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Building a More Resilient Nation: The Path Forward

Natural and human-induced disasters carry with them the potential for injuries and death, displacement of people, loss of homes and land, disruptions in transportation, business interruption, job losses, and greater demands on federal, state, and local resources. Against the backdrop of the nation's aging infrastructure, inconsistent adoption and enforcement of building codes, and health and economic disparities, the future impacts of global population growth and movement, complex and interdependent global commerce and economic systems, and changing climate demand greater resilience to disasters to help decrease disaster-related losses and to increase the nation's physical, social, cultural, economic, and environmental health.

This chapter draws together the six recommendations made in earlier chapters and provides suggestions as to how these recommendations might be implemented. The committee has indicated that the necessary first step to increased resilience is to establish a national "culture of resilience" which includes a full and clear commitment to disaster resilience by the federal government.

***Recommendation 1*: Federal agencies should incorporate national resilience as a guiding principle to inform the mission and actions of the federal government and the programs it supports at all levels.**

This recommendation embodies an approach that includes development of a national vision and a national strategy toward a more resilient nation, and a set of short- and long-term implementation steps to achieve this goal including:

(a) Development of the resilience vision;
(b) Development of communication strategies for promoting resilience among federal, state, and local governments, communities, and the private sector;
(c) Analysis of appropriate investment strategies for increasing resilience;

(d) Establishment of processes for interagency coordination for data and resilience metrics;
(e) Establishment of incentives for increasing resilience; and
(f) Conducting periodic reviews of federal agency progress toward increasing resilience (see Chapter 7 for details).

The committee established early in Chapter 1 a vision of some of the characteristics that might describe a "Resilient Nation in 2030." Using the information contained in this report, we expand upon this vision of characteristics of a "Resilient Nation in 2030" as part of the platform from which the vision and strategy for a resilient nation could be developed with leadership from the federal government (Box 8.1). The findings and five recommendations that follow Box 8.1 frame key actions that can help guide the nation in advancing collective, resilience-enhancing efforts to fulfill the national resilience vision the committee recommends be established.

BOX 8.1
Characteristics of a Resilient Nation in 2030

The nation, from individuals to the highest levels of government, has embraced a "culture of resilience." Information on risks to and vulnerability of individuals and communities is transparent and easily accessible to all. Proactive investments and policy decisions, including those for preparedness, mitigation, response, and recovery, have reduced the loss of lives, costs, and socioeconomic impacts of disasters. Community coalitions are widely organized, recognized, and supported to provide essential services before and after disasters occur. Recovery after disasters is rapid and includes funding from private capital. The per-capita federal cost of responding to disasters has been declining for a decade.

Key elements of this culture of resilience include

- Individuals and communities realize that they provide their own first line of defense against disasters.
- National leadership in resilience is implemented by policy decisions, funding, and actions throughout all federal agencies and Congress.
- Federal, state, and regional investment in and support for community-led resilience efforts are pervasive.
- Site-specific information on risk is readily available, transparent, and effectively communicated. This information has triggered dialogue within communities regarding the risks they face and how best to actively prepare for and manage them.
- Based on risk information, zoning ordinances are enacted and enforced that protect critical functions and help communities reap the benefit of natural defenses to natural hazards (e.g., floodplains, coastal wetlands, sand dunes).

- Building codes and retrofit standards have been widely adopted and are strictly enforced.
- A significant proportion of post-disaster recovery is funded through private capital and insurance payouts.
- Insurance premiums are risk based, and private insurers provide substantial premium reductions for buildings meeting current codes or retrofit standards.
- To speed recovery, community coalitions have developed contingency plans for governance and business continuity as well as for providing services, particularly for the most vulnerable populations.
- Post-disaster recovery is greatly accelerated by sufficient redundancy in infrastructure upgraded and hardened to take into account regional interdependencies.

Also included in these characteristics of a resilient nation (but well beyond the scope of recommendations) are a vibrant and diverse economy and citizenry who are safer, healthier, and better educated than previous generations.

The five recommendations below recognize that achieving resilience requires efforts and actions by individuals, families, communities, all levels of government, the private sector, academia, and community-based organizations including the nonprofit and faith-based groups. The process for improving resilience is dynamic, adaptive, and transparent and acknowledges the existence of interconnected and interdependent sets of social, economic, natural, and manmade systems that support communities. Recognition that events and their consequences do not adhere to geopolitical borders is also important. Embedded in each recommendation is also the need to continue long-term, prudent science and technology resilience research innovations.

The recommendations recognize that while physical resilience is a foundation, human resilience is the engine that drives the ability to absorb, recover from, and adapt to adverse events. No single sector or entity has ultimate responsibility for creating the foundation and driving the engine of resilience. These are shared responsibilities.

Risk Management and Reduction (from Chapters 2 and 5)

Finding: A variety of complementary structural and nonstructural measures exist to manage disaster risk. Risk management is, at its foundation, a community decision, and the risk management approach will only be effective if community members commit to using the risk management tools and measures available. Examples from actual disasters and their aftermaths, such as the June 2008 flood in Cedar Rapids, show that implementation of risk management strategies involves a combination of actors in local, state, and federal government, nongovernmental organizations (NGOs), researchers, the private sector, and individuals in the neighborhood community. Each will have different roles and responsibilities in developing the risk management strategy and in characterizing and implementing measures or tools, whether structural or nonstructural, to be added to the community's risk management portfolio. Some strategies can be implemented over the short term, whereas others may take a longer time.

Recommendation 2: **The public and private sectors in a community should work cooperatively to encourage commitment to and investment in a risk management strategy that includes complementary structural and nonstructural risk-reduction and risk-spreading measures or tools.**

The portfolio of tools should seek equitable balance among the needs and circumstances of individuals, businesses, and government, as well as the community's economic, social, and environmental resources. Among the most promising actions that would achieve results are in the areas of building codes and standards, and insurance.

Steps for Implementation:

Federal agencies, together with local and regional partners, researchers, professional groups, and the private sector can develop an essential framework (codes, standards, and guidelines) that drives the critical structural functions of resilience. Furthermore, cooperative work between the public and private sectors can encourage investment in nonstructural risk reduction measures such as insurance premiums; such premiums can include multiyear policies tied to the property with premiums reflecting risk. Specific focus on (a) building codes and standards and (b) insurance carry promise toward implementing this recommendation.

Finding 2a: Building codes and standards are effective in mitigating and reducing disaster risk to communities. For example, research and practice have demonstrated the value of building new homes to code and to increased standards in areas that may experience high winds or hurricanes. Of 13 homes built to a Fortified standard (Fortified standard is an increased building standard—above regular code—developed by the Institute for Business and Home Safety) on the Bolivar Peninsula, Texas, before Hurricane Ike, 10

survived that disaster. However, codes and standards have some variability due to the nature of local hazards; across the nation, codes and standards are unevenly enforced and many people do not know they exist. In addition to codes and standards, guidelines, certifications, and practices can also be effective in fostering resilience.

Recommendation 2a: **Federal agencies, together with local and regional partners, researchers, professional groups, and the private sector should develop an essential framework (codes, standards, and guidelines) that drive the critical structural functions of resilience.** This framework should include national standards for infrastructure resilience and guidelines for land use and other structural mitigation options, especially in known hazard areas such as floodplains. The Department of Homeland Security is an appropriate agency to help coordinate this government-wide activity. The adoption and enforcement of this framework at the local level should be strongly encouraged by the framework document.

Finding 2b: Investments in risk-spreading or risk-reducing measures through insurance and other financial instruments can facilitate mitigation, including the relocation of businesses, residences, and infrastructure out of hazard-prone areas. Vouchers given to lower-income property owners currently residing in hazard-prone areas could allow these property owners to afford all-hazards insurance; home improvement loans could be used to spread the upfront cost of risk reduction and mitigation measures over time; and seals of approval could be used to show that the property meets mitigation standards, thus enhancing its potential resale value.

Recommendation 2b: **The public and private sectors should encourage investment in risk-based pricing of insurance in which insurance premiums are designed to include multiyear policies tied to the property with premiums reflecting risk.** Such risk-based pricing reduces the need for public subsidies of disaster insurance. Risk-based pricing clearly communicates to those in hazard-prone areas the different levels of risk that they face. Use of risk-based pricing could also reward mitigation through premium reductions and could apply to both privately and publicly funded insurance programs.

National Disaster Loss Data (Chapter 3)

Finding: The ability to measure and evaluate the assets of communities and to understand the economic and human value of resilience is critical to improving disaster resilience. Because the assets of a community involve more than the high-value essential assets such as hospitals and utilities, but also include other resources with high social, cultural, and environmental value, decision-making models developed by communities have to involve both

quantitative and qualitative "valuation" of assets in order to prioritize resilience investments.

In developing the case for enhancing resilience now and providing motivation for community decision makers to understand their inventory of assets and the ways in which they interact with one another, the historical spatial and temporal patterns of economic and human disaster losses on communities in the United States is important. Although the data available to assess economic and human losses nationally are conservative and are neither comprehensive nor centrally archived for the nation, the historical patterns of economic losses from hazards and disasters in the United States appear to be increasing and will be difficult to absorb, if allowed to continue. Without an all-hazards national repository for hazard event and loss data, estimates of how much or where losses are increasing or decreasing are difficult to make with any degree of statistical confidence. This lack of data compromises the ability of communities to make informed decisions about resilience-building strategies.

Recommendation 3: **A national resource of disaster-related data should be established that documents injuries, loss of life, property loss, and impacts on economic activity. Such a database will support efforts to develop more quantitative risk models and better understand structural and social vulnerability to disasters.** To improve access to these data, the principle of open access should be recognized in all relevant federal data management policies. The data should be made accessible through an Internet portal maintained either by a designated agency or by an independent entity such as a university. The National Science and Technology Council (NSTC) in the White House would be an appropriate entity to convene federal and state agencies, private actors, NGOs, and the research community to develop strategies and policies in support of these data-collection and maintenance goals.

Steps for Implementation:

(a) NSTC, or a federal body with a similar capacity, could convene federal agencies, private actors, and the research community to improve post-event data collection and public access to such data. Likely federal actors include the Federal Emergency Management Agency, National Oceanic and Atmospheric Administration, Centers for Disease Control and Prevention, U.S. Geological Survey, U.S. Forest Service, U.S. Department of Agriculture, and U.S. Army Corps of Engineers.
(b) Federal agencies, together with the private sector and research community, could determine essential data, standards, and protocols to employ, and which agencies are best positioned to collect and archive specific data on the impacts of hazards. Such an approach helps to avoid duplication of efforts.
(c) Biennial status reports coordinated by the NSTC on the nation's resilience could be based on analysis of these data and could include priorities for future data collection and dissemination.

National Resilience Scorecard (Chapter 4)

Finding: Without some numerical basis for assessing resilience, it would be difficult to monitor changes or show that community resilience has improved. At present, no consistent basis for such measurement exists.

Recommendation 4: **The Department of Homeland Security in conjunction with other federal agencies, state and local partners, and professional groups should develop a National Resilience Scorecard.**

Steps for Implementation:

(a) General considerations:

- The scorecard should be readily adaptable to the needs of communities and levels of government, focusing specifically on the hazards that threaten each community.
- The scorecard should not attempt unreasonable precision, either in the ways in which individual factors are measured, or in the ways they are combined into composite indicators. Rather, qualitative and quantitative measures should be mingled, and reduced where appropriate to ordinal (rankings) rather than interval or ratio scales.

(b) Specific dimensions of the scorecard might include

- Indicators of the ability of critical infrastructure and businesses to recover rapidly from impacts;
- Social factors that enhance or limit a community's ability to recover, including social capital, language, and socioeconomic status;
- Indicators of the ability of buildings and other structures to withstand earthquakes, floods, severe storms, and other disasters;
- Indicators of the ability of businesses and markets to recover; and
- Factors that capture the special needs of individuals and groups, related to minority status, mobility, or health status.

Support and Establish Community Coalitions (Chapter 5)

Finding: Resilience requires reinforcement of our physical environment—the buildings and critical infrastructure that constitute the communities in which people live. It also requires the strengthening of the nation's social infrastructure—the local community networks that can mobilize to plan, make decisions, and communicate effectively. The principal action through which a local community could vastly accelerate progress toward enhanced resilience of its social and physical infrastructure is the establishment of a problem-solving coalition of local leaders from public and private sectors, with ties to and support from federal and state governments, and with input from the broader citizenry. The charge of such a coalition is to assess the

community's exposure and vulnerability to risk, educating and communicating about risk, and evaluating and expanding its capacity to handle such risk. A truly robust coalition has at its core a strong leadership and governance structure, with a person or persons with adequate time, skill, and dedication necessary for the development and maintenance of relationships among all partners.

Recommendation 5: **Federal, state, and local governments should support the creation and maintenance of broad-based community resilience coalitions at local and regional levels.** Such coalitions can help communities promulgate and implement the proposed national resilience standards and guidelines for communities, and to assist them in the development and completion of the proposed National Resilience Scorecard.

Steps for Implementation:

(a) Assessment by the Department of Homeland Security and the Department of Health and Human Services—to the extent that these two agencies administer state and local grant programs to bolster national preparedness capabilities—of present federal funding frameworks and technical guidance. Such an assessment could gauge whether communities have sufficient support and incentive to adopt collaborative problem-solving approaches toward disaster resilience and emergency management.
(b) Adoption by communities of collaborative problem-solving approaches in which all private and public stakeholders (e.g., businesses, NGOs, community-based organizations, and faith-based organizations) are partners in identifying hazards, developing mitigation strategies, communicating risk, contributing to disaster response, and setting recovery priorities. The emergency management community is an integral part of these discussions, with potential to take a leadership role.
(c) Commitment by state and local governments to ensure that modern zoning laws and building codes are adopted and enforced.
(d) Commitment by state and local governments to secure adequate personnel to create and sustain public–private resilience partnerships, to promulgate and implement proposed national resilience standards and guidelines for communities, and to assist communities in the completion of the proposed national resilience scorecard.

Federal Policy Review (Chapter 6)

Finding: The development of appropriate policies, creation of optimal governance structures, and informed and coordinated management at all levels

of government are crucial to improving community resilience. Community resilience will grow as the knowledge, experience, and understanding of these roles and responsibilities grow among decision makers at all levels of government.

Currently, a multitude of activities, programs, and policies exist at local, state, and federal levels to address some part of resilience for the nation. Several of the critical processes, such as land-use planning and building code enforcement, are the responsibility of local groups or governments. The federal policy role is primarily to ensure that resilience policies are nationally consistent and to provide information and best practices for development of appropriate policies at all levels. Consideration of potential unintended consequences of a new policy with respect to disaster resilience is also important.

The nation does not have an overall vision or coordinating strategy for resilience. Recent work on homeland security and disaster reduction are good beginnings, but the current suite of policies, practices, and decisions affecting resilience are conducted on an ad hoc basis with little formal communication, coordination, or collaboration. In fact, some policies, decisions and practices actually erode resilience.

Leaders at the local, state, and federal level are increasingly aware of community resilience and how it might be advanced through a variety of decisions and processes. Although many of those critical decisions and processes to improve resilience occur at the state and local levels, the federal government plays a central role in providing guidance for policy and program development to assist local communities in their pursuit of greater resilience. Development of new policies informed by an awareness of resilience, how it can be promoted through decisions and processes, and how resilience can be unintentionally eroded through poorly informed decisions is essential.

***Recommendation 6*: All federal agencies should ensure that they are promoting and coordinating national resilience in their programs and policies. A resilience policy review and self-assessment within agencies and strong communication among agencies are keys to achieving this kind of coordination.**

Steps for Implementation:

This commitment will require that each federal agency conduct a resilience self-assessment and communicate the analysis of its key resilience programs and activities to agency staff, to key partners and stakeholders, and to the public. Such an assessment includes

(a) The manner in which each agency's mission contributes to the resilience of the nation;
(b) How an agency's programs provide knowledge or guidance to state and local officials for advancing resilience;

(c) Evaluation by each federal agency of its interactions with other federal agencies, state and local governments, and the public to evaluate the extent to which its resilience work is made available to those who need it;
(d) Evaluation across federal agencies engaged in disaster services regarding what is working and what is not working, and
(e) Participation by each relevant federal agency in the coordination of resilience policy and programs as prescribed in PPD-8.