

Oxford Research Encyclopedia of Natural Hazard Science

Natural Hazards Governance in Democratic States With Developed Economies

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Subject: Policy and Governance Online Publication Date: Jan 2019

DOI: 10.1093/acrefore/9780199389407.013.135

Summary and Keywords

Natural hazards have evolved from being the responsibility of subnational governments—if the government intervened all—to become a core function of national governments. The cost of disaster losses has increased over time in states with developed economies, even as fewer lives are lost. Increasing losses are caused by an increasing number of extreme weather events, which wreak havoc on urbanizing populations that build expensive structures in vulnerable locations. Hazards governance attempts to use political and organizational tools to mitigate or prevent damage and bounce back when disasters occur. In large and developed states, authority for hazards governance is fragmented across levels of government, as well as the private sector, which controls much of the infrastructure and property that is subject to losses.

The political consequences of disaster losses are mixed and depend on contextual factors: sometimes politicians, government agencies, and nonprofit and voluntary organizations are blamed for failures on their watch, and sometimes they are rewarded for coming to the rescue. The study of disasters has become more interdisciplinary over time as scholars seek to integrate the study of natural hazards with socio-political systems. The future of hazards governance research lies in improving understanding of how to manage multiple, overlapping risks over a period of time beyond next election cycle, and across levels of government and the private sector.

Keywords: disaster politics, resilience, recovery, multilevel governance, intergovernmental relations, federalism, improvisation, emergent phenomena, crisis leadership

Introduction

Natural hazards have evolved from a matter for subnational governments—if the government intervened all—to a central task of governance on a national and supranational scale (Boin, Ekengren, & Rhinard, 2013; Roberts, 2013). The study of disasters has also evolved from a focus on how to predict and prevent specific hazards to a more interdisciplinary and comprehensive approach for how to reduce losses, since not all disasters can be prevented. Scholars have made progress in understanding the politics of natural hazards, resilience and recovery, multilevel governance and federalism, and improvisation and emergent phenomena. The future of hazards governance research lies in improving understanding of how to manage multiple overlapping risks over a period of time beyond the next election cycle, and in comparative research across national and subnational systems.

Disaster Science in the 20th Century

Both disaster governance and disaster science grew more complex beginning in the mid-20th century. After World War II, the U.S. federal government built a national-level architecture for civil defense to prepare for nuclear attack, but civil defense agencies gradually used their expertise and resources to prepare for natural disasters (Knowles, 2013, pp. 14–19, 162–174; Roberts, 2014). Bomb shelters could provide protection from earthquakes. Hazards planners learned that the science of evacuation could save lives in the face of a hurricane even if its utility in the face of nuclear war was dubious. Beginning in the 1970s, the U.S. federal government expanded into new areas of American life—including natural hazards—with the programs of the Great Society (Davies, 1996, 2007; Morris, 2014).

Other countries also developed civil defense architecture that came to be employed in natural disasters, and many adopted models from the United States and U.S.S.R. with modifications (Alexander, 2002; Dynes, 1990). The study of natural hazards became similarly nationalized and globalized. Countries, states, and provinces mounted efforts to develop knowledge to better address the disasters that were most common in their jurisdictions.

Government agencies funded the development of disaster science. The first social science study of collective behavior in disaster was Samuel Prince's (1920) analysis of a 1917 explosion aboard a French cargo ship in port that killed 2,000 people in Halifax, Canada. After World War II, and building on new methods in the study of human behavior, disaster sociology emerged as a research program into how groups respond to natural hazards. Many early studies were funded by the United States Office of Civil Defense, and eventually the study of hazards governance and sociology became sufficiently mainstream

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to receive National Science Foundation funding (Quarantelli, 2002, 2005). National security agencies in the United States and elsewhere funded studies on disaster as they looked for situations analogous to war. In the mid-20th century, the social sciences began a closer integration with natural sciences in the study of hazards (Fritz & Marks, 1954). Disasters came to be seen as problems of collective organization, behavior, and politics as much as problems of weather and climate science, or structural engineering.

Some (the University of Colorado Natural Hazards Center) define the field as natural hazards, while others (the journal *Homeland Security Affairs*) use the term homeland security, while still others define their work in terms of crisis management (Harvard's Ash Center), emergency management (FEMA's Emergency Management Institute) and, more recently, resilience. All of these perspectives share a multidisciplinary tradition of investigation into governing hazards and face new challenges in the 21st century. Developed states have not been able to stem the tide of disaster losses, despite better technology and accumulating knowledge. The specters of climate change and urbanization looms over efforts to prepare for any single hazard or event. Disasters are political events, mediated by news broadcasts and bottom-up social media phenomena. Therefore, natural hazards governance is bound to security and environmental threats—witness the spread of homeland security around the world, and at the subnational level of government in the United States. Increasing public attention to disasters has contributed to increased expectations of government in disasters—expectations that political leaders will try to meet despite declining trust in government in many states (Kapucu & Van Wart, 2006).

Better at Saving Lives, But a Future of Greater Property Losses

The study of how to prepare for, manage, and respond to natural hazards in states with developed economies has grown in recent years, responding to the seeming paradox that even as countries become better at saving lives, property losses continue to increase. While the loss of life is much greater in the developing world, occasional mega-disasters such as Hurricane Katrina in the United States in 2005 and Hurricanes Harvey and Maria in 2017 or Japan's Tohoku earthquake and tsunami in 2011, show that the potential for large-scale lethality and for long-term relocation following disaster remain major concerns. On an annualized basis, however, the trend line for disaster deaths is downward in developed economies, while property losses point up.

A 2014 study finds that global disaster losses increased at a rate of \$3.1 billion/year (2008 USD) from 1980–2008 (Mohleji & Pielke, 2014). Almost all (97%) of the increase came from North American, Asian, European, and Australian storms and floods. The bulk of these are from North American storms, and hurricanes in the United States are a significant proportion of these cases. Some scientists claim that climate change is likely

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to increase the intensity and frequency of extreme weather and drive up natural disaster losses. However, studies infer that patterns of human development are important factors in explaining increased disaster losses, in particular the factors of population growth, urbanization along coastal and river regions, and increases in the expansiveness and density of costly private and public properties in locations vulnerable to natural hazards (Centre for Research on the Epidemiology of Disasters, 2016; Mohleji & Pielke, 2014).

Scientists have identified many of the sources of vulnerabilities to disasters, but the systematic study of how better and worse governance contributed to natural hazards losses is relatively new (National Research Council, 2006). Disaster sociology has focused on how hazards interact with vulnerable populations: poor people sometimes live or work in vulnerable or low-lying areas, where there is less access to both public and private emergency and recovery assistance (Webb, 2006). Scholars of environmental justice also analyze how poor or marginalized populations are subject to disproportionate risks (Bullard & Wright, 2012). Poor people, including the elderly poor, often lack sufficient economic and social support when disaster strikes (Cutter, Boruff, & Shirley, 2003, Donner & Rodriguez, 2008). Studying particular disasters can illuminate vulnerabilities in surprising places. Eric Klinenberg's (2002) account of 739 deaths largely caused by a Chicago heatwave in 1995 found that poor, elderly men were most at risk of dying because of a lack of social ties, which led them to stay indoors in stifling heat rather than venture outside. Most studies of risk and vulnerability focus on the United States, which has one of the most unequal income distributions in the developed world (Desilver, 2013).

The study of governance grew out of political science, public administration, and public policy. Governance comes from the idea that functions once considered the domain of government are carried out by an array of actors—multiple levels of government, nonprofits, and the private sector. Thinking about governance moves scholarship away from Weberian hierarchies and toward ideas about coordination and collaboration for public purposes (Agranoff & McGuire, 2003; Agranoff, 2007; Comfort & Kapucu, 2006; Goldsmith & Eggars, 2004).

Studies of collaboration focus on how to solve problems such as natural hazards that are beyond the purview of any one organization (Ansell & Gash, 2007). Reducing vulnerabilities to hazards and improving disaster response and recovery are the responsibilities of many organizations at all levels of government. These responsibilities also fall to the private sector, civil society, and to individuals. Studies of emergency managers at the county level show that the skills they most value are collaboration and coordination, not command, despite the roots of their organizations in military-driven civil defense (Roberts & Wernstedt, 2016).

Public management studies find that emergency managers are more successful collaborators when they perceive problems as severe, have good management skills, lead high capacity organizations, and operate in less complex organizational structures (McGuire & Silva, 2010). Collaboration requires reaching across the bounds of an individual organization to include the private and nonprofit sectors in order to accomplish

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public purposes (Emerson, Nabatchi, & Balogh, 2012, p. 26). One of the most successful examples of formalized collaboration is the Emergency Management Assistance Compact (EMAC), an agreement through which states come to one another's aid after disasters. The compact was formed after Hurricane Andrew overwhelmed Florida's capabilities in 1992, and it is administered by the National Emergency Management Association and state governments, supported by federal legislation (Kapucu, Augustin, & Garayev, 2009; Sylves, 2014).

Beyond the political science and public administration literature, the study of natural hazards governance draws from a long-standing literature on risk governance. One strain of this research focuses on how societies can reduce the characteristics of risk (Renn, 2008). Another strain examines how individual and social psychology shape risk perception and how people respond to perceptions of risk. For example, people who have experienced a recent disaster are more likely to rate it as an important risk. Hazards can also be divided into types, and one type of technological hazard, radiation, inspires a particular kind of risk fear that is not correlated with its objectively measured probability of occurrence: this is a phenomenon that social psychologists call "dread risk" (Slovic, Fischhoff, & Lichtenstein, 1986). People tend to fear low-probability, high-consequence events that are technological in nature. Owing to their infrequency, complexity, and complicated causes, such events are not well understood by the general public. For example, surveys of the public show that terrorist attacks inspire more dread than traffic accidents, even though the likelihood of being killed in a traffic accident is massively greater (Gigerenzer, 2004). Risk perception can distort policy priorities in democratic societies, where perceptions feed back into the policy process (Stewart & Mueller, 2008; Mueller & Stewart, 2011). Attempts to measure and address risks relative to their annual projected costs may also be foiled by administrative procedures. Risk equals probability multiplied by consequences. Yet, scientific assessments of flood risk in Europe are filtered through various political and administrative entities that do not necessarily direct funds to locations at greatest risk (Krieger, 2013).

From Governance of Risk to Policy Process

Classic accounts of natural hazards governance advocate reducing hazard losses by making risks more visible, by enhancing mitigation, and by strengthening planning (Burton, Kates, & White, 1993). More recent studies place hazards governance in the context of wider bargaining in the political and policy process (Sylves, 2014). Mainstream political science, public administration, and public policy journals began to address emergency management in the 1980s and 1990s. One of the earliest treatments of disaster governance in a major journal was a 1985 special issue of *Public Administration Review*. The journal outlined a research agenda for crisis decision support, proposed frameworks for integrating public and voluntary sector responses, and framed the challenge of disaster management as a political and administrative one (Petak, 1985). The

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essays argued for a more comprehensive approach that would better elucidate the problems and challenges of emergency management. Part of the effort involved developing technical tools and solutions that would enable improved disaster response. The search for broader and more comprehensive approaches to emergency management followed. This was also an attempt to transcend definitions and conceptualizations that had been developed by and for practitioners, many of whom worked in public management capacities. Theorists, most of them academics, sought research frameworks that would integrate natural hazards with the study of sociopolitical systems (McEntire, Fuller, Johnston, & Weber, 2002).

In the realm of practice, the emergency management profession came to embrace “all hazards” as a mantra by which to advocate what emergency managers at all levels of government should be doing (Roberts, 2013, pp. 106–117). “All hazards” refers to the idea that emergency managers were, as much as possible, supposed to use the same plans, procedures, and personnel to prepare for and respond to all kinds of hazards: natural disasters, technological disasters, human-caused disasters (which included attack), and hybrid disasters, rather than having separate organizations and plans responsible for each unique form of hazard (Haddow, Bullock, & Coppola, 2017). One purpose to be served by all hazards was achievement of an economy of scale in preparedness and training. Another aim was to promote cross-training and adaptability among responders. Also, this method of organizing facilitated coordination and team building. The concept helped both the public and practitioner community understand that many disasters were multifaceted and capable of producing secondary and tertiary disasters and emergencies demanding a variety of tasks and skills (Haddow, Bullock, & Coppola, 2017). By 1993 the idea became central to the U.S. Federal Emergency Management Agency’s work and penetrated other levels of government.

Almost in parallel came the “phases conceptualization,” which holds that emergency management is composed of interconnected and overlapping mitigation, preparation, response, and recovery phases (NAPA, 1993; Roberts, 2013, pp. 11, 92–95). The “phases” model drove the re-organization of emergency management comprehensively. The model deserves credit for breaking disaster management free from the parochial notion that handling disasters and emergencies was only the domain of responders.¹ These categories also helped broaden the field of emergency management beyond a traditional focus on response.

Emergency management underwent rapid change in the 1980s and 1990s. Military-focused civil defense evolved into civilian dominated emergency management under an all-hazards approach. Disaster laws, policies, and directives spawned emergency management organizations. FEMA was formed in 1979 under President Carter by combining disparate functional units extracted from other departments and agencies. Other countries created similar bureaucracies. Governing natural hazards became an issue for the political system, not just one for management or any particular subdiscipline. The source of the change in emergency management came from many

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directions—in response to disasters, from public expectations, and from the knowledge base of scientists and the growing professionalization of the field.

Social Construction of Hazards

Public policy scholars have explored the ways in which public policies change through social and political construction (Schnieder & Ingram, 1993). The idea is that policies do not correspond to fixed categories but instead reflect shared and changing assumptions. For example, people make emotional value judgments that affect certain groups. They can be quick to label people seen carrying bags of food through a hurricane-ravaged town as looters, even if they did not witness a theft. As a group, however, disaster victims are seen sympathetically, as deserving of assistance (Dauber, 2013). Other recipients of social welfare are not always regarded so charitably. However, a general sympathy toward blameless disaster victims does not always translate into the sympathetic and just distribution of aid after disaster (Sterett, 2015).

Social construction approaches to natural hazards governance may seem obvious, but they sometimes conflict with rationalist and technical accounts. Classic Weberian accounts of bureaucracy portray it as a product of rational design, in which problems are discovered and solutions crafted to fit problems (Fry & Raadschelders, 2013). In fact, bureaucracies often resemble a process of construction and reconstruction, changing in response to events, new perceptions, political agendas, and episodic attention. The September 11, 2001 attacks led to the creation of the massive 180,000-person Department of Homeland Security, which swallowed up the Federal Emergency Management Agency and its roughly 3,500 employees and tilted missions away from natural disasters toward terrorism threats.² Presidential elections in the United States have brought appointees who led disaster agencies with vastly different priorities: some, such as Ronald Reagan's appointee, Louis Giuffrida, favored security threats and tried to turn the agency into a "mini- FBI" during his tenure from 1981–1985 (Roberts, 2013, pp. 82–90). In other cases, presidents appointed officials with little disaster management experience, who hurt the credibility of FEMA (Lewis, 2010).

Scholars of the policy process show how change is influenced by factors not closely related to the problem at hand. Policy monopolies who are happy with the status quo attempt to keep problems invisible (Baumgartner & Jones, 2009). Some policies lack active public engagement and become policies without a public; flood insurance is one example (May, 1991). People may be aware of disaster risk, but they are often indifferent about whether or not to act on the risk, so they do not purchase flood insurance or elevate their house above flood board. In contrast, "private risks" such as crime or job-related accidents generate greater awareness and active coalitions form for the purpose of preventing or abating these harms (May, 1991).

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The policy process literature shows that the metaphorical window of opportunity opens for change when public attention focuses on a problem, available solutions exist to address the problem, and interests push for a resolution of the problem (Jones et al., 2016; Kingdon, 1984). The advocacy coalition framework attempts to explain how complex networks of professions, business, and interest groups can influence government, or keep problems off the table (Albright, 2011; Nohrstedt, 2010; Weible, Sabatier, & McQueen, 2009).

While the policy process literature shows how issues are dealt with on the policy agenda, scholars of the social construction of hazards and disasters analyze how the agenda for policy and governance emerges over time. Disasters are as much a social phenomenon as a natural one, and therefore people's perception and attention level matters as much as the phenomena that physically caused the disaster. Eisensee and Strömberg (2007) found that for every person killed by a volcano, nearly 40,000 people have to die of a food shortage to get the same probability of appearing on the TV news in the United States.

The takeaway from the literature is that many of the problems exposed by disasters stem from underlying social phenomena (Tierney & Bevc, 2007). These phenomena—whether the fact that a poor community resides at or below sea level or that a marginalized community is exposed to environmental hazards because of industrial plants located nearby—become visible over time (Bullard & Wright, 2012). Immediately after a disaster, the media, the public, and politicians focus on the event rather than its underlying causes. Scholarship in the study of policy agendas and social construction has turned toward exploring underlying causes in social ills, physical vulnerabilities, and climate trends.

Social construction does not mean that policies are fixed—only that the dynamics of influence framing, perceptions, and problem definition via social construction may shape and affect policy. Beyond the realm of affect and framing, political construction influences policies through the active participation of politicians, bureaucrats, and citizens in the political process, and the accumulation of change over time (Roberts, 2006, 2013, pp. 8–9). For example, developed states use humanitarian disaster relief to advance foreign policy goals as well as to respond to suffering (Drury, Olson, & Belle, 2005; Mamuji, 2012).

Hazards governance is largely event-driven rather than anticipatory. Sometimes focusing events in the form of major disasters attract attention and put new problems on the agenda (Birkland, 1997). In the United States, Hurricane Katrina led to the Post-Katrina Emergency Management Reform Act of 2006, which gave FEMA more authority and expanded its role within the Department of Homeland Security. In Europe, a series of major oil spills led to media attention, which in turn led to legislation at the European Union level (Broekema, 2016).

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A disaster shifts attention to new issues, and interest groups mobilize to address what they perceive to be the causes and effects of the disaster (Birkland, 1998). Birkland's (1996, 2006) work draws on the social construction and interest group mobilization literature to analyze how the composition of policy communities shapes agenda-setting (and, ultimately, policy outcomes) driven by major disasters. For example, natural hazards are often framed as easily perceptible problems of precipitation and flooding rather than as the politically fraught problem of climate change. In the United States, a large bipartisan policy community is supportive (at least at the level of rhetoric) of flood prevention and resilience but more timid when it comes to programs explicitly designed to address climate change.

Natural hazards governance also appears to be event driven outside of the United States. In the United Kingdom, disaster management became more centralized after September 11, 2001. This led some critics to worry that the system was losing its former resilience, which came from its decentralization (O'Brien & Read, 2005). Disaster mismanagement in the United States also led to debates about whether decentralization and federalism were the cause, or whether excessive centralization was to blame (Birkland & Waterman, 2008; Derthick, 2007). In truth, decentralization can reveal weaknesses in poorly governed or poorly resourced communities, while excessive centralization and bureaucratic procedure can obscure risks and slow response.

In the wake of Hurricane Katrina in the United States, there was blame enough to go around for all levels of government. Politicians tried to shift blame to other levels of government or administrative agencies, and national level politicians had some success among people who shared their political ideology in shifting blame to lower-level governments (Maestas, Atkeson, Croom, & Bryant, 2008). As in many policy domains, citizen evaluations of politicians in disaster politics are liable to be influenced by their prior opinions about party and ideology (Redlawsk, 2002). Further evaluation of motivated reasoning in disaster politics is a fruitful avenue for future inquiry.

Disaster researchers have made important progress in recognizing the unequally distributed consequences of disasters, but they have made less progress in analyzing social factors that contribute to natural disasters. It has become a truism that no disaster is purely natural, because humans shape vulnerability to disaster. A weather event only becomes a disaster because of its consequences for living beings. A study of floods in the Mississippi River Valley and hurricane-related damage after Katrina shows that damage was the result of a three-part process—spreading the costs of damage, concentrating the benefits of development in risky areas, and concealing the real risks (Freudenburg, Gramling, Laska, & Erikson, 2008). The rhetoric of natural disasters as purely a weather phenomenon hides the real source of risk in development, but even generic concepts such as development or disaster capitalism hide the process by which risks become real (Klein, 2007). Scholars would benefit from greater empirical attention to the process through which communities make choices—wittingly and unwittingly—to increase disaster risk.

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Along with the accumulation of scholarship on natural hazards governance comes the problem of how to aggregate knowledge. There is no single disaster dataset on the scale of the correlates of war data of conflict in international relations (Singer & Small, 1994). The concept of what counts as a disaster and how long it lasts is still contested. The study of hazards governance is also more diverse than the study of war from the perspective of international relations. Hazards governance draws on insights from engineering and physical science as well as on theories from political science, sociology, economics, policy, and administration. While many of the problems of governance and the policy process are portable across policy fields, the study of natural hazards governance has developed some field-specific concepts, such as all hazards, all-phases, disaster politics, resilience, and recovery.

The Politics of Disaster in the Risk Society

In many ways, society in developed economies is becoming safer—theater fires and elevator collapses are less common than in the past, and the effects of widespread drought are felt less severely (Wildavsky, 1988). Buildings are better protected from earthquakes than a century ago, and hurricane prediction has become remarkably accurate. At the same time, people are increasingly preoccupied with safety and future risks—a condition that Beck (1992) calls the “risk society.” Globalization, increasing interdependence among social and infrastructure systems, and the media environment combine to make natural hazards more visible (Goldin & Mariathasan, 2014).

As hazards become more visible, government has trouble meeting people’s expectations regarding how quickly a community should recover from a disaster and how many inconveniences they should suffer through (Kapucu & Van Wart, 2006). In the early years of the United States, localities and neighbors responded to disasters, not the federal government. No one expected President George Washington to be involved in a response to any disaster except invasion. Yet today, the president is the responder-in-chief to major natural disasters, industrial accidents, and terrorist attacks (Roberts, 2010). The Federal Emergency Management Agency, founded in 1979 as part of a consolidation of civil defense and natural hazards agencies, has become the focus for the federal government’s role in disaster response. The agency reports to the president and the Congress: and when things go badly, it is often roundly blamed by politicians at all levels of government. After Hurricane Andrew hit Florida in 1992, the emergency manager of Dade County, Florida, asked plaintively, “Where in the hell is the cavalry?” after her requests for aid from FEMA went unanswered (Adair, 2002; Roberts, 2013, p. 88). Some members of Congress wanted to abolish FEMA for not responding quickly or thoroughly enough. Critics blamed the slow response for contributing to President George H.W. Bush’s image as ineffectual and to his loss in the 1992 election, even though he won Florida’s electoral votes (Wines, 1992).

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The next president, Bill Clinton, learned from Bush's experience. Clinton saw many presidents name a crony as FEMA director, but during his campaign for president he vowed to appoint someone with experience (Clinton, 2004, p. 428; Roberts, 2013, pp. 104–115). He appointed James Lee Witt, who had served as director of the Arkansas Office of Emergency Services, to head FEMA and to serve as the president's "eyes and ears" after a disaster (Merida, 1996). Clinton recognized that he could win greater public approval by being seen as coming to the aid of disaster victims.

Increasing Expectations

While disasters are political events (as Witt himself once put it), does the president have a role beyond photo opportunities at a disaster site? (Roberts, 2013, p. 110). One thing presidents can do is get out of the way and visit sites that are not in immediate danger so that their entourage does not interfere with rescue efforts. Many presidents offer reassuring messages of hope and hugs after a disaster. Behind the scenes, the president can urge a multitude of agencies to cooperate. Without the president's encouragement, bureaucratic norms can take over. Red tape slowed some of the response to Katrina, and for this George W. Bush and FEMA drew some of the blame (Birkland & Waterman, 2008; Waugh, 2006). The president also signs disaster declarations requested by governors to provide financial and operational assistance to states overwhelmed by catastrophic disasters (Sylves & Búzás, 2007; Sylves, 2014, pp. 76–107).

Increasing public and media expectations have made response and recovery more of a priority for the president and national-level agencies now than in the past. Disasters are as much a test of the modern president's mettle as war or the health of the economy. Disasters provide electoral benefits to politicians and bureaucrats who come to the aid of victims. There are fewer immediate benefits for reducing the causes of disaster through mitigation programs—building dams and levees, restoring wetlands, or limiting growth in vulnerable areas. The root causes of disaster losses are the patterns of human development in vulnerable locations—patterns that presidents and the U.S. federal government have minimal ability to control. Even in more centralized political systems, politicians have fewer incentives to limit the causes of disaster than they do to participate in response and recovery—with the exception of cases in which a nation experiences a similar chronic hazard routinely. For example, the Netherlands' long experience with severe flooding gave rise to a social consensus for a large investment in structural protection through dams and levees (Wesselink, 2007).

Attributing responsibility for disaster management to the federal government or a president or single leader distorts the system of disaster management. This is because the chief cause of disaster losses is human settlement in vulnerable locations. In the United States, state and local governments set the conditions for planning and zoning. Across all countries that employ a federal structure, attributing responsibility for disaster management to the national government distorts the system by under-emphasizing the role that localities and civil society play in disaster response. Neighbors, and then local

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government, businesses, and nonprofits are the first to respond—and the last to leave, since they are themselves community residents. National government officials may enact monitoring conditions after disaster, but most of them leave once the recovery period is deemed over.

Some scholars worry whether government is up to the job. Hazards governance has made substantial advances in coordinating among levels of government, in developing organizations tools such as the Incident Command System that prescribe roles before and during a crisis, and in using data analytics and communication technology. At the same time, scholars worry about a hollowing out of government capacity in an age of static budgets and contracting out (Cigler, 2007). Government needs the people, the expertise, and the funds to carry out ambitious plans to prepare for and respond to disasters.

Leadership and Accountability

Improving coordination across complex webs of infrastructure and administrative jurisdictions is easier said than done. When government fails to meet expectations, political leaders may be held accountable—but it is not always predictable if they will be blamed or rewarded for their response to disaster (Boin, McConnell, & 't Hart, 2008). Law is a tool to solve problems after disaster, but it is also a tool that can be used to impede or delay problem solving or evade blame (Sterett, 2013). Corporations or governments can use liability law to escape financial consequences or public ire from de facto if not de jure negligence (Seed et al., 2006).

A long debate in political science turns on whether voters blame politicians for seemingly random episodes of shark attacks—and therefore if politicians are held accountable for things outside of their control (Achen & Bartels, 2016). At the very least, disasters create opportunities for blame and accountability. It is still unclear why leaders can develop a reputation for success in one crisis (President G. W. Bush after September 11) and not in another (G. W. Bush after Katrina) (Boin et al., 2010). Does the public misperceive crisis leadership (some cases in Boin, McConnell, & 't Hart, 2008), or are the qualities of good leadership situational, or contingent on the opportunities available in the environment (Stern, 2009; Wasserman, Anand, & Nohria, 2010)? Leadership in disasters relies on the correspondence of a leader's ability and skills with the timing and place of the event, support throughout an organization, and sometimes luck. It may also be that crisis leadership skills carry over from one disaster to another, and it is easier to analyze crisis leadership in an operational context (such as a local fire chief or emergency manager), than it is to analyze leadership in a political context, which brings conflicting value considerations. Good crisis leadership requires the ability to craft a narrative about the cause of the crisis, to build credibility as a messenger, to manage relations with subordinate officials and levels of government, and to incorporate learning into preparing for the next crisis (Boin, 't Hart, Stern, & Sundelius, 2006; Sylves, 2006). Good leaders

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learn, but great leaders integrate learning into organizational and political systems that will outlast their tenure (Gerber, 2007).

The experience of crisis itself may help open leaders' minds to imaginative possibilities for preparing for the next disaster (Stern, 2009). The 9/11 Commission blamed the failures leading to the September 11 attacks on a "lack of imagination," and the same might be said about certain natural hazards such as rising sea levels that require preparing for the future (National Commission on Terrorist Attacks, 2004). Short-term crisis leadership may demand different skills than long-term leadership. A short-term crisis manager may need to have personal networks in place before a disaster and a sophisticated ability to make sense of the operating environment (Harrald, 2006; Stern, 2013; Lu & Xue, 2016). Vision and imagination may be a long-term leader's most important qualities (Drabek, 2014). The shock of a disaster can lead to a drop in government performance, but a study of public education systems after two hurricanes shows that staff capacity and stability can mitigate declines in performance after disaster (Meier, O'Toole, & Hicklin, 2010).

The politics of disaster are complicated by the tension between politicians' short time horizons, such as looking to the next election, and the long timeline of hazards, whose vulnerabilities take years, decades, or even centuries to accumulate. One means of addressing hazards over the long term has been to bureaucratize hazard management through risk management, which subjects some decisions to investment calculations designed to reduce risk over the long term through bureaucratic processes at some distance from day-to-day political decision making. "Risk-based" has been a mantra in the U.S. Department of Homeland Security since its early days (Roberts, 2013, pp. 177, 186). Sometimes risk management is a euphemism for blame avoidance, and sometimes it represents wise investment in hazards management through the use of insurance, flood zones, and structural and nonstructural mitigation measures (Boin & Lodge, 2016). Critics of the Department of Homeland Security point out that many of its policies are not guided by risk management and that money has been wasted on measures that are actually security theater or that do not allocate resources to the most severe threats (Mueller & Stewart, 2011; Stewart & Mueller, 2008). Defenders of the department's efforts may point out that the government provides information such as flood zone mapping and insurance rates to inform citizens about risks so that they can make decisions based on their risk tolerance and likely payoffs.

Disaster spending and risk-based programs are never fully removed from politics, however. The study of political incentives for disaster spending has been investigated most thoroughly in the United States, where the president makes disaster declarations on a case-by-case basis. The president, a state's governor, and the respective state's congressional delegation sometimes differ in their recommendations, and the president can choose to issue a declaration or deny the request (Sylves & Búzás, 2007). In 1988, the Stafford Act gave the president more discretion over disaster relief spending, but the act was an extension of a larger trend of presidential involvement. The number of disaster declarations issued each year has increased since President Eisenhower issued the first

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serially numbered one in 1953 to aid victims of a tornado in Georgia (Lindsay & McCarthy, 2015). The average number of declarations issued from 1960 to 1969 was 19 per year, while from 2000 to 2009 the average increased to 56 per year. Presidents have become increasingly aware of the electoral value of disaster relief (Sylves & Búzás, 2007; Sylves, 2014).

Politicians receive electoral support for delivering disaster aid. Gasper and Reeves (2011) found that electorates punish presidents and governors for severe weather damage and that they are able to distinguish between a president's and a governor's actions in providing or denying aid. In the case of disaster declarations, a state that is highly electorally competitive and relevant for a president's reelection chances can expect to receive twice as many presidential disaster declarations as a state that is not important to a president's reelection chances (Reeves, 2011). State and local leaders (Twigg, 2012) as well as European prime ministers also reap rewards from providing disaster relief (Boin, McConnell, & 't Hart, 2008). The literature on politicians' involvement in disaster relief can make progress by investigating the variety of ways that political leaders can participate in disaster relief and the strategies most likely to lead to electoral rewards or punishment.

In an age of the 24-hour news cycle, disasters focus national attention on the government's response to an emergency. Most politicians recognize the importance of appearing to respond to a crisis. There is less reward for preventing a disaster since politicians can rarely take credit for an event that did not happen. In some cases, politicians may claim credit for preventing attacks or terrorism, but it is more difficult to show that natural disasters were foiled like a terrorist caught red-handed. More typically, disaster mitigation preparedness investments reduce the extent of losses and prevent a routine event from becoming a major disaster. For example, rain could fall and fill streets without damaging houses or slowing down a city's core functions for more than an afternoon. Healy and Malhotra (2009) found that voters in the United States reward the incumbent presidential party for delivering disaster relief spending but not for investing in disaster preparedness spending.

Politicians have greater incentive to take credit for investments in disaster response and recovery, where they can be seen to have a palpable effect on the lives of disaster victims in need, than to take credit for investments in mitigation and preparedness, whose payoffs are more uncertain. Politicians' ability to advocate for the district they represent is one variable that predicts successful and speedy recovery. Aldrich (2016) examined why some communities recovered more quickly than others after the 2011 Fukushima disaster. He finds that the best predictor of recovery is the number of powerful politicians representing the area in the national government. Beyond political representation, Aldrich's (2012) other work finds that social capital is a strong predictor of recovery across disaster types and cultures. Social capital refers to the neighborhood ties and civic skills necessary to share information and access financial and material assistance from outside the neighborhood. Social capital studies inform the burgeoning literature on

disaster resilience, even as most studies of resilience neglect consideration of political and electoral incentives. Political scientists and political historians have been slower to engage the concept of resilience than sociologists, urbanists, planners, and engineers.

Resilience and Recovery

Rather than try and prevent disasters, resilient societies count on bouncing back from floods, earthquakes, hurricanes, and other events (Comfort, 1994; Manyena, 2006; Wildavsky, 1988). In the 2000s and 2010s, resilience became a catch-all term, replacing “sustainability.” This is apparent in the naming of many government and foundation disaster management programs in university curricula. Sustainability still has its fans, but resilience is the hot term of the 21st century. In the United Kingdom, for instance, the 2004 Civil Contingencies Act used the term “resilience” to describe the government’s approach to protecting lives and property from natural and man-made hazards (Lentzos & Rose, 2009; Coaffee & Rogers, 2008).

At its best, resilience has focused attention around steps that communities can take to recover quickly, even from a severe event. Some communities choose to leave low-lying areas undeveloped to act as natural barriers, while others develop parks along a riverside or mangrove forests along ocean fronts, all in the name of resilience. The concept also conveys efforts to improve infrastructure, such as building redundancy into systems of interdependent health, transportation, and safety networks (Birkland, 2016; Kapucu & Sadiq, 2016; Leavitt & Kiefer, 2006). At the operational level, resilience initiatives can include training, simulations, and wholesale cultural change (Weick & Sutcliffe, 2011). At their worst, however, resilience initiatives can be more symbolism than substance, used to rebrand the status quo.

The earliest social science studies of disaster focused on the factors that influenced the speed of recovery, such as the severity of the damage and the amount of aid (Dacy & Kunreuther, 1969). The literature moved from investigating single disasters to comparing recovery among disasters in particular communities in order to understand the effects that shape recovery over the period of a decade or longer (Erikson, 1976; Haas, Kates, & Bowden, 1977; Wright, Rossi, Wright, & Weber-Burdin, 1979). Disaster sociology continues in the 21st century with a focus on how to improve planning and citizen involvement to make recovery lasting and impactful (Rodriguez, Quarantelli, & Dynes, 2007). Planners focus on practical steps such as improving zoning ordinances to build resilience to disasters. The resilience mantra is “build back better,” and planners and urbanists point to the connection between human communities and the natural environment that can be missed with a focus on structural engineering solutions (Olshansky & Johnson, 2014).

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Overly top-down or outside-driven recoveries can leave problems to fester. A former planning director from New Orleans blames an overly top-down and elite-driven planning process for the gaps that led to weak recovery in some neighborhoods following Hurricane Katrina (Ford, 2010). Kristina Ford's experience in government made clear the political dimensions of planning decisions. "Inevitably . . . each and every land-use decision a city makes will disappoint some set of citizens and please others," she wrote (Ford, 2010, p. 216). The most successful bottom-up flood risk planning processes involve local stakeholders who have sufficient time, money, and attention (Thaler & Levin-Keitel, 2016). When those are in short supply, elites and outsiders can overwhelm the planning process, even with the best of intentions.

One debate in the literature turned on whether recovery proceeds in a linear fashion or a logarithmic one, in stages. Early research proposed a linear timeline to recovery from beginning, to partial, to complete (Haas, Kates, & Bowden, 1977). More recent research found that it moves in fits and starts (Rubin, 2012). Actual recoveries do not proceed in neat phases because they are a result of interrelated social and physical phenomena that have their own timelines (Neal, 2007). Disaster recovery exposes preexisting problems: returning a school system to normal may take longer in a community that underpays its teachers compared to neighborhood jurisdictions. Restoring a neighborhood may take longer in a community that is poor, because residents have to move to seek work elsewhere and may not have the means to return and rebuild.

Now that the concept of resilience is commonplace in many countries, the next step is to connect it to the messy and particular details of governance (Yoon, Kang, & Brody, 2016). One criticism of resilience is that it is an ecological concept, not a political or administrative one, and may carry deterministic assumptions (Duit, 2016). Marrying resilience thinking with an understanding of political incentives and structures could help better prepare communities for hazards.

The flexibility of the concept of resilience is a potential strength when combined with specific actions that are feasible in a specific context. The idea of resilience could be a focal point for different groups to come together to produce a community dedicated to reducing disaster losses (Bulley, 2013). New efforts by the Rockefeller Foundation to install resilience officers in city government or the United Nations' resilience scorecard for cities are examples of this burgeoning activity. The resilience community draws on different disciplines and professions with the shared goal of preparing for disasters by strengthening planning and zoning codes, building infrastructure to send flood water outside of a city, locating vulnerable populations that may need help during a disaster, and planning for long-term recovery and displaced populations in advance (Levine, Esnard, & Sapat, 2007; Mitchell, Esnard, & Sapat, 2012; Peek, 2008; Smith, 2012).

Insurance holds out promise for building resilience. Ideally, insurance could encourage people to build cost-justified disaster-resistant structures and raise the costs of development in vulnerable locations. Raising insurance rates to market levels would shift more of the costs of disaster risk to property owners and encourage people to build better

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structures in better locations. In practice, property owners in the United States and elsewhere have pressured politicians into watering down insurance programs so that developers and property owners do not pay a market price for insurance up front and can expect to receive some government support to rebuild after disaster (Knowles & Kunreuther, 2014; Strother, 2016).

In the United States, flood insurance has not been widely adopted. Congress adopted the National Flood Insurance Act of 1968 in order to make the insurance more affordable through government support as a response to a perceived market failure. Insurance companies are often wary of marketing disaster insurance without government support because premiums can be too high for people to want to purchase the insurance since the risk pool is not large enough to widely diffuse costs. The unaffordability of market rate insurance in some vulnerable locations such as barrier islands should be a signal for people to not invest in those areas because the risk is too high. In reality, offering market rate insurance in beautiful or convenient locations that people want to live in or develop has generally proven politically impossible (Knowles & Kunreuther, 2014; Strother, 2016).

Many reformers have focused their efforts on making insurance more widely available so as to encourage flood-resistant behavior (Kousky & Kunreuther, 2014). Even with government subsidies, flood insurance coverage rates are low. For example, Harris County, Texas, which includes the city of Houston, suffered flooding from Hurricane Harvey in 2017. The city is on average only 80 feet above sea level, but only 15% of homes had flood insurance before the storm (Walsh, 2017).

But what if insurance is not the solution? Cognitive and behavioral biases may lead some people to refrain from buying insurance. A preference for the status quo, a focus on the short term, and difficulties understanding probability and uncertainty may interfere with people's calculations about whether to buy insurance (Kunreuther & Michel-Kerjan, 2009; Leonard, Howitt, Kunreuther, & Useem, 2010). Studies show that people do not have a keen sense of the risks posed by floods in their area (Champ, Flores, Brown, & Chivers, 2002).

Critics of the National Flood Insurance Program point out that it offers no incentive for people to move from risky locations—it does the opposite, creating incentives for people to move to flood prone areas by subsidizing insurance in those areas, sometimes repeatedly (Ben-Shahar & Logue, 2016; Strother, 2016). The program lacks sufficient tools to improve community resilience by itself. Future reforms may engage public-private partnerships to promote flood insurance and expand the risk pool through reinsurance (Auerswald et al., 2006, Kunreuther & Michel-Kerjan, 2009). Talk of insurance reform should be placed into context, however. Insurance is not the equivalent of community resilience—it is merely a tool to incentivize people to adjust their behavior to reduce risk. So far, it has fallen short of expectations.

Multilevel Governance and Federalism

The authority of subnational governments and international organizations has grown in the early 20th century, leading to a concomitant growth in the literature on multilevel governance and federalism (Schakel, Hooghe, & Marks, 2015). Scholars of multilevel governance go beyond debates about centralization and decentralization to focus on how authority is distributed upward, downward, and outward (Hooghe & Marks, 2003; Schakel, Hooghe, & Marks, 2015). Scholars of American politics have concentrated on the growth of national authority and power over policy domains such as disaster management that were once left to states and localities (Davies, 2007; Higgs, 1987; Roberts, 2013). Even as the federal government's authority has grown in the United States, the intergovernmental paradox of emergency management remains: local governments are the most likely to suffer the effects of catastrophic disaster and the least likely to perceive the threat as a high priority because they have so many other responsibilities relative to their capacity (Cigler, 2006). States and the federal government have specialized expertise and extra capacity during a disaster, but there are limits to their authority to reduce the causes of disaster through land-use planning, zoning, and infrastructure without the participation of local governments.

After the devastation of Hurricane Katrina in 2005, some scholars alleged that federalism failed, by leaving New Orleans and Louisiana without sufficient support when they were overwhelmed by the storm (Birkland & Waterman, 2008). Federalism also failed to support sufficient planning to reduce hazards or protect vulnerable populations before the storm (Kapucu, Arslan, & Collins, 2010). A revisionist view of federalism's role in the tragedy pointed out that the city's evacuation went better than expected, with approximately 1.2 million people, 92% of the affected population, evacuated in a 40-hour period (Derthick, 2007; Roberts, 2013, pp. 127-145). Meanwhile, federal government agencies including the Coast Guard and Fish and Wildlife Service made heroic rescues. After numerous after-action reports, the consensus was that the federal government was good at responding to more routine disasters but that it responded too slowly to catastrophic impacts of Katrina.

Multilevel governance analyzes the ways in which authority is distributed beyond centralization and decentralization. Some forms of multilevel governance are regionally specific, such as mutual aid compacts, or federal-government-coordinated emergency management regions (Gerber & Robinson, 2009; Kapucu, Augustin, & Garayev, 2009; Roberts, 2008). The literature does not conclude which form of multilevel governance or degree of centralization is best (Schwarze et al., 2011). Instead, it contextualizes claims about how the location of authority shapes governance. The national and international level of government often has expertise, while lower levels of government have local knowledge and sometimes greater participatory processes. The local community level is

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also where disaster vulnerability and losses palpably occur (Donner & Rodríguez, 2008; Walker & Burningham, 2011).

The concept of governance includes actors outside of textbook definitions of government. Nonprofit and voluntary organizations, quasi-governmental organizations, and business play a more important role in recovery than the literature has so far accounted for (Simo & Bies, 2007). Smith and Birkland (2012, p. 153) find a “bias on the part of most policy makers to think of institutional actors as ‘official’ organizations,” rather than unofficial or voluntary organizations such as the “Cajun Navy” that took to bass boats to rescue hurricane victims in the Gulf Coast, or even private businesses that set up logistics chains before disaster strikes.

Improvisation and Emergent Phenomena

In states with strong civil societies, nonprofit organizations and voluntary groups carry much of the weight of response after disaster. A rich research program attempts to unpack the conditions for effective improvisation after disaster in the public and voluntary sectors (Edwards, 2008). A long-standing debate in the social sciences turns on whether organization happens spontaneously, such as Mandeville’s fable of the bees, or whether identifiable conditions such as the rule of law or stable institutions set the preconditions for seemingly spontaneous organizations. Hazards scholars have extended this debate to the study of what happens after disaster.

Before centralization of government functions in the United States, local organizations led response and recovery efforts. “When army (or beginning in the 1880s, Red Cross) representatives arrived on the scene of a disaster, they generally found ad hoc local or regional relief committees collecting funds and relief supplies, and performing recovery efforts,” Peter May writes (1985, p. 18). After the Civil War and Reconstruction, the United States settled the question of whether it was one country or many states in favor of being one country, while retaining elements of federalism. In 1900, the U.S. Congress chartered the Red Cross as a private, independent, and national organization to distribute central government relief dollars. The Red Cross initially provided funds for flood relief, most famously after the 1927 Mississippi River floods, and it responds to disasters into the 21st century (Woodruff, 1985).

The Red Cross was originally chartered in 1863 in Geneva, Switzerland, in order to care for wounded soldiers. In the 20th century, it engaged in response to fires, floods, and heatwaves throughout Europe through its country-based associations. In recent years it has increasingly been involved in disaster risk reduction, in addition to its responses to global humanitarian crises. The United States has a long-standing network of civil society organizations active in disaster relief, particularly faith-based groups such as the

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Salvation Army, Mennonites, Lutheran Disaster Response, and Catholic Charities, among others.

Some other countries have a shorter history of civil society activity and less of separation between civil society and the state, but that is changing. Aside from the United States, Russia and Japan (among others) have developed an increasingly active civil society involved in hazards management (Porfiriev, 2005). Disaster response systems in developed economies have had to consider this increasingly complex and decentralized hazards governance ecosystem. To take one example, in Japan after the 1995 Kobe earthquake, more than one million people volunteered to help disaster victims, and some of these people remained active in citizen-led disaster relief NGOs long after the event.

With the emergence of volunteers and NGOs active in disaster, government organizations have to figure out how to tap the resources of civil society effectively. Scholarship on improvisation criticizes excessively formal and bureaucratic approaches (Comfort & Kapucu, 2006; Neal & Phillips, 1995), finds that coordination is as important as technical skill (Shaw, 2003), and recommends that organizations be loosely coupled so as to be more responsive and less vulnerable (Perrow, 1984, 2011). Government itself may respond best when it sticks to routines (Schneider, 1992), but disaster response extends beyond government to include civil society.

Improvisation and emergent behavior occur as people create new organizations, norms, and behaviors in response to disasters (Drabek & McEntire, 2003). For example, after the 2011 Tohoku earthquake in Japan, citizens created new organizations to respond and a new norm: that citizens should bear responsibility for monitoring and reporting radiation levels (Schwartz, 2002). Successful improvisation requires physical and knowledge resources, and preexisting relationships (Kendra & Wachtendorf, 2003). Disaster management knowledge is best conceived of as a property of networks or groups of people who are connected, rather than of individuals or organizations alone (Majchrzak, Jarvenpaa, & Hollingshead, 2007; Roberts & Wernstedt, 2016). Thinking about knowledge as shared collectively over time helps to show why some groups can improvise in preparation and response.

One of the largest improvisational disaster responses was the waterborne evacuation of Manhattan following the September 11 attacks. Coast Guard ships, ferries, and private craft joined together to evacuate between 300,000 and 500,000 people to the outer boroughs and New Jersey in 10 hours following the attacks. People were not aware of what was happening, and they wanted to return home but could not make it across blocked bridges and tunnels. In addition to their personal connections and resources, Kendra and Wachtendorf (2016, p. 68) found that the mariners who improvised to stage this “American Dunkirk” shared important habits of mind. “The wise mariner develops habits of looking, thinking, and questioning, and exhibits the qualities of vigilance, skepticism, and doubt,” they wrote. Moreover,

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their professional lives are always on the edge of crisis, looking ahead to possible dangers, planning maneuvers far in advance, having an escape strategy for a dicey traffic situation, having a little extra speed in reserve, just in case. These habits, it turns out, are excellent preparation for disaster response. (p. 68)

Future work on improvisation and emergent organizations will likely explore habits of thinking, cognitive processes, and communication patterns among groups (Mendonça & Wallace, 2004B, 2007). Improvisation, like jazz music, relies on nonverbal cues and mutually understood timing and sequence to produce social behavior as miraculous and unexpected as the Manhattan evacuation (Mendonça & Wallace, 2004A). Improvising responses to natural hazards is a social function of individual thinking and acting in groups—a function on which hazards governance relies.

Future research may explore how to cultivate creativity and other habits of mind among emergency management, and how social media and digital technology can facilitate or inhibit creative problem solving. Research at the individual level will have to be combined with research at the organizational and network level. Exercises, training, and simulations have shown success in preparing managers for emergency situations, and future work can explore what kind of exercises work best for particular situations (Stern, 2013).

Conclusion

Scholarship on natural hazards has grown in number and scope along with the increasing sophistication of hazards professionals. In the mid-20th century, disaster preparation and recovery was a responsibility for ad hoc citizens committees or state and local experts who would swoop into a community after disaster (Rubin & Barbee, 1985). Now most localities have hazard mitigation plans and emergency managers who have access to electronic tools, a common language, and an emerging professional identity (Roberts, 2013, pp. 70–112). Coordination across levels of government remains an issue, and learning how to better coordinate with volunteers, the private sector, and quasi-governmental organizations without harming improvisation is at the leading edge of research.

Major disasters in wealthy states, such as Katrina in the United States or the Tohoku earthquake in Japan, focused attention on long-term recovery and hazard mitigation. Why was there so much devastation in wealthy, technologically advanced societies? As counties have grown, they have urbanized and built expensive structures in risky though often beautiful and convenient locations. Miami Beach offers exciting vacation possibilities, but its glitzy nightlife should not exist from a hazard mitigation perspective. The fragmentation of hazards governance makes coordinating across levels and entities difficult. The tradeoff between centralization and decentralization alone is too simple

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since hazards governance crosses so many overlapping areas of life and so many overlapping disciplinary perspectives.

The future of hazards governance scholarship lies in better understating how to manage risk and in integrating community level analysis with the societal level. Society is a broad term, but it is contextually dependent—for flood hazards, the relevant society may be a river basin or a nation's flood insurance program. For climate change, the relevant society is global.

Some nations have made progress in risk management. Experiments in Canada have attempted to measure risk across sectors by aggregating expert opinion since no one person or agency has an objective view of hazard risk (Chang et al., 2014). After New Zealand experienced two large earthquakes in 2010 and 2011, the government enacted a risk reduction framework into law that assisted local communities in developing risk management approaches, including a community-driven discussion about what level of risk the community is willing to take (New Zealand, 2015). Over the long term, governments will have to wrestle with how to approach hazards that are not simply the results of weather events but also reflect climate change, economic forces including development incentives and a search for continued growth in wealthy states, as well as economic inequality within states (Steinberg, 2001).

Comparative studies of hazards governance may shed light on pressing questions about how to approach these knotty issues (Christensen, Danieksen, Andreas, Lægreid, & Rykkja, 2016; McEntire & Mathis, 2007; Sylves & Waugh, 1996). What kinds of public engagement and participation lead to hazards reduction? How can decision makers elicit which tradeoffs the public is willing to make? And what parts of good governance are most relevant for managing natural hazards? Building on a relatively thin literature comparing different national and subnational approaches could shed light on these questions and provide ideas for how to prepare for the future.

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Notes:

(1.) We thank Richard Sylves for this point.

(2.) The DHS has grown to 240,000 employees, and FEMA has roughly 18,000. Calculations vary because of the difficulty of categorizing part-time positions and surge capacity employees. See online.

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