridges, hospitals, water treatment and distribution systems, communication networks, and power grids. Decades-old construction may be especially vulnerable. Current loads, environmental conditions, and safety standards may exceed the original engineering design. Improper inspection, repair, maintenance, and upgrades may lead to physical deterioration and reduced performance. Structures may be in places considered safe at the time they were built, but encroaching hazards, such as floods, storms, and fires, may exceed their design capacity or resilience. Because infrastructure projects are typically large-scale, restoring them following a disaster can be time-consuming, costly, and complex. During the downtime, a community's lifelines – the most fundamental services in the community that, when stabilized, enable all other aspects of society to function – may be further disrupted by the lack of power/ energy, telecommunications, transportation, health care, clean water, sanitary services, safety and security, and more.

Resilience Is Multi-Faceted

Government officials cannot stop many disasters, but they can take steps to reduce or prevent the impacts of disaster events on housing and infrastructure by enhancing resilience. Preparation can minimize damage, lower recovery costs, and alleviate human suffering. Federal support can put these investments within reach for SLTT governments. *Resilience* is the ability to bounce back from a disaster. It involves anticipating, preparing for, adapting to, and recovering rapidly from adverse events and changing conditions. Hazard or disaster *mitigation* planning can boost resilience by lessening the impact of disasters. For example, flood mitigation efforts might focus on building flood barriers, limiting construction in flood-prone areas, and developing early-warning systems. These measures support resilience by reducing damage, which eases response and speeds recovery.

> Mitigation focuses on limiting the negative impacts of natural disasters and severe weather events. Multiple long-standing federal programs, such as FEMA's Hazard Mitigation and Flood Mitigation programs and the U.S. Army Corps of Engineers (USACE) flood control effects, were established to implement mitigation activities.

Disaster management and planning should address three primary types of resilience:

1. Immediate Community Resilience – The ability of a community to rapidly respond to and recover from a disaster event.

2. Individual Resilience – The ability and expectation for individuals to be resilient and champion adaptation to increasingly frequent and severe disaster events.
3. Long-Term Resilience Design, Planning, and Implementation – The long-term design, development, planning, and implementation actions required to build and maintain a disaster-resilient community.

Planning for resilience is a collaborative effort across the whole community – every level of government, individuals, and communities, as well as the private sector. Each stakeholder has a vital role in creating and supporting that collaboration.

Rebuilding after a major disaster can often take a decade or more, with consequential impacts on the long-term health and viability of the impacted area. Preventative resilience and mitigation investments can help shorten the timeframe, reduce costs, and limit effects on citizens.

THE FEDERAL FRAMEWORK SUPPORTS STATE MANAGEMENT AND LOCAL EXECUTION

Federal Disaster Response Activates upon State Request

When a substantial natural and/or human-caused disaster or emergency strikes, the governor or leader of the impacted state, territory, or federally recognized Indian tribal government can ask the President to declare a disaster. This disaster declaration sets into motion a series of activities to mobilize resources and facilitate cooperation across agencies, jurisdictions, and sectors. The Federal Emergency Management Agency (FEMA) leads the near-term disaster response. Since 2013, FEMA has responded to more than 1,300 major disaster declarations, including 114 in 2023.

The Stafford Act (42 USC 5121, et seq.) is the centerpiece of federal disaster response and recovery policy. It establishes the process for federal disaster declarations, authorizes programs to help individuals and communities in the wake of disasters, and provides funding for preparedness, mitigation, and resilience activities.

Familiarity with the Stafford Act and FEMA's implementing requirements is central to the ability of SLTT governments to successfully access the financial resources available through the Act and FEMA.

The current framework for federal disaster management support was implemented with the passage of the Stafford Act in 1988, creating statutory authority for most federal disaster response activities. Supported by major amendments in 2000 (the Disaster Mitigation Act), 2005 (Post-Katrina Emergency Reform Act), 2013 (Sandy Recovery Improvement Act), and 2018 (the Disaster Recovery Reform Act), the federal approach is shifting from response and recovery to mitigation and resilience. FEMA is the primary provider of this assistance, but 17 other federal agencies have resilience-related programs, including the U.S. Departments of Transportation (DOT), Housing and Urban Development (HUD), Commerce (DOC), Interior (DOI), Energy (DOE), and the Environmental Protection Agency (EPA).

In 2021, the Biden Administration released climate adaptation and resilience plans for most major federal departments and agencies. These plans provide a roadmap to federal agency actions in pursuit of adaptation and resilience goals and can be helpful for SLTT leaders in understanding those initiatives.

Federal Recovery, Resilience, and Mitigation Programs are Administered by States

State governments administer the essential federal resilience and mitigation programs to address housing, infrastructure, and disaster resiliency needs. This arrangement can allow the state to tailor the program to the local context, conditions, and challenges. State agencies can provide targeted technical assistance and guidance to localities to help them access and implement the programs effectively. State assistance can be crucial for local governments with limited resources and capacities. However, this arrangement may also frustrate local officials, for example, if state and local priorities do not align or the state imposes additional, burdensome requirements and regulations.

> Some states have developed their own resilience and mitigation programs to address distinct needs within their communities. An example of a state-initiated effort is the Louisiana Strategic Adaptations for Future Environments (LA SAFE), which combined federal funding with philanthropic support to pursue goals focused on catalytic projects, replicable programs, and long-term adaptations.

Two major state-administered programs are FEMA's Building Resilient Infrastructure and Communities (BRIC) program and the Hazard Mitigation Grant Program (HMGP) [3]. Both programs are available to states affected by federally declared disasters but with different funding arrangements. BRIC is a competitive grant program, while HMGP allocates funds exclusively by formula. Both programs generally cover 75 percent of project costs, with states and local governments responsible for the remaining 25 percent. States can spend funds directly or pass funds through to local governments, private companies, and non-profit organizations.

> Approximately 70 percent of funding allocated by BRIC for FY 2023 goes through a competitive process, with separate 11 percent set-asides for 1) states and territories on a formula basis and 2) building code upgrades. Tribal entities receive $50 million with up to $25 million for building codes.

The federal government has also expanded the resources available to support SLTT resilience investments through the 2021 *Infrastructure Investment and Jobs Act* (IIJA) and the 2022 *Inflation Reduction Act* (IRA). For example, the National Conference of State Legislatures (NCSL) notes that the IIJA makes $50 billion available to address floods, wildfires, heat, and droughts, and the IRA provides an additional $112 billion for climate-related projects.[4]

Federal resilience programs typically have planning or assessment requirements. For example, several FEMA funding programs require SLTT governments to have an approved Hazard Mitigation Plan (updated every five years) to be eligible for certain non-emergency disaster assistance. The plan addresses risks identified during a prescribed assessment and planning process. All fifty states, the District of Columbia, and five territories have FEMA-approved hazard mitigation plans. Fourteen states have received approval for an enhanced state mitigation plan, making them eligible for increased funding. To achieve this status, these states developed a

comprehensive mitigation program, demonstrated the capability to manage increased funding, and adopted an approach to estimate the cost-effectiveness of mitigation measures.[5]

Additionally, two other sources of resilience funding can be found in the State Homeland Security Grant Program (SHSGP) and Urban Area Security Initiative (UASI), administered by FEMA on behalf of DHS. These programs require eligible SLTT governments to complete and renew risk and capability assessments every three years. The Threat Hazard Identification and Risk Assessment (THIRA) helps communities identify and plan to address risks. The Stakeholder Preparedness Review is a jurisdiction's assessment of capabilities to address the risks identified in the THIRA.

Federal Agencies Are Working to Put Programs in Reach of SLTT Governments

Accessing federal assistance can be challenging for states and local governments. Existing programs and incentives can be insufficient, inflexible, or misaligned to resilience goals. Well-intentioned program requirements can create obstacles to implementation. A few of the difficulties SLTT governments face include:

- Grant application processes that are complex and often inequitable.
- A multitude of funding and programs that are spread across multiple agencies; determining eligibility can be an onerous task.
- Associated program requirements and timeframes make participation difficult for many low-capacity SLTTs.
- Assistance that may not allow, encourage, or incentivize collaborative, cross-jurisdiction/sector applications and projects.

Individual federal agencies have taken steps to help applicants find and secure funding. For instance, FEMA created BRIC Direct Technical Assistance (DTA) to help low-capacity communities and tribal nations begin climate resilience planning and project solution design. Support may include climate risk assessments, community engagement, partnership building, and mitigation and climate adaptation planning. Available assistance ranges from pre-application to grant close-out. Disadvantaged communities and those facing hardship receive priority.[6] DOE has taken a different approach, providing a simple online search tool to help communities find mitigation and resilience funding opportunities across many agencies. Users can sort 30 major programs by sponsoring agency, type of financial assistance, recipient type, and whether a disaster declaration is required.[7] In addition, the FEMA Disaster Assistance Simplification Act and the Disaster Management Costs Modernization Act, currently being considered by Congress, would address the complexity of federal programs.

The IIJA includes funds to provide technical assistance for resilience. The Georgetown Climate Center estimates that the IIJA funding applicable to resilience projects exceeds the $50 billion touted by the White House.[8] This increased support for resilience is partly due to the White

House's direction for federal agencies to "prioritize building infrastructure that is resilient and that helps combat the crisis of climate change."[9] Part of this resilience funding involves technical assistance, such as the EPA's Operational Sustainability of Small Public Water Systems program, a $50 million four-year program of which a portion supports organizations that provide technical assistance.

Federal programs also help states and localities pursue resilience more efficiently through phased applications or funding. Phased applications may allow for more strategic and comprehensive planning of resilience projects, as applicants must demonstrate how their proposals align with their long-term goals and priorities. A preliminary screening round may eliminate some applicants or a noncompetitive planning grant may precede a competitive implementation grant process.

For example, the BRIC program has a two-phase application process. During the Notice of Interest phase, applicants submit a summary of their proposed project and its alignment with BRIC program objectives. FEMA invites selected applicants to submit a full proposal in the second phase. The Disaster Resilience Grants Program, administered by the National Institute of Standards and Technology (NIST), has a similar structure.[10] The EPA's Climate Pollution Reduction Grant program, authorized under the IRA, also features two phases. The first phase will provide $250 million for noncompetitive planning grants. The second will distribute approximately $4.6 billion through competitive implementation grants. Tribes and territories will compete separately from other applicants.[11]

> Another potential requirement of the multi-stage application process is conducting a benefit-cost analysis (BCA) consistent with FEMA guidelines, as seen in BRIC and some other programs. Completing this process can often require outside support.

Phased applications have some additional benefits. For instance, the planning requirement may facilitate better intergovernmental coordination and collaboration. It could reduce or defer the administrative burden if the initial phase application is less resource-intensive than a full proposal to prepare. Screening and vetting could also reduce the burden on applicants if their proposals are not viable. On the other hand, phased applications and funding could increase the administrative burden if applicants must provide more or updated information and documentation at each phase. Phasing could also create uncertainty and delays in the funding process as applicants must wait for feedback and approval at each phase before proceeding to the next one. The longer lead time and commitment to a specific approach may limit flexibility and responsiveness to changing needs and circumstances.

Many SLTT governments have the capacity to pursue only a few (if any) federal opportunities simultaneously. To make the best use of their capacity, SLTT officials should:

- **Identify their priorities:** Determine what is most important to their communities, such as critical infrastructure, vulnerable populations, key assets, or goals identified through other planning processes.
- **Identify their risks.** Identify the hazards that could harm those priorities, such as fires, wind, earthquakes, or cyber-attacks.

- **Evaluate those risks for the highest vulnerabilities.** Weigh the likelihood and potential impact of the hazards.
- **Consider options for reducing those vulnerabilities.** Develop mitigation strategies, improve infrastructure, implement policies and procedures, or pursue other measures to reduce risk.
- **Review and pursue funding opportunities to target those risks and help advance their priorities.** Match needs to available programs.

Federal Equity Initiatives Provide Resources to Communities That Have Experienced Underinvestment

Historically disadvantaged communities are disproportionately impacted by disasters. Assisting disadvantaged communities in developing resilience will improve disaster outcomes for the entire region's housing and infrastructure. For example, the Justice40 initiative directs funding to these communities through a wide range of programs. [12] Justice40 defines "community" as a group of individuals living in geographic proximity or a geographically dispersed set of individuals who experience common conditions. All federally recognized tribal entities qualify for Justice40, regardless of whether they have land. FEMA's BRIC and Flood Mitigation Programs and the DOT's IIJA-funded Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation program are among the many federal programs covered by Justice40.

Justice40 is one of the Biden-Harris Administration's signature efforts, enacted by Executive Order in 2021. It sets a goal for 40 percent of federal investments to be directed to communities that are marginalized, underserved, and overburdened. IRA programs were added to Justice40 on November 29th, 2023.

The recent Community Disaster Resilience Zones Act, enacted in 2022, directed FEMA to identify 'communities of need.' The tract-level determination is based on the National Risk Index score and designation as a "disadvantaged community" per the Council on Environmental Quality's Climate and Economic Justice Screening Tool. FEMA, EPA, HUD, DOT, and other agencies are targeting financing assistance for investment in modern, resilient infrastructure and nature-based solutions. The first designations were announced in September 2023. FEMA will designate zones in tribal lands and territories in a subsequent round.

In April 2022, FEMA released an updated Local Mitigation Planning Policy Guide and State Mitigation Planning Policy Guide. Both address equity considerations for underserved communities and socially vulnerable populations, emphasizing direct engagement during planning processes. All communities and regions must be part of resilience planning to achieve equitable regional enhancement.

Additional Information on Federal Efforts

- National Disaster Recovery Framework. US Department of Homeland Security, Second Edition, June 2016.
- Disaster Resilience Framework - Principles for Analyzing Federal Efforts to Facilitate and Promote Resilience to Natural Disasters. US Government Accountability Office (GAO) GAO-20-100SP, October 2019.
- Justice 40 Initiative Statement. The White House. Website Accessed October 2023.
- Implementing Infrastructure Investments at the County Level: The Bipartisan Infrastructure Law (P.L. 117-58). National Association of Counties. Website accessed October 2023.
- Federal Progress, Plans, and Performance (Agency Adaptation and Resilience Plans). Office of the Federal Chief Sustainability Officer, Council on Environmental Quality. Website accessed November 2023.

STATE AND LOCAL INITIATIVES PROMOTE RESILIENCE

States and Localities Have Adopted a "Whole of Government" Approach to Mitigation

According to the National Conference of State Legislatures (NCSL), at least 14 states have created a chief resilience officer (CRO) or resilience program to streamline planning and project oversight for disaster mitigation and climate resilience projects.[13] A CRO focuses attention on the state's specific vulnerabilities and brings specialized capacity to address resilience. A CRO brings a "whole of government" approach by helping to coalesce policies, coordinate actions, facilitate information sharing across multiple agencies, and develop plans to support the state's priorities. Some states have also created task forces, commissions, or working groups as advisory bodies that may conduct initial research, develop reports, reach out to communities, and provide ongoing support.

CROs at the local level play a similar role, emphasizing building relationships, connecting stakeholders, bridging sectors, and overseeing planning and project execution. The Resilient Cities Network, initially supported by the Rockefeller Foundation,[14] supports CROs by sponsoring communities of practice and events. The organization's website features several frameworks to help cities shift towards resilience.[15]

A key driver for the CRO concept at the local level was the Rockefeller Foundation's 100 Resilient Cities (100RC) initiative, which operated from 2013 through 2019. The objectives was to help cities "build resilience to the physical, social, and economic challenges that are a growing part of the 21st century." An Urban Institute program assessment reported that more than two years after the program ended, two-thirds of 100RC cities still had a CRO.

States Are Developing Housing Recovery Plans

States have developed many innovative approaches to resilience planning that complement federal programs. State-wide measures create consistency and empower local governments to address their communities' needs. State-level post-disaster housing strategies can serve both purposes. The Texas A&M University School of Architecture notes that disaster housing recovery plans, alongside other emergency management plans, provide several benefits to communities from immediate post-disaster needs through long-term rebuilding. These plans can:

- Devise strategies to manage housing recovery before a disaster strikes.
- Create an opportunity to incorporate other local planning priorities into the housing recovery process.
- Identify and prepare to address the needs of especially vulnerable households.

- Expedite recovery, allowing people to resume their lives more quickly, which in turn supports the community's recovery.
- Recover the tax base more quickly by restoring property values and helping wage earners to return to the community. A robust residential base may support other taxable activities, such as tourism and the sale of goods and services.
- Engage the public in dialogue about the importance of community resilience and options to achieve it.

The School's Disaster Housing Recovery Plan Evaluation Tool allows state and local officials to assess whether their plans include the critical components known to improve effective, efficient, and inclusive housing recovery. Basic, intermediate, and advanced tools are available for housing recovery planning at various levels of sophistication.[16]

Stabilizing the Property Insurance Market Can Support Post-Disaster Housing Resilience

Frequent, costly disasters have destabilized the insurance market in some states. As the primary regulators of the insurance industry, states play a key role in developing policies and techniques to address the growing insurance cost and availability crisis. Increasingly frequent and intense disasters have led many insurers to retreat from high-risk areas. For instance, Florida started losing insurers as early as 2005, and property owners now face limited options and high premiums. Other states regularly impacted by hurricanes, wildfires, floods, mudslides, and earthquakes find themselves in similar situations.

States can incentivize improvements that increase resilience, help reduce insurance rates, and boost private coverage options. There are two examples in Louisiana. The first is the Fortify Homes Program, and the second is the "Insure Louisiana Incentive Program." Enacted in 2022, the incentive program provides grants to insurers who agree to remain in the market. Insurers must write policies in the state with net written premiums equal to four times the value of the grant.[17] Increasing options for insurance helps reduce costs for property owners, and deploying resilience and mitigation steps reduces the risks those insurers must consider.

> Louisiana's Fortify Homes Program provides property owners with up to $10,000 to upgrade roofs with the FORTIFIED standard established by the Insurance Institute for Business and Home Safety. The Insure Louisiana Incentive Program provides grant to insurers who agree to remain in the state and write policies.

Building Codes and Land Use Laws Can Reduce the Vulnerability of New Construction and Redevelopment

States can reduce vulnerability by establishing resilience and mitigation requirements for public and private construction projects. These measures typically address the specific natural hazards and risks each state faces. For example, California has stringent building codes focusing on

earthquake resistance and measures to mitigate the impact of wildfires.[18] In response to Hurricane Sandy, New York implemented guidelines for government building resilience to hurricanes and other extreme weather events. Guidelines address flood-resistant design and measures to enhance the overall durability of government facilities.[19] Florida's building codes, including those for government buildings, emphasize resilience against hurricanes. Requirements include measures to withstand high winds and storm surges, among other hazards. Washington revised its state building code in 2018 after a difficult wildfire season the previous year.

States can also create requirements governing local land use policies. Since 2020, South Carolina has required counties to include a resilience element in their comprehensive plans.[20] New Jersey revised its municipal land use law in 2021 to require climate change-related hazard vulnerability assessments as part of the comprehensive land-use planning process.[21]

Data and Analysis Can Improve Decision Making

> Local governments require sophisticated modeling to understand potential risks, such as RAND's "decision making under deep uncertainty."

Comprehensive, up-to-date data and analysis are crucial for evidence-based decision making and rational planning at all levels of government. The need is acute in resilience planning because it attempts to prepare for complex, abstract, system-level changes that are both predicted and unpredictable. Moreover, many changes result from longstanding, slow-moving, complex trends that are not fully understood. In other words, perception is an inadequate tool for planning. Government agencies and other institutions are creating partnerships to improve the availability and use of information in resilience planning and decision making.

The Center for Risk-Based Community Resilience Planning at Colorado State University is developing a multi-disciplinary community disaster resilience model that combines systems-level data on technological, financial, social support, healthcare delivery, education, and public administration. The Center is a NIST-funded Center of Excellence. Its product, the Interdependent Networked Community Resilience Modeling Environment, is free to use and continues to be under development.

In December 2023, New York State announced a partnership with the University at Albany, a "first-of-its-kind operational collaboration between university researchers and state emergency managers." The State Weather Risk Communication Center will provide real-time decision-support products to state officials, emergency managers, and other leaders responsible for protecting people and property in an emergency weather event. The center will also provide training, workshops, and after-action assessments to identify opportunities to improve operations.

Texas approved the creation of the Center for Resiliency at Lamar University, serving the southeast part of the state, in 2021. It aims to establish a "networking center and data collaborative to provide service, outreach, and education for improved multi-disaster resilience in the Gulf Coast region." The Center gathers, analyzes, and then redistributes regional

information to promote learning and the development of a shared knowledge base. It also supports community-centered projects, conducts outreach, and hosts regular meetings to discuss topics of shared concern.

The National Oceanic and Atmospheric Administration (NOAA) provides technical data and training to state and local governments. The 2022 Sea Level Rise Technical Report projects flooding risk throughout the United States. Decision makers can use this information to plan for adaptation, bolstering resilience. State Climate Summaries provide current, local climate perspectives in each state, Puerto Rico, and the U.S. Virgin Islands. The summaries describe each state's historical temperature and precipitation conditions and use several visual aids to show past observations and plausible future projections. Easy-to-access climate data is available through Climate Mapping for Resilience and Adaptation. In addition to providing an evidence basis for decision making, grant applicants can use the portal to demonstrate proposed actions to address known current and future hazards equitably and inclusively. NOAA provides many other data sets and sources of information.

Collaboration across Jurisdictions Magnifies Impact

Resilience goes beyond jurisdictional boundaries, and effective solutions require increased intergovernmental cooperation. States and localities can only partially address disaster resilience when acting individually. Collaboration can create opportunities for resource sharing, coordination, and learning.

The federal government has had a role in creating state-level collaborative arrangements. For instance, Emergency Management Assistance Compacts (EMACs) are pre-existing arrangements that allow states to provide mutual assistance, collaborate, and share resources when responding to state-declared disasters. All fifty states, the District of Columbia, and four territories are members. [22] Although EMAC is a state-to-state arrangement, EMAC legislation passed by Congress in 1996 addressed the complexities of liability, responsibility for costs, and the recognition of credentials, licenses, and certifications to be honored across state lines. Furthermore, mobilization through EMAC triggers access to federal support.

Another example is the Resources and Ecosystems Sustainability, Tourist, Opportunities, and Revived Economies of the Gulf Coast States (RESTORE) Act, enacted by Congress in 2012 to support ongoing recovery from the 2010 Deepwater Horizon oil spill. The Act created the Gulf Coast Ecosystem Restoration Council, comprising five Gulf Coast state governors and cabinet-level officials from six federal agencies. Funding recovered from sanctions and insurance helps Gulf Coast states and communities recover from the broad economic impacts. This model could be used to address regional vulnerabilities.

Collaboration can also be an effective tool at the local level. For instance, the Southeast Florida Regional Climate Change Compact focuses on resilience and adaptation in Palm Beach, Broward, Miami-Dade, and Monroe counties.[23] The compact served as a platform for creating a public-private partnership to develop a $161 million stormwater and water supply reservoir.

States can play a critical role in helping local governments secure federal support. Federal programs require a financial match, generally 10-25 percent of the project. These requirements are intended to foster greater project buy-in from grantees. States can assist local partners with financial support, making applications more competitive as federal agencies look more carefully at the "firmness" of pledged matching funds. For instance, Minnesota established the State Competitiveness Fund (SCF), which appropriated $100 million to create the SCF Match Program to assist eligible entities with IRA and IIJA match requirements.[24] The Michigan Infrastructure Office accepts applications for grant identification and writing and helps support match requirements for the same federal programs.[25]

Local Governments Focus on Local Challenges

Local governments are key to building resilience. They are well-positioned to understand and address the resilience needs of their community and effectively address the place-based impacts of natural disasters. For example, New York City has developed resiliency plans for climate, stormwater, and wastewater hazards. Having experienced extensive flooding during Hurricane Ida in September 2021 and an unnamed storm in September 2023, the stormwater resilience plan is relevant as it calls for outlining "goals and initiatives for the City to implement over a period of 10 years, including new policies for resilient stormwater management, the integration of future-looking climate change projections into long-term drainage planning, changes to the City's flash flood emergency response procedure, and an increased focus on public communications related to rainfall-based flooding."[26]

Many jurisdictions, particularly in the western U.S., must determine how to address resilience and mitigation needs arising from fast-moving, devastating wildfires. A local Community Wildfire Protection Plan can be developed to reduce the risk of wildfire in the community. The plan should include a summary of the wildfire risk, an assessment of the community's values and assets, and a list of recommended actions to reduce the wildfire risk. Guidance is available from the U.S. Fire Administration (a FEMA component) and other organizations serving the disaster management community.

Additional Information on State Efforts

The following links provide additional details into the abovementioned topics and information relevant to state governments and disaster resilience.

- Housing Resilience: Best Practices for States on Resilient Planning and Recovery. National Governors Association, August 2019.
- Planning Considerations: Post-Disaster Housing Guidance for State, Local, Tribal and Territorial Partners. FEMA, June 2020.
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- "The Rise of the Chief Resilience Officer." The Urban Institute, September 2022.

Additional Information on Local Efforts

The following links provide additional information about state and local disaster resilience.

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- Developing Urban Resilience. Urban Land Institute. Website accessed October 2023.
- Community Resilience. National Institute of Standards and Technology (NIST). Website accessed October 2023.
- Community Wildfire Protection Plans. FEMA/US Fire Administration. Website accessed October 2023.
- Disaster Resiliency and Recovery Resources – A Guide for Rural Communities. USDA Rural Development. January 2022.
- How FEMA Can Build Rural Resilience Through Disaster Preparedness. Center for American Progress, October 2022.
- Intergovernmental Roundtable on Disaster Resilience. NACO. Website accessed October 2023.
- Municipal Climate Resilience Planning Guide. Office of Planning Advocacy, New Jersey Department of State, May 2022.
- Public-Private Partnerships for Transportation and Water Infrastructure | Congressional Budget Office (cbo.gov). January 2020.

STRATEGIES TO SUPPORT RESILIENCE PLANNING

Natural disasters (and other modern hazards and emergencies) occur with increasing frequency and intensity, significantly impacting the nation's housing and infrastructure. All levels of government and multiple sectors must collaborate, innovate, and make additional investments to address these challenges and realize a more resilient future.

Roundtable participants identified five strategies to improve housing and infrastructure resiliency, described below. Many specific measures under each strategy can apply to multiple levels of government, depending on the program.

Plan Holistically

The ability to bounce back from disasters hinges on the ability of complex, dynamic systems to adapt and recover jointly from events in a way that does not compromise prospects for long-term community vitality. Government officials should simultaneously address multiple aspects of long-term disaster resilience planning to achieve resilience. Several approaches can support this goal:

- **Establish and expand regional coalitions** around specific goals for resilience, public health, and related areas.
- **Develop plans** to address disaster and hazard mitigation, resilience, sustainability, public works development, and related areas, as well as options to secure funding, improve collaboration, and reach successful outcomes.
- **Pursue and use funding** to address design, environmental, public health, workforce development (when statutorily possible), and similar policies and programs to complement and bolster housing and infrastructure resilience and mitigation actions.
- **Establish a shared understanding of the challenges and vulnerabilities** of each community, partner, or region during the resiliency planning process.
- **Evaluate projects** based on their short- and long-term improvements to housing and resilience, as short-term recovery is just one part of the broader picture of disaster resilience.
- **Consolidate data** on housing, public health, and related issues to justify funding, especially for disadvantaged communities.

Incorporate Equity

All communities must be part of resilience planning to achieve equitable regional enhancement. Equity can be addressed in many ways:

- **Pursue various projects and opportunities,** especially those that improve circumstances for disadvantaged communities.

- **Incorporate support for disadvantaged communities into funding applications and long-term plans**, consistent with the Biden-Harris Administration's emphasis on equity.
- **Explore options within new federal initiatives** emphasizing equity in resiliency planning. These options include targeted funding under Justice40 and the Community Disaster Resilience Zones Act.

Collaborate and Coordinate

Communities, localities, and states should endeavor to collaborate and coordinate formally. Disasters do not adhere to jurisdictional or societal boundaries, nor should resilience efforts. Consider the following strategies:

Use existing partnerships as a platform or model for additional collaboration. Local governments may have working relationships through regional councils, local government associations, special districts, authorities, compacts, or other organizations. Resilience planning may be a logical extension of their activities, or the organizational structure may serve as a model for a new set of arrangements. Existing compacts such as EMAC and RESTORE could be expanded or replicated at the state level.

Create partnerships that are insulated from politics to the greatest extent possible. Depending on the setting, the methods below may achieve durability critical to long-term projects.

- Interstate compacts are jointly ratified by two or more states, complicating efforts to change the terms or shift operations.
- A state structure to support local governments could be formalized in statute, which could be challenging to change.
- A non-profit association, joint powers authority, quasi-governmental agency, or special district with multi-jurisdictional governing boards could enjoy stability as each participant has limited power.

Reduce the obstacles to establishing partnerships. Local governments operate within state law, creating opportunities and obstacles to establishing partnerships. States can encourage local collaboration by taking several steps:

- Ensure the appropriate authority exists.
- Ease the administrative lift by developing governance frameworks, creating model documents, developing checklists, streamlining processes, providing technical assistance, and establishing collaborative purchasing options.
- Support local investment in efficiency-increasing tools such as information and communication technology, performance measurement systems, data-driven decision making, analytical frameworks, and streamlined regulatory frameworks.

- Lay the groundwork for effective collaboration with local officials: pursue joint funding opportunities to address multi-jurisdictional issues.
- Develop relationships and lines of communication with potential and established partners long before disasters occur. Include non-profit and private organizations, as they are critical in developing resilience.
- Increase community partners' attention to resilience and mitigation to achieve long-term resilience goals.

Target Vulnerabilities

Every state, locality, Tribe, and territory faces distinct challenges that demand tailored, place-based solutions. Market forces may encourage private actors to make decisions to benefit themselves in the short run, but the cumulative effect can undermine long-term community resilience. Regulatory intervention in the private land use market is a function of state and local governments. These powers can be used to address the vulnerabilities a community may face. To target vulnerabilities:

Incorporate resilience and sustainability provisions into building codes, zoning ordinances, and insurance standards to promote effective disaster resilience planning.

- State-wide measures would ensure consistency over time and geography.
- The Federal government should consider ways to incentivize SLTTs to employ resilience best practices.[27]

Identify outdated codes, regulations, practices, and approaches that slow down or prevent effective implementation of more resilient housing and infrastructure.

Increase local government officials' awareness of current building and zoning code standards and conduct outreach about resilience concepts.

Explore options to stabilize the property insurance market, if necessary.

Align and Streamline Assistance

Government at all levels should enhance program design for greater efficiency, including optimizing funding allocations, speeding up application processes, and simplifying reporting requirements to alleviate the strain on program participants. Governments hoping to improve assistance should contemplate the following:

Simplify all aspects of grant administration. SLTTs most in need of federal assistance are the least well able to obtain it through the competitive grant system due to the substantial resources required to navigate the processes. Fully untangling the federal grants system may be infeasible, but points of program design and re-design may create opportunities to apply customer-oriented principles, streamline processes, and improve outcomes.

- Design funding opportunities that do not require SLTT governments to have extensive expertise or resources to pursue funding opportunities effectively.
- Streamline and consolidate grants administration through process re-engineering.
- Ensure that rules, interpretations, and program guidance are clear, complete, and consistent.
- Balance flexibility with compliance and risk minimization.

Expedite the deployment of funds. Large, well-resourced jurisdictions may be able to cover spending in the short term, but others may have to defer projects until funding is available. The expectation of delay may discourage some jurisdictions from applying in the first place.

Improve decision making with strategic data and information. Resilience requires simultaneous planning and preparation in many complex, dynamic, and interrelated systems. Comprehensive data, analysis, and modeling provide a solid knowledge base. It can help decision makers envision probabilities and possibilities. It can also help grant applicants demonstrate that proposed projects align with current and future challenges.

Support SLTT governments' innovation. SLTT governments are best able to address the needs of their communities and develop context-specific problem-solving approaches. Disasters are inherently place-based, and those closest to the problem often better understand the nuances required to develop resilience. Flexibility in program requirements can create opportunities for innovation.

- Enhance and expand block grants and blended funding programs to promote resilience responses and solutions that address broad needs rather than specific, categorical concerns.
- Support innovative options when considering solutions to housing and infrastructure resilience. For example, using nature-based and other modern solutions will be critical as traditional solutions may no longer be cost-effective, enduring, or provide optimal resilience outcomes.
- Provide training, information sharing, networking, and other capacity-building practices to help spur and disseminate innovation.

CONCLUSION

To improve resilience, all levels of government must be more effective, efficient, and equitable as they collaborate across sectors and levels of government. Working in familiar siloes and using traditional but outdated approaches are no longer sufficient in the face of increasingly frequent and intense natural disasters.

Over the last decade, 90 percent of the nation's counties have been impacted by one or more federally declared disasters, costing the U.S. more than $1 trillion in damages. The nation – SLTT governments, the federal government, private organizations, and nonprofit partners – must cooperatively deploy equitable, flexible, and sustainable solutions that prioritize resilience. Failure to do so may result in increasing economic hardships and the loss of more lives.

Federal programs support state management, local execution, and nonprofit/private participation. Collaboration across jurisdictional boundaries is critical, as major disasters do not respect administrative or political lines. Yet, collaboration can be hard for individual localities to establish. Existing partnerships, states, and the federal government can intervene with incentives and assistance. Many initiatives are making progress toward improving resiliency, but much work remains to be done. Only through a modern, flexible, and innovative approach to resilience will the nation's housing and infrastructure be able to economically, effectively, efficiently, and equitably adapt to withstand future human-caused and natural disasters.

APPENDIX A: AUTHOR INFORMATION & BIOGRAPHIES

About the Academy

The National Academy of Public Administration (the Academy) is an independent, nonprofit, and nonpartisan organization established in 1967 and chartered by Congress in 1984. It provides expert advice to government leaders in building more effective, efficient, accountable, and transparent organizations. To carry out this mission, the Academy draws on the knowledge and experience of its approximately 1,000 Fellows—including former cabinet officers, Members of Congress, governors, mayors, state legislators, as well as prominent scholars, career public administrators, and nonprofit and business executives. The Academy helps public institutions address their most critical governance and management challenges through in-depth studies and analyses, advisory services and technical assistance, congressional testimony, forums and conferences, and online stakeholder engagement. Learn more about the Academy and its work at www.NAPAwash.org.

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About the Center for Intergovernmental Partnerships

The Academy established the Center for Intergovernmental Partnerships (the Center) in September 2021 in recognition of the fact that no significant public problem fits entirely within one government agency or even one level of government. The Center helps identify intergovernmental gaps and serves as a forum for dialogue and problem-solving on those issues across local, state, tribal, territorial, and federal levels of government. Through convenings, collaboration, and research, the Center will be a hub for solutions to our society's biggest intergovernmental challenges. It will bring leaders from every level of government and relevant sectors together to design solutions that create new governance models for the 21st century.

About Hagerty Consulting

Hagerty Consulting (Hagerty) is an emergency management consulting firm that helps clients prepare for, respond to, and recover from disasters. For over twenty years, Hagerty has helped communities and organizations prepare for, respond to, and recover from some of the nation's largest and most complex disasters. A full-service firm, Hagerty helps clients by planning and training for the risks their community or organization faces before disaster strikes; enabling surge staffing and disaster management expertise during response operations; providing strategic support and financial/ grants management guidance amidst response and recovery efforts; and seeking and managing funding opportunities to mitigate risk(s) and help them chart a more resilient future.

Academy Biographies

Nancy Y. Augustine, Ph.D.: Nancy joined the Academy in January 2019 and was named Director of the Center for Intergovernmental Partnerships in July 2021. She has led projects for the Legislative Branch, the Department of Commerce Office of Inspector General, and the US Merchant Marine Academy (DOT). She specializes in intergovernmental relations, public management, policy assessment, comprehensive and strategic planning, state and local fiscal issues, and planning for facilities and infrastructure investments. Nancy has previously researched housing and social support programs for the Department of Housing and Urban Development, the Department of Labor, the District of Columbia Auditor, and the Pew Charitable Trusts. She also worked in local government for ten years in long-range planning and policy development. Nancy has a Ph.D. in Public Policy and Public Administration from the George Washington University and has taught at the Trachtenberg School (George Washington University). She also has an M.A. in Economics from Georgetown University and a Master of Urban and Environmental Planning from the University of Virginia.

Miles Murphy: Miles is a Senior Research Analyst with the Center for Intergovernmental Partnerships, overseeing the coordination, planning, and facilitation of meetings, research, and analysis related to all aspects of the Academy's intergovernmental activities. He is developing subject matter expertise for various CIP projects and organizes the creation/development of social media and web content for the Academy/CIP. Miles graduated from Wake Forest University in 2011 and later earned his M.S. in Coastal and Ocean Policy, a degree focused on the overlapping interests of environmental science and public policy, from UNC Wilmington in 2015. He has experience working in the private and public sectors, most recently as the Senior Planner for the Town of Carolina Beach.

Coleman Stallworth: Coleman is a Research Associate with the Center for Intergovernmental Partnerships. He helps plan and organize CIP events and activities. Coleman also runs the Center's social media and develops online intergovernmental content. He graduated from the University of Miami with a B.A. in Political Science and a minor in Public Administration. Previously, Coleman helped on city council campaigns and helped organize the University's first black-led student government campaign.

APPENDIX B: METHODOLOGY AND SCOPE

This report synthesized the results of two roundtable discussions with housing, infrastructure, environmental, emergency management, resilience, and sustainability experts to identify the critical elements of disaster-resilient housing and infrastructure.

Research Questions and Project Design

Four research questions guided the project.

1. What are the definitions of resilience (as discussed above), and how do they apply to state, local, Tribal, and territorial (SLTT) governments' capacities to deal with disasters?
2. What are the most consistent intergovernmental challenges in disaster resiliency?
3. What adjustments to current funding mechanisms would facilitate improved access to and utilization of existing funding by all SLTT governments, communities, and individuals?
4. What capacities allow SLTT governments, communities, and individuals to develop short and long-term disaster resilience planning?

The project occurred in two phases. The first phase entailed two roundtable meetings between various local and state officials and private organizations to discuss housing and infrastructure in the context of disaster resiliency. These sessions took place over the summer of 2023.

Respondents identified examples of practical problems with the current system, critical aspects of housing, infrastructure, and resiliency, discussed collaboration and innovation in the face of modern wicked problems, and identified best practices. Phase one culminated in several components of resilience and best practices to inform writing in phase two.

Phase two involved document analysis and research but primarily focused on analyzing and synthesizing the information discussed at the two roundtable sessions.

Roundtable Discussions

The Study Team conducted two 90-minute roundtable sessions to hear from various housing, infrastructure, natural disaster, and environmental resilience experts.

The questions guiding questions for each session were as follows:

Session 1 Questions:

1. How do you/your community/organization define resilience, and what efforts do you take to implement or contribute to long-term resiliency planning?
2. After a disaster impacts a community, one goal is to build back more resiliently to withstand future hazards. Where in the disaster recovery process are there opportunities to increase community resilience – particularly to rebuild community infrastructure in a stronger, smarter, and safer way?

    a. Has your community/organization successfully utilized any innovative or unique approaches?

3. How should states/localities/organizations coordinate their resiliency efforts with other government actors, the private sector, and nonprofits? What are the challenges to doing so?
4. With the once-in-a-generation federal infrastructure resilience funding currently available via programs in the Infrastructure Investment and Jobs Act (IIJA) and Inflation Reduction Act (IRA), have you identified and/or applied for those funds? If so, what has your experience been, and if not, what is your current barrier to doing so?
5. The Senate recently passed the Disaster Assistance Simplification Act, aimed at "streamlining the sharing of information among federal disaster assistance agencies, expediting the delivery of life-saving assistance to disaster survivors, speeding the recovery of communities from disasters, protecting the security and privacy of information provided by disaster survivors, and for other purposes." Would your communities/organizations prefer combined/streamlined funding programs or more ability/flexibility to apply collaboratively for funding?
6. Affordable, resilient housing stock remains insufficient nationwide, especially in a post-disaster environment. What steps have your communities/organizations taken to account for the broad reach of these housing and infrastructure resiliency challenges, including the impacts on land-use planning, building codes, insurance, and similar contributing factors?
7. There is a known gap in the funding mechanisms for disaster housing, specifically between short-term transitional sheltering and longer-term mitigation planning. How can communities/organizations navigate these programs' varied requirements, timing, and competing goals?
8. Are there any effective strategies you have employed to ensure adequate funding for your short and long-term needs?
    a. What improvements in policies, programs, or systems would impact communities' ability to plan for resilience?

Session 2 Questions:

1. Are there specific actions that can improve the ability of SLTT governments to align resources to achieve common resilience goals?
    a. How can these collaborations also facilitate improved long-term regional resilience planning?
2. Virtually every housing market in the country has a shortage of affordable housing, exacerbated in the wake of a significant natural disaster. How can SLTT governments most effectively integrate the need for additional affordable housing stock into the resilience discussion?
3. How can SLTT governments promote resilience during housing construction and renovation?

b. How can governments creatively assist property owners in addressing the additional costs associated with resilience improvement and upgrades?

4. Insurance companies have started to pull back from areas that have experienced severe disasters or are at a perceived increased risk of disasters. Can public long-term resilience and mitigation investments alter this trend? What may be strong examples of such investments?

    c. Can SLTT governments take interim steps to help citizens address increasing costs or lack of options for insurance amid the challenges of resilient development and recovery?

5. How can communities most effectively implement changes in planning, zoning, building codes, and other elements as components of long-term resilience planning?

6. What opportunities exist for expanded collaboration between levels of government to address resilience?

    d. How can SLTT governments be better empowered to solve the problems they experience rather than the ones the federal government anticipates?

7. To what extent do varying compliance and oversight requirements inhibit the ability of SLTT governments to use available funding effectively?

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